

NBER WORKING PAPER SERIES

THE GORDON GEKKO EFFECT:
THE ROLE OF CULTURE IN THE FINANCIAL INDUSTRY

Andrew W. Lo

Working Paper 21267
<http://www.nber.org/papers/w21267>

NATIONAL BUREAU OF ECONOMIC RESEARCH
1050 Massachusetts Avenue
Cambridge, MA 02138
June 2015

I thank Tobias Adrian, Bev Hirtle, and Antoine Martin for inviting me to discuss this topic, and Tobias Adrian, Jayna Cummings, Leigh Hafrey, Hamid Mehran, Joe Langsam, Adair Morse, Antoinette Schoar and participants at the October 2014 FAR meeting and the May 2015 Consortium for Systemic Risk Analytics meeting for helpful comments and suggestions. The views and opinions expressed in this article are those of the author only, and do not necessarily represent the views and opinions of any institution or agency, any of their affiliates or employees, or any of the individuals acknowledged above. The views expressed herein are those of the author and do not necessarily reflect the views of the National Bureau of Economic Research.

The author has disclosed a financial relationship of potential relevance for this research. Further information is available online at <http://www.nber.org/papers/w21267.ack>

NBER working papers are circulated for discussion and comment purposes. They have not been peer-reviewed or been subject to the review by the NBER Board of Directors that accompanies official NBER publications.

© 2015 by Andrew W. Lo. All rights reserved. Short sections of text, not to exceed two paragraphs, may be quoted without explicit permission provided that full credit, including © notice, is given to the source.

The Gordon Gekko Effect: The Role of Culture in the Financial Industry
Andrew W. Lo
NBER Working Paper No. 21267
June 2015
JEL No. G01,G28,G3,M14,Z1

ABSTRACT

Culture is a potent force in shaping individual and group behavior, yet it has received scant attention in the context of financial risk management and the recent financial crisis. I present a brief overview of the role of culture according to psychologists, sociologists, and economists, and then present a specific framework for analyzing culture in the context of financial practices and institutions in which three questions are answered: (1) What is culture?; (2) Does it matter?; and (3) Can it be changed? I illustrate the utility of this framework by applying it to five concrete situations—Long Term Capital Management; AIG Financial Products; Lehman Brothers and Repo 105; Société Générale’s rogue trader; and the SEC and the Madoff Ponzi scheme—and conclude with a proposal to change culture via “behavioral risk management.”

Andrew W. Lo
MIT Sloan School of Management
100 Main Street, E62-618
Cambridge, MA 02142
and NBER
alo@mit.edu

Table of Contents

1	Introduction.....	1
2	What Is Culture?.....	2
3	Values from the Top Down: Authority and Leadership	3
4	Values from the Bottom Up: Composition	6
5	Values from the Environment: Risk and Regulation	8
6	Values from Evolution: The Adaptive Markets Hypothesis.....	10
7	Examples from the Financial Industry	17
8	Regulatory Culture.....	22
9	The Role of Feedback Loops	25
10	Practical Implications for Regulators and Risk Managers	28
	References	33

1 Introduction

In the 1987 Oliver Stone film *Wall Street*, Michael Douglas delivered an Oscar-winning performance as master-of-the-universe Gordon Gekko. An unabashedly greedy corporate raider, Gekko delivered a frequently quoted monologue in which he eloquently describes the culture that has become a caricature of the financial industry:

The point is, ladies and gentleman, that greed, for lack of a better word, is good. Greed is right, greed works. Greed clarifies, cuts through, and captures the essence of the evolutionary spirit. Greed, in all of its forms; greed for life, for money, for love, knowledge has marked the upward surge of mankind. And greed, you mark my words, will not only save Teldar Paper, but that other malfunctioning corporation called the USA.

Despite the notoriety of this encomium to enlightened self interest, few people know that these words are based on an actual commencement speech, delivered by convicted insider trader Ivan Boesky in 1986, only eighteen months before his conviction, at what is now the Haas School of Business of the University of California at Berkeley.¹

Millions of people saw *Wall Street*, and Gekko's monologue became part of popular culture. Hundreds, perhaps thousands of young people were inspired to go into finance as a result of Douglas's performance. This dismayed the co-writer of the screenplay, Stanley Weiser, who wrote in 2008, at the height of the Financial Crisis, "A typical example would be a business executive or a younger studio development person spouting something that goes like this: 'The movie changed my life. Once I saw it I knew that I wanted to get into such and such business. I wanted to be like Gordon Gekko.' After so many encounters with Gekko admirers or wannabes, I wish I could go back and rewrite the greed line to this: 'Greed is Good. But I've never seen a Brinks truck pull up to a cemetery.'"²

What makes this phenomenon truly astonishing is that Gekko is not the hero of *Wall Street*—he is, in fact, the villain. Moreover, Gekko fails in his villainous plot thanks to his young protégé-turned-hero, Bud Fox. The man whose words Weiser put into the mouth of Gekko, Ivan Boesky, later served several years in a federal penitentiary for his wrongdoings. Nevertheless, many young people decided to base their career choices on the screen depiction of a fictional villain whose most famous lines were taken from the words of a convict. Culture matters.

¹ Greene (1986), Sterngold (1987).

² Weiser (2008).

This is a prime example of what I propose to call “the Gekko effect.” It is known that some cultural values are positively correlated to better economic outcomes, perhaps through the channel of mutual trust.³ Stronger corporate cultures (as self-reported in surveys) appear to have better performance than weaker cultures, through the channel of behavioral consistency, although this effect is diminished in a volatile environment.⁴ The Gekko effect highlights the fact that some corporate cultures may transmit negative values to their members in ways that make financial malfeasance significantly more probable. To understand these channels and formulate remedies, we have to start by asking what culture is, how it emerges, and how it is shaped and transmitted over time and across individuals and institutions.

2 What Is Culture?

What do we mean when we talk about corporate culture? There are quite literally hundreds of definitions of culture. In 1952 the anthropologists A.L. Kroeber and Clyde Kluckhohn listed 164 definitions that had been used in the field up to that time, and to this day we still do not have a singular definition of culture. This paper does not propose to solve that problem, but merely to find a working definition to describe a phenomenon. Kroeber and Kluckhohn settled on the following: “Culture consists of patterns, explicit and implicit, of and for behavior acquired and transmitted by symbols, constituting the distinctive achievements of human groups, including their embodiments in artifacts.”⁵ Embedded in this seemingly straightforward and intuitive definition is an important assumption that we shall revisit and challenge below—that culture is transmitted rather than innate—but will adopt temporarily for the sake of exposition and argument.

A corporate culture exists as a subset of a larger culture, with variations found specifically in that organization. Again, there are multiple definitions. The organizational theorists O’Reilly and Chatman define it as “a system of shared values that define what is important, and norms that define appropriate attitudes and behaviors for organizational members,”⁶ while Schein defines it in his classic text as “a pattern of shared basic assumptions that was learned by a group... that has worked well enough to be considered valid and, therefore, to be taught to new members as the correct way to perceive, think, and feel in relation to those problems.”⁷

³ For example, see Guiso, Sapienza and Zingales (2006).

⁴ Gordon and DiTomaso (1992), Sørensen (2002).

⁵ Kroeber and Kluckhohn (1952, p. 35).

⁶ O’Reilly and Chatman (1996, p. 166).

⁷ Schein (2004, p. 17).

The key point here is that the distinctive assumptions and values of a corporate or organizational culture define the group. They will be shared within the culture, and they will be taught as the correct norms of behavior to newcomers to the culture. People who lack these values and norms will not be members of the shared culture, even though they may occupy the appropriate position on the organizational chart. In fact, these outsiders may even be viewed as hostile to the values of the culture, a point to which we will return.

It is clear from these definitions that corporate culture propagates itself less like an economic phenomenon—with individuals attempting to maximize some quantity through their behavior—and more like a biological phenomenon, like the spread of an epidemic through a population. Gordon Gekko, then, is the “Patient Zero” of an epidemic of shared values (most of which are considered repugnant by larger society, including Gekko’s creator).

This biologically inspired model of corporate culture can be generalized further. Three factors will affect the transmission of a corporate culture through a group: its leadership, analogous to the primary source of an infection; its composition, analogous to a population at risk; and its environment, which shapes its response. The next sections will explore how the transmission of values conducive to corporate failure might occur, how such values emerge, and what can be done to change them.

3 Values from the Top Down: Authority and Leadership

Who maintains the values of a corporate culture? Economics tells us that people respond to incentives; therefore, phenomena such as tournament salaries and Wall Street bonuses are a natural and efficient way to increase a firm’s productivity, especially in a high-risk industry in which there is little prior way to establish the relative differences between individual performance. If a corporate culture appears “greedy” to the outside world, it is because the world does not understand the economic environment in which it operates.

The other social sciences offer a different perspective. A corporate culture directs its employees through authority—sometimes called “leadership” in the corporate world—as much as financial incentives, if not more so. The great German sociologist Max Weber broke down authority into three ideal types: the charismatic, who maintains legitimacy through force of personality; the traditional, who maintains legitimacy through established custom; and the legal-rational, whose legitimacy comes from shared agreement in the law.⁸ We can see that

⁸ Kronman (1983, pp. 43–50).

Gordon Gekko is almost a pure example of Weber's charismatic authority; however, at this point, the style of authority is less important than the fact of authority.

According to Herbert A. Simon's classic analysis of administrative behavior, a person in authority establishes the proper conduct for subordinates through positive and negative social sanctions.⁹ Social approval or disapproval, praise or embarrassment, may be the most important factor to induce the acceptance of authority. Also important is the sense of shared purpose, in the military sometimes called *esprit de corps*. People with a sense of purpose are more likely to subordinate themselves to authority, in the belief that their subordination will aid the goals of their purpose.

How much economic incentive is needed for an authority figure to influence the members of a culture into bad outcomes? Experimental social psychology gives us a rather disturbing answer. In the infamous Milgram experiment, originally conducted at Yale by the psychologist Stanley Milgram in 1961, volunteers administered what they believed were high-voltage electric shocks to a human experimental subject, simply because a temporary authority figure made verbal suggestions to continue.¹⁰ Of these scripted suggestions, "You have no other choice, you must go on," was the most forceful. If a volunteer still refused at that point, the experiment was stopped. Twenty-six out of forty people administered what they believed was a dangerous, perhaps fatal, 450-volt shock to a fellow human being, even though all expressed doubts verbally, and many exhibited obvious physiological manifestations of stress, three of them even experiencing what appeared to be seizures. One businessman volunteer "was reduced to a twitching, stuttering wreck, who was rapidly approaching a point of nervous collapse... yet he continued to respond to every word of the experimenter, and obeyed to the end." Milgram's volunteers were paid four dollars plus carfare, worth about \$50 today.

Even more notorious is the Stanford prison experiment, conducted by the Stanford psychologist Philip Zimbardo in 1971, which randomly assigned volunteers to the roles of guards and prisoners inside the basement of the Stanford psychology department building for a two-week experiment.¹¹ Almost immediately after the experiment began, the "guards" started to behave in a dehumanizing way towards the "prisoners," subjecting them to verbal harassment, forced exercise, manipulation of sleeping conditions, manipulation of bathroom privileges (some of it physically filthy), and the use of nudity to humiliate the "prisoners." Zimbardo, who played the role of prison superintendent, terminated the experiment after only six days, at the urging of his

⁹ Simon (1997, pp. 184–185).

¹⁰ Milgram (1963).

¹¹ Haney, Banks, and Zimbardo (1973a, b).

future wife, Christina Maslach, whom he had brought in as an outsider to conduct interviews with the subjects.¹² Zimbardo paid his subjects fifteen dollars a day, roughly \$90 per diem in today's dollars.

It should be obvious that monetary incentives are completely insufficient to explain the behavior of these volunteers. In Milgram's experiment, the majority of subjects submitted themselves to the verbal demands of an authority, despite the severe mental stress inflicted by these tasks. In Zimbardo's experiment, volunteers threw themselves into the role of guards with gusto, with Zimbardo himself playing the role of the superintendent willing to overlook systemic abuses. In each case, the volunteers fulfilled the roles which they believed were expected of them by the authority.

Leadership is important in harnessing the behavior of a corporation's employees to become more productive and competitive. Unfortunately, as Milgram and Zimbardo have demonstrated, the same factors that allow leadership to manifest itself through performance and teamwork, also allow it to promote goals without a moral, ethical, legal, profitable, or even rational basis. Remember that 65% of Milgram's experimental subjects were compelled to keep administering electric shocks merely by verbal expressions of disapproval by the authority figure.

In corporate cultures that lack the capacity to incorporate an outside opinion, the primary check on behavior is the authority. From within a corporate culture, an authority may see his or her role as similar to the conductor of an orchestra, managing a group of highly trained professionals in pursuit of a lofty goal. From a viewpoint outside the culture, however, they may be cultivating the moral equivalent of a gang of brutes, as did Zimbardo himself in his role as mock prison superintendent. It took a trusted outsider to see the Stanford prison experiment with clear eyes, and to convince Zimbardo that his experiment was in fact an unethical degradation of his test subjects.

Finally, even if the authority has an excellent track record, Robert Shiller has pointed out there is a subtle form of moral hazard associated with this excellence: if "people have learned that when experts tell them something is all right, it probably is, even if it does not seem so... Thus the results of Milgram's experiment can also be interpreted as springing from people's past learning about the reliability of authorities."¹³

¹² Additional details from the Stanford Prison Experiment website, <http://www.prisonexp.org>.

¹³ Shiller (2005, p. 159).

4 Values from the Bottom Up: Composition

Not all of corporate culture is created from the top down. A culture is also composed of the behavior of the people within it, from the bottom up. Corporate culture is subject to compositional effects, based on the values and the behaviors of the people it hires, even as corporate authority attempts to inculcate its preferred values and behaviors into its employees.

The pool of possible corporate employees today is wide and diverse. Firms and industries draw from this pool with a particular employee profile in mind, often filtering out other qualified candidates. However, this filter may shape the corporate culture in unexpected ways. In the late 1990s, the anthropologist Karen Ho conducted an ethnographic survey of Wall Street investment banks. Beginning in the 1980s, the era of Oliver Stone's *Wall Street*, these firms deliberately targeted recent graduates of elite schools, in particular Harvard and Princeton, appealing to their intellectual vanity: "the best and the brightest." These recruits brought their social norms and values with them to Wall Street.¹⁴ As newer hires were promoted, and older members departed, a new norm of behavior developed within investment bank culture through population change. Knowledge of the older Wall Street culture faded and became secondhand, while Michael Lewis's memoir about graduating from Princeton to work at Salomon Brothers, *Liar's Poker*, became a manifesto for this new elite.¹⁵ Even the drawbacks of a Wall Street job could confirm the values of an elite worldview. Ho found that her informants rationalized Wall Street job insecurity as normative, since the insecurity revealed "who is flexible and who can accept change."¹⁶ The historically high levels of Wall Street compensation were, in her informants' view, the natural reward for members of the elite assuming the personal risk of losing their job.

Corporations deliberately choose employees with attributes its leadership believes are useful to the corporation. To borrow a biological metaphor, the hiring process is a form of artificial selection from a population with a great deal of variation in personality type, worldview, and other individual traits. All else being equal, employees with traits that better fit the corporate culture will do better in the corporation, since they are already adapted to the particular corporate environment. This leads to a feedback loop reinforcing the corporate culture's values. Employees who do not fit this profile find themselves under social pressure to adapt or leave the organization. This process of selection and adaptation leads to stronger corporate cultures, which are correlated to stronger performance. However, there are times when a corporation

¹⁴ Ho (2009, pp. 39–66).

¹⁵ Ho (2009, p. 337).

¹⁶ Ho (2009, p. 274).

benefits from a diversity of viewpoints. The innovator, the whistleblower, the contrarian, and the devil's advocate all have necessary roles in the modern corporation, especially in a shifting economic environment. A human resources manager, then, faces much the same dilemma as a portfolio manager.

Many corporations deliberately hire "self-starters" or "go-getters," people with aggressive or risk-taking personalities who are thought to have a competitive nature, which (so goes the belief) will lead to higher profits for the firm. This personality type is drawn to what the sociologist Stephen Lyng has described as "edgework."¹⁷ Lyng takes this term from the writings of the gonzo journalist Hunter S. Thompson to describe the pleasurable form of voluntary risk-taking sometimes found in adventure sports such as skydiving, or in hazardous occupations such as test piloting. In these fields, the individual is put at severe risk, but the risk is made pleasurable through a sense of satisfaction in one's superior abilities to navigate such dangerous waters. This naturally extends to the financial industry, and in fact the sociologist Charles W. Smith recently used the concept of edgework to compare the financial market trader to the sea kayaker.¹⁸

Edgeworkers normally think of themselves as ferociously independent. Nevertheless, Lyng has found that success in the face of risk reinforces a sense of group solidarity and belonging to an elite culture between edgeworkers, even across professions. But this sense of solidarity extends only to fellow edgeworkers, which puts them at odds with the larger culture. In a corporation, this can lead to a split between a trading desk, or even upper management, and the rest of the corporate culture. For example, the organizational theorist Zur Shapira conducted surveys of fifty American and Israeli executives, and found that, even though many urged their subordinates to maintain risk-averse behavior, they themselves took greater risks, taking active enjoyment in succeeding in the face of those risks. One company president still viewed himself as an edgeworker, telling Shapira, "Satisfaction from success is directly related to the degree of risk taken."¹⁹ For a new hire who patterns job behavior on an authority figure within the firm, this may be a case of "Do as I say, not as I do."

Group composition may lead to differences that cannot be explained by culture alone. An individual's temperament and personality are largely internal in origin, and are difficult to change. Some traits, such as the propensity for risk-taking, may have deeper causes. For example, it has long been documented that younger men are more prone to dangerous activities

¹⁷ Lyng (1990).

¹⁸ Smith (2005).

¹⁹ Shapira (1995, p. 58).

than older men or women of the same age, in behaviors ranging from automobile accidents to homicide.²⁰ There may be a neuroscientific reason for this difference in the development of the adolescent brain.²¹ These differences are by definition not cultural: they can neither be learned nor transmitted symbolically. Yet these differences affect the highest levels of human behavior.

Nevertheless, culture is still powerful even in the face of intrinsic behavioral variation. To take the most dramatic example, consider risk-taking behavior, which has known physiological and neurological correlates. Insurance companies use automobile fatalities as a proxy to measure risk-taking behavior between groups. However, there has been an absolute decline in automobile fatalities in the U.S. over the last forty years, despite a vast increase in the number of drivers and miles traveled. This decline was caused by changes in culture: in material culture, such as advances in the design of automobiles and highways; in regulatory culture, such as appropriate speed limit enforcement; and in social culture, such as the stigmatization of driving under the influence of alcohol. The same innate propensity for risk is as present today as it was in 1975, but the culture at large changed to limit its negative effects on the highway.

5 Values from the Environment: Risk and Regulation

The third factor to influence a corporate culture is its environment. Competition, economic climate, regulatory requirement—the list of possible environmental factors to affect corporate culture may seem bewilderingly complex. However, the anthropologist Mary Douglas made the elegant observation that a culture’s values are reflected in how it manages risk, which in turn reflects how the culture perceives its environment.²² No culture has the resources to eliminate all risk; therefore, a culture ranks its dangers according to what it finds most important, both positively and negatively. This prioritization acts like a snapshot of the culture’s operating environment, just as an insurance portfolio may act like a snapshot of the policyholder’s day-to-day environment. It is important to note that a culture’s ranking of danger may have little to do with the mathematical probability of an event. As a modern example, Douglas looked at the expansion of legal liability in the United States and its role in the insurance crisis of the 1970s. The underlying probability of medical malpractice or illness from toxic waste changed very little over that period. In Douglas’s analysis, what changed was how society chose to respond to those dangers, due to a change in cultural values.

²⁰ Wilson and Daly (1985).

²¹ For example, see Steinberg (2008).

²² Douglas and Wildavsky (1982).

Cultures warn against some dangers but downplay others in order to reinforce their internal cultural values. For example, sociologist Sudhir Venkatesh finds that in “Maquis Park,” a poor African-American neighborhood in Chicago, risk-taking behavior is leaving the established network of formal and informal business relationships that define the community, rather than experiencing the Knightian uncertainty of establishing new connections with few resources in the hostile environment of greater Chicago.²³ Despite its high crime rate, the culture of Maquis Park is risk-averse. Criminal behavior there is often an application of economic rationalism and cost-benefit analysis in the face of limited options, rather than an expression of a higher tendency to take risks.

Douglas’s idea that the values of a culture are reflected in how they prioritize risk has immediate application in understanding differences in corporate behavior. For example, compare risk-taking in the insurance industry versus the banking industry. The insurance industry is culturally more conservative precisely because a significant portion of its revenues is determined by state regulation—insurers make money by protecting their downside, i.e., through careful risk management. In the banking industry, however, revenues are variable, and in many cases, directly related to size and leverage; therefore, risk-taking is much more flexible and encouraged.

According to Douglas, modern cultures fall into three ideal types: the hierarchical, which includes the bureaucratic tendencies of government, but also of the large corporation; the individualistic, the world of the market, the entrepreneur, and classic utility theory; and the sectarian, the world of the outsider, the interest group, and the religious sect. These cultures have predictable ways in which they interact with one another. The United States is obviously multicultural, but its central institutions are largely hierarchical or individualistic, while its population is largely sectarian. Each type of culture has a distinctive response to danger—a re-emphasis of the importance of the hierarchy, the individual, or the sect—which it uses to reinforce the values of the culture, often at the expense of competing views.

This cultural immune system has important implications, not only for managers, but also for regulators. To borrow Douglas’s distinction, the central cultures of the financial world find it very easy to ignore voices from the border, whether they are radicalized protestors in the streets, regulators from a government agency, or a dissenting opinion from within the financial community. Regulators are not immune to this defense mechanism, whether they are federal agencies, professional standard organizations, or law enforcement. In fact, the sanctions taken against a whistleblower in a regulatory organization may be much harsher than those taken in a

²³ Venkatesh (2006, pp. 148–150).

corporation, because the whistleblower diminishes the regulator's legitimacy, the source of its legal-rational authority over others.

A corporate culture may defend itself so strongly that, despite almost everyone's dissatisfaction with the status quo, it may find itself unable to change its norms of behavior. This is not an exaggeration. In the 1990s, the organizational theorist John Weeks conducted an ethnographic survey of a large British bank, "British Armstrong," in which he found precisely that pattern of behavior.²⁴ Prevailing corporate cultural values in "BritArm" were used to diminish or discount criticism. For example, BritArm prided itself on its discretion, which meant that complaints had to be made obliquely, and were therefore easily ignored. However, employees who made blunt or outspoken criticisms were viewed as outsiders who lacked BritArm's cultural values, and were also ignored as part of the culture's immune response. An acceptable level of complaint, in fact, became a new norm among BritArm's employees, part of their corporate cultural identity. As Weeks explains, "Complaining about a culture in the culturally acceptable ways should not be seen as an act of opposition to that culture. Rather, it is a cultural form that... has the effect of enacting the very culture that it ostensibly criticizes."²⁵

6 Values from Evolution: The Adaptive Markets Hypothesis

If corporate culture is shaped from the top down, from the bottom up, and through its environment, the natural follow-on question to ask next is how? A corporation's leadership may exert its authority to establish norms of behavior within the firm, but a corporation's employees bring their preexisting values to the workplace, and all of the actors in this drama have some resistance to cultural sway for non-cultural, internal reasons. None of them are perfectly malleable individuals waiting to be molded by external forces. This resistance has never stopped corporate authority from trying, however. Notoriously, Henry Ford employed hundreds of investigators in his company's Sociological Department to monitor the private lives of his employees, to ensure they followed his preferred standard of behavior inside the factory and out.²⁶ The success or failure of such efforts depends critically on understanding the broader framework in which culture emerges and evolves over time and across circumstances.

Determining the origin of culture, ethics, and morality may seem to be a hopeless task more suited to philosophers than economists. But there has been surprising progress from anthropology, evolutionary biology, psychology, and the cognitive neurosciences that has

²⁴ Weeks (2004).

²⁵ Weeks (2004, p. 12).

²⁶ Snow (2013).

important implications for economic theories of culture. For example, evolutionary biologists have shown that cultural norms such as altruism, fairness, reciprocity, charity, and cooperation can lead to advantages in survival and reproductive success among individuals in certain settings.²⁷ E. O. Wilson has argued even more forcefully, when he coined the term “sociobiology” in the 1970s, that social conventions and interactions are, in fact, the product of evolution. More recent observational and experimental evidence from other animal species such as our close cousins, the chimpanzees, has confirmed the commonality of certain cultural norms, suggesting that they are adaptive traits passed down across many generations and species. A concrete illustration is the notion of fairness, a seemingly innate moral compass that exists in children as young as 15 months as well as in chimpanzees.²⁸

In financial economics, this evolutionary perspective has a more direct instantiation in the Adaptive Markets Hypothesis,²⁹ an alternative to the Efficient Markets Hypothesis in which financial market dynamics are the result of a population of individuals competing for scarce resources and adapting to past and current environments. The Adaptive Markets Hypothesis recognizes that competition, adaptation, and selection occur at multiple levels—from the subtle methylation of sequences in an individual’s DNA to the transmission of cultural traits from one generation to the next—and they can occur simultaneously, each level operating at speeds dictated by specific environmental forces. To understand what individuals value, and how they will behave in various contexts, we have to understand how they interacted with the environments in their past.

The Adaptive Markets Hypothesis explains why analogies to biological reasoning are often effective in the social sciences. Darwinian evolution is not the same process as cultural evolution, but they occur under similar constraints of selection and differential survival. As a result, one can fruitfully use biological analogies, as well as biology itself, to explain aspects of culture, even of corporate culture, which did not exist until the late nineteenth and early twentieth centuries. These explanations fall into two categories: explanations of individual behavior by itself, and explanations of the interactions between individuals that lead to group dynamics.

At the level of the individual, recent research in the cognitive neurosciences has provided refined insights into the nature of moral and ethical judgments, showing that these judgments

²⁷ See, for example, Hamilton (1964), Trivers (1971), and Nowak and Highfield (2011).

²⁸ See Burns and Sommerville (2014) for recent experimental evidence of fairness with 15-month-old infants, and de Waal (2006) for similar experimental evidence for capuchin monkeys and chimpanzees.

²⁹ Lo (2004, 2013).

arise from one of two possible neural mechanisms: one instinctive, immediate, and based on emotion; and the other more deliberative, measured, and based on logic and reasoning.³⁰ The former is fast, virtually impossible to override, and relatively inflexible, while the latter is slow, much more nuanced, and highly adaptive. This “dual-process theory” of moral and ethical decision making—which is supported by a growing body of detailed neuroimaging experimental evidence—speaks directly to the question at hand of the origin of culture. At this level, culture is the amalgamation of hardwired responses embedded in our neural circuitry, much of which is innate and cannot easily be reprogrammed, and more detailed analysis and complex behaviors that are path- and life-history-dependent, which *can* be reprogrammed (slowly) and are more in tune with our social environment.

Apart from its pure scientific value, the dual-process theory has several important practical implications. Current efforts to shape culture may be placing too much emphasis on the analytical process, while ignoring the less malleable and, therefore, more persistent innate process. Therefore, a deeper understanding of this innate process is essential to answering questions about whether and how culture can be changed. One starting point is the work of social psychologist Jonathan Haidt, who proposed five moral dimensions that are innately determined and whose relative weightings yield distinct cultural mores and value systems: harm vs. care, fairness vs. cheating, loyalty vs. betrayal, authority vs. subversion, and purity vs. degradation.³¹ Since the relative importance of these moral dimensions is innately determined, they naturally vary in the population along with hair color, height, and other traits.

Haidt and his colleagues discovered that, far from being distributed in a uniformly random way across the population, these traits had strong correlations to political beliefs (see Figure 1).³² For example, people in the United States who identified themselves as liberal believed that questions of harm/care and fairness/cheating were almost always relevant to making moral decisions. The other three moral foundations Haidt identified—loyalty/betrayal, authority/subversion, and purity/degradation—were much less important to liberals. However, those who identified themselves as conservative believed that all five moral foundations were equally important, although none were given as high a level of importance as liberals gave to fairness/cheating or harm/care. These innate traits had predisposed people to sort themselves into different political factions.

³⁰ Greene (2014).

³¹ Haidt (2007). In more recent writings, Haidt has added a sixth dimension: liberty vs. oppression.

³² Graham, Haidt, and Nosek (2009) and Iyer et al. (2012).

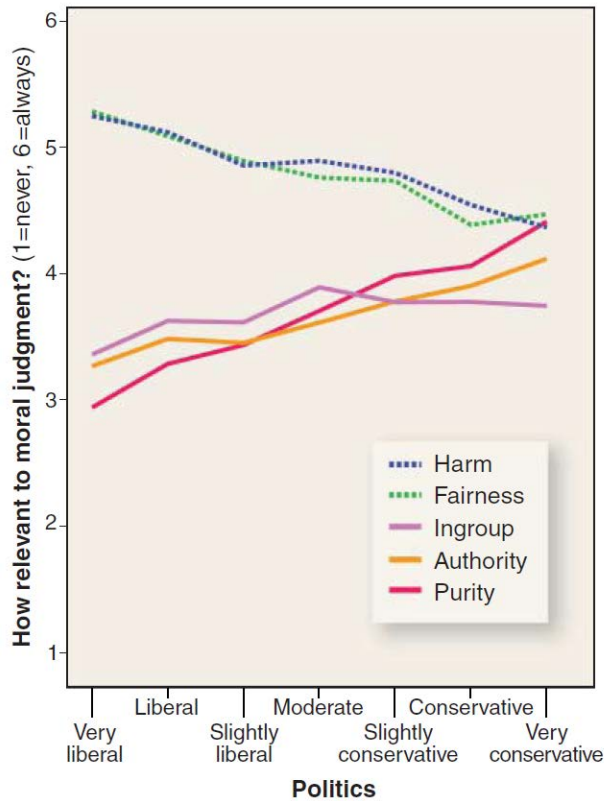


Figure 1. The importance of Haidt’s five moral dimensions among individuals of various political views. Source: Haidt (2007, Figure 1).

It takes little imagination to see this sorting process at work across professions. Someone who believes that fairness is the highest moral value will want to choose a vocation where they can exert this value, perhaps as a public defender, a teacher of underprivileged children, or a sports referee. Those who believe, instead, that fairness is an unimportant value might find themselves drawn to the prosecutorial side of the law, or high-pressure sales, or indeed, Gordon Gekko’s caricature of predatory finance. This is not to say that everyone in those professions **shares** those values, of course, but rather that individuals with those values may find such professions more congenial—a form of natural selection bias—and will, therefore, eventually be statistically over-represented in that subpopulation.

At the same time that evolution shapes individual behavior, it also acts on how individuals relate to one another. From these interactions ultimately emerges the collective behavior that we call “culture.” Many forms of group behavior have been conceptually difficult for classical evolutionary theory to explain, since it is primarily a theory centered on the reproductive

success of the individual, or even more reductively, of the gene. Some recent research in evolutionary biology has even revived the controversial notion of “group selection,”³³ in which groups are the targets of natural selection, not just individuals or genes. Although many evolutionary biologists have rejected this idea,³⁴ arguing that selection can only occur at the level of the gene, an application of the Adaptive Markets Hypothesis can reconcile this controversy, and also provide an explanation for the origins of culture.

The key insight is that natural selection can sometimes produce individual behavior that appears to be coordinated within specific groups, but is simply the result of certain common factors in the environment—“systematic risk” in financial economic terminology—that impose a common threat to a particular subset of individuals. In such cases, a standard application of natural selection to individuals can produce behaviors that may seem like the result of group selection, but are, in fact, merely a reflection of systematic risk in the environment.³⁵

For example, consider the extraordinary behavior of Ross McGinnis, a 19-year-old machine-gunner in the U.S. Army during the Iraq war who sacrificed himself when a fragmentation grenade was tossed into a Humvee vehicle during a routine patrol in Baghdad on December 4, 2006. He reacted immediately by yelling “grenade” to alert the others, and then pushed his back onto the grenade, pinning it to the Humvee’s radio mount, and absorbing the impact of the explosion with his body, saving the lives of his four crewmates.³⁶

Although this was a remarkable act of bravery and sacrifice, it is not an isolated incident. Acts of bravery and sacrifice have always been part of the military tradition, as documented by the medals and other honors awarded to our heroes. Part of the explanation may be selection bias—the military may simply attract a larger proportion of altruistic individuals.

However, a more direct explanation may be that altruistic behavior is produced by natural selection operating in the face of military conflict. Put another way, selfish behavior on the battlefield is a recipe for defeat, and over time and across many similar circumstances, our military has learned this lesson. On the other hand, altruistic behavior confers survival benefits for the population on the battlefield, even if it does not benefit the individual. Accordingly, military training instills these values in individuals—through bonding exercises like boot camp, stories of heroism passed down from seasoned veterans to new recruits, and medals and honors

³³ Nowak, Tarnita, and Wilson (2010).

³⁴ Abbot et al. (2011).

³⁵ Zhang, Brennan, and Lo (2014).

³⁶ <http://www.army.mil/medalofhonor/mcginnis/profile/> (accessed March 20, 2015).

for courageous acts—so as to increase the likelihood of success for the entire troop. Military culture is the evolutionary product of the environment of war.

Now consider an entirely different environment; imagine a live grenade being tossed into a New York City subway car. Would we expect any of the passengers to behave in a manner similar to Ross McGinnis in Baghdad? Context matters. And culture is shaped by context, as Milgram and Zimbardo discovered in their experiments with ordinary subjects placed in extraordinary contexts (see Section 3).

Context matters not only on the battlefield, but also in the financial industry. Recently, Cohn, Fehr, and Maréchal (2014) documented the impact of context on financial culture in an experiment involving 128 human subjects recruited from a large international bank. These subjects were asked to engage in an exercise that measured their honesty, using a simple coin-tossing exercise in which self-reported outcomes determined whether they would receive a cash prize. Prior to this exercise, subjects were split into two groups, one in which the participants were asked seven questions pertaining to their banking jobs, and the other in which the participants were asked seven non-banking-related questions. By bringing the banking industry to the forefront of the subjects' minds just prior to the exercise, the authors induced the subjects to apply the cultural standards of that industry to the task at hand. The subjects in the former group showed significantly more dishonest behavior than the subjects in the latter group, who exhibited the same level of honesty as participants from non-banking industries. The authors concluded that "the prevailing business culture in the banking industry weakens and undermines the honesty norm, implying that measures to re-establish an honest culture are very important."³⁷

Two recent empirical studies of fraud provide additional support for the impact of context on financial culture. Dyck, Morse, and Zingales (2013) used historical data on securities class action lawsuits to estimate the incidence of fraud from 1996 to 2004 in U.S. publicly traded companies with at least \$750 million in market capitalization. They document an increasing amount of fraud as the stock market rose, which eventually declined in the wake of the bursting of the Internet Bubble in 2001–2002 (see Figure 2). This interesting pattern suggests that the business environment may be related to changes in corporate culture that involve fraudulent activity and corporate risk-taking behavior. Deason, Rajgopal, and Waymire (2015) found a similar pattern in the number of Ponzi schemes prosecuted by the U.S. Securities and Exchange Commission (SEC) between 1988 and 2012 (see Figure 3): an upward trend during the bull market of the late 1990s, a decline in the aftermath of the Internet Bust of 2001–2002, and

³⁷ Cohn, Fehr, and Maréchal (2014, p. 86).

another increase as the market climbed, until the Financial Crisis and the subsequent stock market decline between 2008 and 2009, after which the number of Ponzi schemes declines sharply. In fact, Deason, Rajgopal, and Waymire estimate a correlation of 47.9% between the S&P 500 quarterly return and the number of SEC-prosecuted Ponzi schemes per quarter, which they attribute to several factors: Ponzi schemes are harder to sustain in declining markets; SEC enforcement budgets tend to increase after bubbles burst; and there may be more demand for enforcement by politicians and the public. They also found that Ponzi schemes are more likely when there is some affinity link between the perpetrator and the victim, such as a common religious background or shared membership in an ethnic group, or when the victim group tends to place more trust in others (e.g., senior citizens), reminding us that culture can also be exploited maliciously.

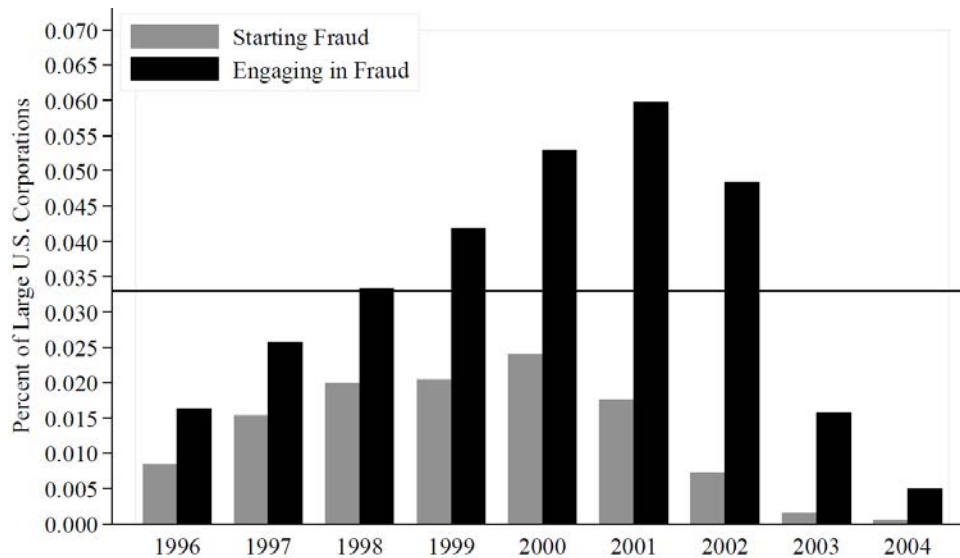


Figure 2. Dyck, Morse, and Zingales's (2013, Figure 1) estimates of the percentage of large corporations starting and engaging in fraud, from 1996 to 2004.

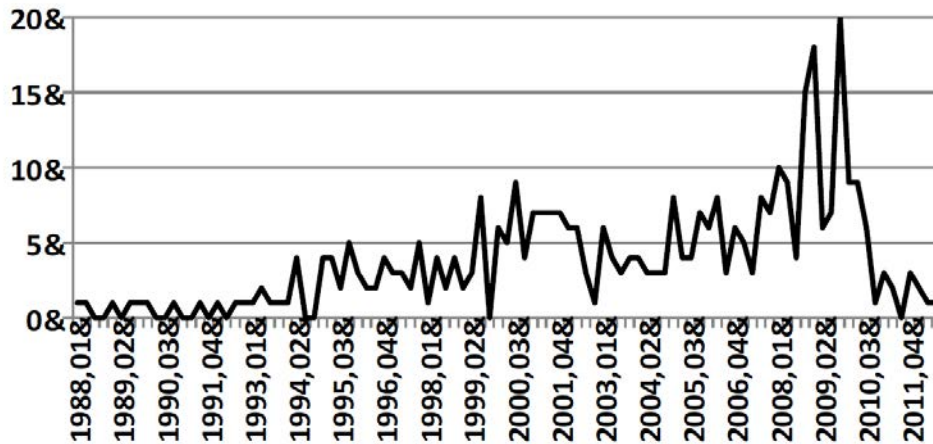


Figure 3. Frequency of SEC-prosecuted Ponzi schemes by calendar quarter from 1988 to 2012. Source: Deason, Rajgopal, and Waymire (2015, Figure 1).

These two studies confirm what many already knew instinctively: culture is very much a product of the environment, and as environments change, so too does culture. Therefore, if we wish to change culture, we must first understand the forces that shape it over time and across circumstances. This broader contextual, environmental framework—informed by psychology, evolutionary theory, and neuroscience, and quantified through metrics and empirical measurement—will play a key role in Section 10 when we consider what can be done about culture from a practical perspective.

7 Examples from the Financial Industry

Moving from the general to the specific, several recent financial debacles demonstrate the role of corporate culture in financial failure. Let us start with a control case, the fall of Long-Term Capital Management (LTCM). In organizational theorist Charles Perrow’s terminology, its collapse was a “normal accident.”³⁸ That is, it was caused by a combination of “tight coupling” in the engineering sense—in which the execution of one process depends critically on the successful completion of another—and complex interactions within the financial system. To summarize a well-known story very briefly, LTCM’s sophisticated models were caught off-guard by the aftermath of Russia’s default on its GKO bonds on August 17, 1998, triggering a

³⁸ Perrow (1999).

short and vicious cycle of losses and flights to liquidity, and ultimately leading to its bailout on September 23, 1998.³⁹

On paper, LTCM's corporate culture was excellent. Its composition was elite: founded by John Meriwether, the former head of bond trading at Salomon Brothers, and future Nobelists Robert C. Merton and Myron Scholes. Its culture was individualistic, as many trading groups are, but it derived its authority from a legal-rational basis, the superiority of its mathematics. Its corporate culture played little direct role in its failure. In fact, with much of their personal fortunes invested in the business, LTCM's managing partners were perfectly aligned with their investors. Not a single client has sued them for inappropriate behavior. Not a single regulator has cited them for violations of any sort.

However, Wall Street's corporate culture was apparently caught off-guard by LTCM's predicament. It had perceived LTCM to be a paragon of Wall Street's highest values—a combination of intelligence, market savvy, and ambition that was sure to succeed—when a more accurate assessment of LTCM might have been as a cutting-edge experimental engineering firm. Their creditors notoriously gave LTCM virtually no “haircut” on their loans, on the assumption that their trades were essentially risk-free. In addition to these very low (or even zero) margin requirements, LTCM was able to negotiate other favorable credit enhancements with its counterparties, including two-way collateral requirements, rehypothecation rights, and high thresholds for loss.⁴⁰ These were often made on the strength of their reputation, rather than detailed examination of LTCM's methods. Daniel Napoli, then Merrill Lynch's head of risk management, was quoted as saying, “We had no idea they would have trouble—these people were known for risk management. They had taught it; they *designed* it [emphasis in original].”⁴¹ (Napoli himself lost his position shortly after LTCM's collapse.) LTCM's failure may be viewed as akin to the failure of a bridge whose materials were exposed to an unfamiliar stress, but the behavior of LTCM's creditors is more likely a failure of their corporate culture.

Corporate cultures can be overconfident in their abilities to assess risk. This can be seen in the fall of the large multinational insurer, American International Group (AIG), in 2008. Under its original chairman, Maurice “Hank” Greenberg, AIG was run not merely hierarchically, but

³⁹ See, for example, GAO (1999, pp. 38–45).

⁴⁰ GAO (1999, p. 42).

⁴¹ Lowenstein (2000, p. 179).

almost feudally, with reciprocal chains of loyalty and obligation centered on Greenberg.⁴² In fact, Greenberg had structured AIG's compensation plan deliberately to promote lifetime loyalty to the firm. Greenberg was, in Weberian terms, a charismatic authority, overseeing each division of his large multinational organization personally. In particular, in regular questioning sessions Greenberg demanded to know exactly what risks each unit of AIG was taking, and what measures were being used to reduce them. Many observers ascribed AIG's continued growth to AIG's excellent practice in insurance underwriting, closely monitored by Greenberg.

However, the "headline risk" of Greenberg's possible role in financial irregularities caused AIG's board of directors to replace him with Martin Sullivan in early 2005. Sullivan had risen through the ranks of AIG, originally starting as a teenage office assistant. Sullivan assumed that AIG's vigorous culture of risk management would maintain itself without Greenberg at the helm. Meanwhile, Joseph Cassano, the head of AIG's Financial Products (AIGFP) unit, had a working relationship with Greenberg that did not transfer to Sullivan. Cassano's conduct grew more aggressive without Greenberg's check on his behavior.⁴³

AIGFP's portfolio contained billions of dollars of credit default swaps on "toxic" collateralized debt obligations. This was not the only toxic item on AIG's balance sheet, which also had significant problems in its securities lending program. However, it was the largest, and it created the most visible effects during the financially dangerous autumn of 2008. While AIGFP's first sales of credit default swaps on collateralized debt obligations began in 2004, during Greenberg's tenure, they accelerated into 2005, before executives within AIGFP convinced Cassano about declining standards in the subprime mortgage market. AIGFP's final sale of credit default swaps took place in early 2006, leaving a multibillion-dollar time bomb on its balance sheet. Cassano defended his actions in an increasingly adverse environment until his ouster from AIG in early 2008.⁴⁴

It is probably too easy to ascribe AIGFP's extended period of credit default swap sales to Greenberg's departure. As noted, Cassano's unit began selling credit default swaps well before Greenberg's exit. However, Robert Shiller's insight into the Milgram experiment is pertinent here. Greenberg's culture of risk management, which was accompanied by consistently high growth in the traditionally low-growth insurance industry, led Cassano and Sullivan to believe that AIG's risk management procedures were consistently reliable in conditions where they

⁴² Boyd (2011) and Shelp and Ehrbar (2009) provide two viewpoints of AIG's culture from which a triangulation can be made.

⁴³ Boyd (2011, p. 161).

⁴⁴ Boyd (2011, pp. 258–262).

were not. Paradoxically, the moral hazard of past success may have led AIG to make much riskier investments than a company with a poorer track record of risk management.

Some corporate cultures actively conceal their flaws and irregularities, not only from the public or from regulators, but also from others within the corporation itself, because of the risk that this knowledge might undermine their position. For example, let us look at Lehman Brothers' use of the so-called "Repo 105" accounting trick.⁴⁵ Briefly, this was a repo, or repurchase agreement, valued at \$1.05 for every dollar, which was designed to look like a sale. Lehman Brothers paid more than five cents on the dollar to temporarily pay down the liabilities on its balance sheet before it repurchased the asset. Lehman Brothers used this accounting trick in amounts totaling \$50 billion in late 2007 and 2008 to give the firm a greater appearance of financial health—which of course was ultimately a failure.

Was this tactic legal? No American law firm would agree to endorse this practice, so Lehman Brothers engaged in regulatory arbitrage, and found a distinguished British law firm, Linklaters, willing to give the practice its imprimatur. Linklater's endorsement of Repo 105 was kept secret from the outside world, except for Lehman's outside auditors, Ernst & Young, who also allowed the practice to pass.⁴⁶ However, Lehman's use of Repo 105 was also kept from its board members.⁴⁷ Lehman Brothers omitted its use of Repo 105 in its quarterly disclosures to the SEC, and also neglected to tell its outside disclosure counsel.⁴⁸

In contrast to LTCM, the corporate culture at Lehman Brothers resembled less an engineering firm experiencing an unfortunate design failure, and more like Zimbardo's Stanford experiment. An internal hierarchy within Lehman's management deliberately withheld information about its misleading accounting practices to outsiders who might have objected, even within the firm, because it believed that was its proper role. When Lehman's global financial controller reported his misgivings to two consecutive chief financial officers that Repo 105 might be a significant "reputational risk" to the company, his concerns were ignored.⁴⁹ Lehman's hierarchical culture defended its values against voices from its border, even though they occupied central positions on its organizational chart. Instead of taking measures to avoid headline risk, it instead buried its practices in secrecy.

⁴⁵ Valukas (2010).

⁴⁶ Valukas (2010, pp. 782–786, 948–951).

⁴⁷ Valukas (2010, pp. 945–947).

⁴⁸ Valukas (2010, pp. 853–856).

⁴⁹ Valukas (2010, pp. 884–887).

The case of rogue trader Jérôme Kerviel illustrates another possible type of failure of corporate culture, that of neglect. In January 2008, Kerviel built up a €49 billion long position on index futures in the corporate and investment banking division of the French bank, Société Générale, before his trades were detected.⁵⁰ For comparison purposes, Société Générale's total capital at that time was only €26 billion. Unwinding his unauthorized position cost Société Générale €6.4 billion, an immense loss that threatened to take down the bank. Kerviel's legal difficulties are still ongoing, but he has stated Société Générale turned a blind eye to his activities when they were making money—and Société Générale's own internal investigation reports that he made €1.5 billion for the bank on his unauthorized trades in 2007.

However, the internal investigation paints a very different, if equally unflattering, picture of Société Générale's corporate culture. Kerviel's first supervisor did not notice his early fraudulent trades or their cover-up, but in fact allowed Kerviel to make intraday trades, a privilege well above Kerviel's status as a junior trader. In January 2007, Kerviel's supervisor quit, and his trading desk was left effectively unsupervised for three months. During this time, Kerviel built up a futures position of €5.5 billion, his first very large position. His new desk manager, hired in April 2007, had no prior knowledge of trading activities, and did not use the monitoring programs that would have detected Kerviel's trades. Moreover, Kerviel's new manager was not supported by his supervisor in assisting or supervising his new activities. The Société Générale report found that a culture of inattention and managerial neglect existed up to four levels above Kerviel's position, to the head of Société Générale's arbitrage activities.⁵¹ Ultimately, it was the attention and perseverance of a monitor in Société Générale's accounting and regulatory reporting division which caught Kerviel, after the monitor noticed an unhedged €1.5 billion position while calculating the Cooke ratio for Société Générale's Basel compliance requirements.⁵²

This is Douglas's individualistic culture taken to a point of absurdity. Mark Hunter and N. Craig Smith believe that the roots of Société Générale's Corporate and Investment Banking division's inept management culture can be found in its complex corporate history.⁵³ Société Générale was a private retail bank nationalized after the Second World War, and then privatized again in 1986. Throughout its postwar history, however, it was a proving ground for French elite graduates, similar to the way Wall Street investment banks recruit from the United States' Ivy League universities. The key difference is that the elite focused on Société Générale's

⁵⁰ Société Générale (2008, p. 2).

⁵¹ Société Générale (2008, pp. 3–8).

⁵² Société Générale (2008, pp. 31–34).

⁵³ Hunter and Smith (2011).

retail banking oversight, because of its close connection to French policymakers in the public and private sectors, rather than its proprietary trading desks. Société Générale's corporate culture viewed the Corporate and Investment Bank as a "cash machine," not central to its elite outcomes. Kerviel was a graduate of provincial universities, and was not expected to rise in the elite hierarchy. Therefore, little attention was paid to his activities, even when he made surprisingly large amounts of money.

8 Regulatory Culture

Regulatory culture is hardly immune to these challenges—consider the unraveling of the mother of all Ponzi schemes: Bernard Madoff. The SEC formally charged Madoff with securities fraud on December 11, 2008, the day after Madoff's sons turned him in to the FBI. Justice was swift in this case; on March 12, 2009, Madoff pled guilty to all charges.⁵⁴ However, although justice was swift, the SEC's internal Office of Investigations discovered that the SEC was not. The Office of Investigations learned that the SEC had received six "red flag" complaints about Madoff's hedge fund operations, reaching as far back as 1992, and had been presented with two reputable articles in the trade and financial press from 2001 that questioned Madoff's abnormally consistent returns.⁵⁵

It is instructive to consider how the SEC's culture dealt with these claims. Harry Markopolos submitted the earliest of the analytical complaints about Madoff's performance to the SEC. Markopolos, originally a portfolio manager for Rampart Investment Management, found he could not replicate Madoff's returns without making impossible assumptions. Markopolos submitted his findings several times to the SEC: in 2000, through its Boston office, which was never recorded reaching the SEC's Northeast Regional Office (NERO);⁵⁶ in 2001, which NERO decided not to pursue after one day's analysis;⁵⁷ in 2005, of which more below; a significant follow-up email in 2007, which was "ignored," in the words of the Office of Investigations report;⁵⁸ and in April 2008, which failed to arrive due to an incorrect email address.⁵⁹

Two similar analyses were brought to the SEC's attention, one directly and one indirectly. In May 2003, an unnamed hedge fund manager contacted the SEC's Office of Compliance

⁵⁴ SEC Office of Investigations (2009, p. 1).

⁵⁵ SEC Office of Investigations (2009, pp. 21–22), Ocrant (2001), Arvedlund (2001).

⁵⁶ SEC Office of Investigations (2009, pp. 61–67).

⁵⁷ SEC Office of Investigations (2009, pp. 67–74).

⁵⁸ SEC Office of Investigations (2009, pp. 61, 354).

⁵⁹ SEC Office of Investigations (2009, pp. 361–363).

Inspections and Examinations (OCIE) with a parallel analysis.⁶⁰ In November 2003, upper management at Renaissance Technologies became concerned that Madoff's returns were "highly unusual" and that "none of it seems to add up." In April 2004, this Renaissance correspondence was flagged for attention by a compliance examiner at NERO during a routine examination.⁶¹

The OCIE and NERO conducted two separate, independent examinations of Madoff. Each examination was unaware of the other, until Madoff himself informed examiners of their mutual existence. (OCIE had not used the SEC's tracking system to update the status of its examination; however, NERO had not checked the system, rendering the point moot.)⁶² OCIE passed its unresolved examination documents to NERO, and made no further communication with them about the case.⁶³ Although NERO examiners still had important questions about Madoff's actions, NERO closed the examination before they were answered due to cultural time constraints. "There's no hard and fast rule about field work but... field work cannot go on indefinitely because people have a hunch," one NERO assistant director later testified.⁶⁴

Markopolos' 2005 complaint reached NERO with the strong endorsement of the SEC's Boston office.⁶⁵ However, the previous fruitless examination of claims against Madoff biased the NERO examiners against Markopolos' claim.⁶⁶ The examiners quickly discounted Markopolos' idea that Madoff was running a Ponzi scheme. The staff attorney involved with the examination wrote at the beginning of the investigation that there wasn't "any *real* reason to suspect some kind of wrongdoing...all we suspect is disclosure problems [emphasis in original]".⁶⁷ The Office of Investigations was harsh in its verdict: "As a result of this initial failure, the Enforcement staff never really conducted an adequate and thorough investigation of Markopolos' claim that Madoff was operating a Ponzi scheme."⁶⁸

The Madoff failure, of which the earlier summary was necessarily a streamlined account, was only one of many events that caused the internal culture of the SEC to fall under scrutiny. An

⁶⁰ SEC Office of Investigations (2009, pp. 77–80).

⁶¹ SEC Office of Investigations (2009, pp. 145–149).

⁶² SEC Office of Investigations (2009, pp. 195–197).

⁶³ SEC Office of Investigations (2009, pp. 136–138).

⁶⁴ SEC Office of Investigations (2009, p. 223).

⁶⁵ SEC Office of Investigations (2009, p. 240–244).

⁶⁶ SEC Office of Investigations (2009, p. 255–259).

⁶⁷ SEC Office of Investigations (2009, p. 266–268).

⁶⁸ SEC Office of Investigations (2009, p. 368).

extensive study of the SEC in 2012 and 2013 by the Government Accountability Office (GAO) found systemic problems throughout its organizational culture:⁶⁹

Based on analysis of views from Securities and Exchange Commission (SEC) employees and previous studies from GAO, SEC, and third parties, GAO determined that SEC's organizational culture is not constructive and could hinder its ability to effectively fulfill its mission. Organizations with constructive cultures are more effective and employees also exhibit a stronger commitment to mission focus. In describing SEC's culture, many current and former SEC employees cited low morale, distrust of management, and the compartmentalized, hierarchical, and risk-averse nature of the organization. According to an Office of Personnel Management (OPM) survey of federal employees, SEC currently ranks 19th of 22 similarly sized federal agencies based on employee satisfaction and commitment. GAO's past work on managing for results indicates that an effective personnel management system will be critical for transforming SEC's organizational culture.

Apparently, the SEC's hierarchical culture was hardened into "silos," which not only prevented the flow of information from one division to another, but also hindered the flow of information between management and staff.⁷⁰ Morale, the sense of shared purpose, was low among staff, but management believed it was much higher.⁷¹ Despite earlier initiatives, the SEC's culture had grown more risk averse over time, a majority of both staff and senior officers explicitly agreeing that this was due to the fear of public scandal. Some staff members anonymously reported that "managers have been afraid to close cases or make decisions because senior officers want to minimize the chances that they would be criticized later."⁷²

The GAO concluded its report with seven specific recommendations for changing the SEC's culture. These included improvements in coordination and communication across internal departments and other agencies—presumably to prevent future cases like Madoff from slipping through the cracks—and changes in personnel management practices to better align job performance with compensation and promotions. The SEC agreed with all seven recommendations. By its own account, it has made significant progress in addressing each of them since then. For example:⁷³

⁶⁹ GAO (2013).

⁷⁰ GAO (2013, pp. 33–38).

⁷¹ GAO (2013, p. 11).

⁷² GAO (2013, pp. 16–17).

⁷³ SEC (2014, p. 132).

Based on GAO's recommendations, SEC made significant efforts to improve communication and collaboration. In an effort to optimize communications and collaboration, the SEC benchmarked and implemented a variety of best practices used both within the public and private sector, including cross-agency working groups, an agency-wide culture change initiative and a more robust internal communication strategy. Work continues in this area to ensure that employees across the SEC are sharing critical information... The purpose of OPM's audit was to determine SEC's adherence to merit system principles, laws, and regulations, and to assess the efficiency and effectiveness in administering human resources programs under the Talent Management System of the Human Capital Framework. OHR is currently in the process of addressing all of the required and recommended actions identified in the OPM audit and anticipates that all recommendations will be resolved by the end of FY 2015.

These changes seem to be having an impact. The SEC's score on the OPM's Global Satisfaction Index—based on the same survey⁷⁴ cited in the GAO's earlier report—improved from 59 to 2012 to 65 in 2014. For comparison, in 2014 the agency with the highest job satisfaction rating was the National Aeronautics and Space Administration (an index value of 74), the agency with the lowest rating was the Department of Homeland Security (an index value of 48), and the government-wide index value was 59.

9 The Role of Feedback Loops

Although the SEC's improvements may seem too little too late to those swindled by Madoff, the process by which these changes were proposed and implemented is a significant mechanism through which culture can be modified. By conducting a thorough, non-partisan analysis of what happened, how it happened, why it happened, and what can be done to reduce the likelihood of future occurrences, the GAO provided important feedback that led to improvements at the SEC, including improvements in its organizational culture. This is not the only institutional feedback mechanism now in place at the SEC. The SEC Office of the Inspector General—an independent office within the SEC that conducts periodic audits and investigations within the agency—provides ongoing feedback to the SEC's leadership to “prevent and detect fraud, waste, and abuse and to promote integrity, economy, efficiency, and effectiveness in the Commission's programs and operations.”⁷⁵ Meanwhile, regular employee surveys conducted by the OPM and the SEC provide objective metrics by which to measure progress and identify problems with morale and culture as they emerge. The well-known adage that “one cannot

⁷⁴ Office of Personnel Management (2014).

⁷⁵ http://www.sec.gov/about/offices/inspector_general.shtml (accessed March 18, 2015).

manage what one does not measure” encapsulates the critical role that metrics and feedback play in managing culture.

Perhaps the best example of the positive effects that feedback can have is the National Transportation Safety Board (NTSB), an independent government agency with no regulatory authority. The NTSB’s mission is to investigate accidents, provide careful and conclusive forensic analysis, and make recommendations for avoiding such accidents in the future. For example, when an airplane crashes, the NTSB assembles a pre-arranged team of on-call engineers and flight-safety experts who are immediately dispatched to the crash site to conduct a thorough investigation. This process includes interviewing witnesses, poring over historical flight logs and maintenance records, and sifting through the wreckage to recover the flight recorder or “black box” and, if necessary, reassembling the aircraft from its parts to determine the ultimate cause of the crash. Once its work is completed, the NTSB publishes a report summarizing the team's investigation, concluding with specific recommendations for avoiding future occurrences of this type of accident. The report is entered into a publicly available searchable database.⁷⁶ Even though the NTSB has no regulatory power, the recommendations contained in their definitive reports have been one of the major factors underlying the remarkable safety record of modern commercial air travel.

For example, it is now standard practice to spray airplanes with de-icing fluid just prior to takeoff when the temperature is near freezing and it is raining or snowing. This procedure was instituted in the aftermath of USAir Flight 405's crash on March 22, 1992. Flight 405 stalled just after becoming airborne because of ice on its wings, despite the fact that de-icing fluid was applied before it left its gate. Flight 405's takeoff was delayed because of air traffic, and ice re-accumulated on its wings while it waited for a departure slot on the runway in the freezing rain. The NTSB Aircraft Accident Report AAR-93/02—published February 17, 1993 and available through several internet sites—contains a sobering summary of the NTSB's findings:

The National Transportation Safety Board determines that the probable cause of this accident were the failure of the airline industry and the Federal Aviation Administration to provide flightcrews with procedures, requirements, and criteria compatible with departure delays in conditions conducive to airframe icing and the decision by the flightcrew to take off without positive assurance that the airplane's wings were free of ice accumulation after 35 minutes of exposure to precipitation following de-icing. The ice contamination on the wings resulted in an aerodynamic stall and loss of control after liftoff. Contributing to the cause of the accident were the inappropriate procedures used by, and

⁷⁶ http://ntsb.gov/_layouts/ntsb.aviation/index.aspx

inadequate coordination between, the flightcrew that led to a takeoff rotation at a lower than prescribed air speed.

Rather than placing blame on the technology, or on human error, the NTSB conducted a thorough forensic examination and concluded that an incorrect application of the technology—waiting too long after de-icing, and not checking for ice build-up just before takeoff—caused the crash. Current de-icing procedures have no doubt saved many lives thanks to NTSB Report AAR-93/02, but this particular innovation did not come cheaply; it was paid for by the lives of the 27 individuals who did not survive the crash of Flight 405. Imagine the waste if the NTSB did not investigate this tragedy and produce concrete recommendations to prevent this from happening again.

Financial crashes are, of course, considerably less dire than air crashes, generally involving no immediate loss of life. However, the recent financial crisis and its impact on the economy and on people's lives should be sufficient motivation to create a "Capital Markets Safety Board" (CMSB) dedicated to investigating, reporting, and archiving the "accidents" of the financial industry. The CMSB would maintain teams of experienced professionals—forensic accountants, financial engineers from industry and academia, and securities and tax attorneys—who would work together on a regular basis. Over the course of many cases investigating every single financial disaster, a number of new insights, common threads, and key issues would emerge from CMSB analyses. The publicly available reports from the CMSB would yield invaluable insights to investors seeking to protect their future investments from similar fates, and once in the hands of investors, this information would eventually drive financial institutions to improving their "safety records."

A case in point is the Madoff Ponzi scheme. While several reports have been written on the SEC's failure to recognize and stop this massive fraud, the forensic analysis on how Bernard Madoff—a highly respected and successful businessman who accumulated a huge fortune long before he began conning investors—came to commit such a crime has yet to be written. What was the cultural milieu that gave rise to Madoff? How did someone with so many genuine accomplishments come to defraud friends and family, not to mention legions of admiring and (in not a few cases) worshipful investors? Is this an isolated incident that can be forgotten now that the perpetrator is behind bars, or should it serve as a cautionary tale because we all possess the potential for similar crimes within us? And what were the factors that allowed even sophisticated institutional investors to be duped by Madoff? Greed? Exclusivity? Competitive pressures from a low-yield environment and gyrating stock markets? Unless we begin conducting forensic analyses of cultures gone wrong so we can learn what and how to change, we will be condemned to repeat the mistakes of our past. We need an NTSB for the financial industry.

As an aside, let us take a brief forensic look at the cultural features that have led to the NTSB's success. The NTSB's culture of definitive expertise and teamwork has earned the public's trust, and it is widely regarded as "the best in the business" at its role in not merely in the United States but throughout the world.⁷⁷ Following the earlier classification scheme, the NTSB has an individualistic culture with an elite composition and a legal-rational basis for its authority, but with a twist: small teams are the cohesive, accountable unit in the organization, rather than individuals per se. This increases the sense of shared purpose during an investigation, while allowing flexibility of assignments at other times. Unlike other regulatory agencies, a job at the NTSB is considered the capstone of a career, rather than a stepping stone. As a result, the NTSB is that rarity of government agencies: a highly focused, effective organization with strong morale.⁷⁸

10 Practical Implications for Regulators and Risk Managers

Corporate culture is clearly a relevant factor in financial failure, error, and malfeasance. As we have seen, risk priorities mirror a corporate culture's values, since no corporation has the resources to manage risk perfectly. Société Générale put very little priority in managing its trading desks, which reflected the low value it placed on its traders. Lehman Brothers spent more time concealing the flaws in its balance sheet than it spent remedying them: the risk of disclosure was more important than the risk of bankruptcy. AIG felt so secure in its practice of risk management that it allowed billions of dollars of toxic assets to appear on its balance sheet not once, but twice. While such banal generalizations may contain grains of truth, they offer little guidance on what to change and how to change it.

What is the best way to immunize against the Gekko effect? The psychologist Philip Zimbardo put it succinctly enough: resist situational influences.⁷⁹ Zimbardo was lucky enough to have a dissenting opinion he implicitly trusted before his prison experiment spiraled out of control. Since that time, Zimbardo has investigated how good people can be influenced into doing evil things by their surrounding culture, much as the character of Bud Fox was seduced by Gordon Gekko's culture in *Wall Street*. Zimbardo offers ten key behaviors that he believes will minimize the effectiveness of a destructive culture in spreading its values, whether corporate or otherwise. Among them are the willingness to admit mistakes, the refusal to respect unjust authority, the ability to consider the future rather than the immediate present, and the

⁷⁷ Lebow et al (1999, p. 2).

⁷⁸ Fielding, Lo, and Yang (2011, pp. 29–33).

⁷⁹ Zimbardo (2007, p. 451–456).

individual values of honesty, responsibility, and independence of thought. These behaviors may sound hackneyed, but they are no more hackneyed than the instructions to cover one's mouth while coughing or to wash one's hands regularly in the prevention of communicable diseases.

However, many skeptics would argue that, like fighting City Hall or trying to cheat Death, attempting to change a large organization's culture is a Sisyphean task. How can any single agent expect to change attitudes and behavioral patterns that can span years and tens of thousands of current and former employees? While I believe such skepticism is misplaced, the dual-process theory of moral and ethical decision-making does explain one source of this skepticism: it is, indeed, hard to change innate behavior by definition. But the dual-process theory also implies a path by which culture *can* be changed. More practically, the Adaptive Markets Hypothesis provides a framework in which we can think systematically about taking on this challenge.

The first step is a subtle but important semantic shift. Instead of seeking to "change culture," which seems naïve and hopelessly ambitious, suppose our objective is to engage in "behavioral risk management."⁸⁰ Despite the fact that we are referring to essentially the same goal, the latter phrase is more concrete, actionable, and unassailable from a corporate governance perspective. Human behavior is clearly a factor in virtually every type of corporate malfeasance, hence it is only prudent to take steps to manage those behaviors most likely to harm the business franchise. Once this semantic leap has been made, it is remarkable how quickly more practical implications follow. By drawing on traditional risk management protocols used at all major financial institutions, we can develop a parallel process for managing behavioral risk.

Consider, for example, the typical process by which the risk of a financial portfolio is managed,⁸¹ which can be summarized by the mnemonic SIMON (Select, Identify, Measure, Optimize, Notice). First, select the major risk factors driving portfolio returns; second, identify the objective function to be optimized, along with any constraints that must be satisfied; third, measure the statistical laws of motion governing portfolio-return dynamics; fourth, optimize the objection function subject to the return dynamics and any constraints, which yields the optimal portfolio weights and hedging positions; and finally, notice any change in the system and repeat the previous four steps as needed. Any systematic financial risk-management protocol must have every element of SIMON represented in some fashion.

⁸⁰ I thank Hamid Mehran for suggesting this terminology.

⁸¹ Lo (1999).

Now consider applying SIMON to the management of behavioral risks. First, select the major behavioral risks facing the firm (e.g., a lack of appreciation and respect for compliance procedures, intolerance by senior management for opposing views, cutting corners with respect to operational policies and procedures to achieve growth and profitability targets, etc.); second, identify the objective function and constraints (e.g., corporate values, short- and long-run goals, and the firm's mission statement); third, measure the statistical laws of motion governing behavior (e.g., the dual-process theory of moral reasoning, Haidt's five-factor model, the OPM Global Satisfaction Index); fourth, optimize the objective function subject to constraints, which yields the optimal compensation structures and hedging instruments (e.g., compliance procedures, reporting requirements, supervisory relationships) for aligning the culture with the objectives; and finally, notice any changes in the system to ensure that the behavioral risk management protocol is achieving the desired result, and repeat the previous four steps as often as needed.

The weakest link in this analogical chain is the third: measuring behavioral laws of motion. Our quantitative understanding of human behavior is still in its infancy, and without reasonably accurate predictive analytics, behavioral risk management is more aspirational than operational. In the case of financial risk management, the laws of motion of asset returns are readily available from a multitude of risk-management software platforms and real-time data vendors in the form of linear factor models, credit scores, and value-at-risk and loss-probability models. There is currently nothing comparable to support behavioral risk managers. Psychological profiles, social network maps, and job-satisfaction surveys like those conducted by the OPM are currently relegated to human resources departments, not risk committees or corporate boards.

However, the starting point for any scientific endeavor is measurement. Psychological profiles, social networks, and human resources data can serve as the basis for constructing behavioral risk models, perhaps along the lines implied by the work of social psychologists such as Haidt (2007), and empirically based models of the systematic and idiosyncratic factors underlying fraud, malfeasance, and excessive risk-taking behavior, as described in Dyck, Morse, and Zingales (2013) and Deason, Rajgopal, and Waymire (2015). But even before attempting to construct such models, a great deal can be learned by simply documenting the reward structure for individuals within an organization so as to develop an integrated view of the corporate ecosystem. For example, if a financial institution's chief risk officer (CRO) is compensated through bonuses tied only to the firm's profitability and not to its stability, it should be obvious that risk may not be this individual's primary focus.

From a quantitative perspective, the ultimate achievement would be an empirically based methodology for predicting individual and group behavior to some degree as a function of

observable systematic and idiosyncratic factors. For example, imagine being able to quantify the risk appetite of financial executive i by the following linear factor model:

$$\begin{aligned} \text{Risk Appetite}_i = & \alpha_i + \beta_{i1}(\text{Reward}) + \beta_{i2}(\text{Potential Loss}) + \beta_{i3}(\text{Career Risk}) + \\ & \beta_{i4}(\text{Competitive Pressure}) + \beta_{i5}(\text{Peer Pressure}) + \\ & \beta_{i6}(\text{Self-Image}) + \beta_{i7}(\text{Regulatory Environment}) + \epsilon_i \end{aligned}$$

where the coefficients measure how important each factor is to the executive's risk appetite, and the factors vary across time, circumstances, and institutions. If we could estimate such a behavioral risk model for each executive, then we would be able to define "culture" quantitatively as a preponderance of individuals with numerically similar factor loadings. A culture of excessive risk-taking and blatant disregard for rules and regulations might consist of an entire division of individuals that share very high loadings for the "Reward" and "Competitive Pressure" factors, and very low loadings for the "Potential Loss" and "Regulatory Environment" factors. If such a risk model could be empirically estimated, we would begin to understand the Gekko effect at a more granular level and develop ways to address it. Moreover, since this framework implicitly acknowledges that the factors driving behavior are time-varying and context-dependent, as competitive pressures increase due to low yields and increased competition, regulators can expect behavior to change, and should adapt accordingly.

The alignment of corporate values and mission with behavior can be facilitated in a number of ways once behaviors, objectives, and value systems are specified. Economic incentives are the standard approach favored by the private sector, but there are other tools available to the behavioral risk manager, including changes in corporate governance, the use of social networks and peer review, and public recognition or embarrassment. If, for example, an organization is concerned about insufficient controls, due to a culture that equates risk-taking with power and prestige, one solution is to appoint a CRO who: (1) reports directly to the company's board of directors; (2) can only be removed by a vote of the board; and (3) has the authority and the responsibility to temporarily relieve the CEO of his or her responsibilities if the CRO determines that the firm's risk levels are unacceptably high, and the CEO has not responded to the CRO's request to reduce risk.

A more extreme measure to change the risk-taking culture of an organization is to make all employees who are compensated above some threshold, e.g., \$1 million, jointly and severally liable for all lawsuits against the firm. Such a measure would greatly increase the scrutiny that such highly compensated individuals would place on their firm's activities, reducing the chances of misbehavior. Of course, such a measure would also greatly decrease the amount of risk the firm would be willing take, which may not sit well with shareholders. Balancing the tradeoffs among various incentives and governance mechanisms will ultimately determine the

kind of culture that emerges and whether this culture is consistent with the corporation's core values and mission.

A similar behavioral risk model can of course be estimated for regulators. The recent reforms at the SEC provide an opportunity to consider how quantitative metrics, such as those produced by the OPM survey, can be combined with empirical patterns of corporate fraud and malfeasance to produce more adaptive regulation. For example, rising markets should be accompanied by increasing surveillance for potential Ponzi schemes among the most vulnerable affinity groups, and regulatory examinations should target those institutions with cultures most likely—as defined by their behavioral risk models—to violate key regulations. In addition, there is the potential for regulators to pick up elements of culture from the corporations they regulate which can render them less effective, much like public health workers being infected by the disease they are fighting. Sometimes this leads to cases of full-fledged regulatory capture, while in others, it merely leads to an inaccurate bill of good health. It is essential for regulatory efficacy that regulators remain immune to the values of other corporate cultures while maintaining a sufficiently deep working knowledge of them. This is easier said than done, but measurement of regulatory culture may be a starting point for identifying potential problems before they turn into more serious lapses.

These hypothetical examples show that culture can be a choice, not a fixed constraint. The emerging discipline of behavioral risk management can be the means by which a corporation's culture is measured and managed. And thanks to advances in the behavioral and social sciences, big data, and human resources management, for the first time in regulatory history, we have the intellectual means to construct behavioral risk models. We just need the will to do so. To paraphrase Reinhold Niebuhr's well-known serenity prayer, the behavioral risk manager must seek the serenity to accept those parts of culture that cannot be changed, the courage and the means to change those parts of culture that can and should, and the behavioral risk models and forensic studies required to distinguish one from the other.

References

- Abbot, Patrick, et al. 2011. "Inclusive fitness theory and eusociality." *Nature* 471, E1–E4.
- Arvedlund, Erin. 2001. "Don't Ask, Don't Tell." *Barron's*. May 7.
- Boyd, Roddy. 2011. *Fatal risk: A cautionary tale of AIG's corporate suicide*. Hoboken, N.J.: Wiley.
- Burns, Monica P. and Jessica A. Sommerville. 2014, "'I pick you': the impact of fairness and race on infants' selection of social partners." *Frontiers in Psychology* 5, doi:10.3389/fpsyg.2014.00093.
- Cohn, Alain, Ernst Fehr, and Michel André Maréchal. 2014. "Business culture and dishonesty in the banking industry." *Nature* 516, 86–89.
- De Waal, Frans. 2006. *Primates and philosophers: How morality evolved*. Princeton, NJ: Princeton University Press.
- Deason, Stephen, Shivaram Rajgopal, and Gregory Waymire. 2015. "Who gets swindled in Ponzi schemes?" unpublished working paper, Goizeta Business School, Emory University, Atlanta, GA.
- Dyck, Alexander, Adair Morse, and Luigi Zingales. 2013. "How pervasive is corporate fraud?" working paper, April.
- Douglas, Mary, and Aaron Wildavsky. 1982. *Risk and culture: An essay on the selection of technological and environmental dangers*. Berkeley, CA: University of California Press.
- Fielding, Eric, Andrew W. Lo, and Jian Helen Yang. 2011. "The National Transportation Safety Board: A Model for Systemic Risk Management." *Journal of Investment Management* 9, 17-49.
- General Accounting Office (GAO). 1999. "Long-Term Capital Management: Regulators Need to Focus Greater Attention on Systemic Risk." GAO/GGD-00-3. October.
- Government Accountability Office. 2013. "Securities and Exchange Commission: Improving Personnel Management Is Critical for Agency's Effectiveness." GAO-13-621. July.
- Gordon, George G. and Nancy DiTomaso. 1992. "Predicting corporate performance from organizational culture." *Journal of Management Studies* 29, 783-798.
- Graham, Jesse, Jonathan Haidt, and Brian A. Nosek. 2009. "Liberals and conservatives use different sets of moral foundations." *Journal of Personality and Social Psychology* 96, 1029-1046.

- Greene, Bob. 1986. "A \$100 million idea: Use greed For good." *Chicago Tribune*. December 15.
- Greene, Joshua. 2014. "Beyond point-and-shoot morality: Why cognitive (neuro)science matters for ethics." *Ethics* 124, 695–726.
- Guiso, Luigi, Paola Sapienza and Luigi Zingales. 2006. "Does culture affect economic outcomes?" *Journal of Economic Perspectives* 20, 23-48.
- Haidt, Jonathan. 2007. "The new synthesis in moral psychology." *Science* 316, 998-1002.
- Hamilton, William. 1964. "The genetical evolution of social behaviour. I and II." *Journal of Theoretical Biology* 7 (1): 1–52.
- Haney, Craig, Curtis Banks, and Philip Zimbardo. 1973a. "Interpersonal dynamics in a simulated prison." *International Journal of Criminology and Penology* 1, 69-97.
- Haney, Craig, Curtis Banks, and Philip Zimbardo. 1973b. "Study of prisoners and guards in a simulated prison." *Naval Research Reviews* 9, 1-17.
- Ho, Karen Zouwen. 2009. *Liquidated: an ethnography of Wall Street*. Durham, NC: Duke University Press.
- Hunter, Mark and N. Craig Smith. 2011. [Société Générale: The rogue trader](#). Fontainebleau, France: INSEAD.
- Iyer, Ravi, Spassena Koleva, Jesse Graham, Peter Ditto, and Jonathan Haidt. 2012. "Understanding libertarian morality: The psychological dispositions of self-identified libertarians." *PLoS ONE* 7(8): e42366.
- Kroeber, Alfred Louis and Clyde Kluckhohn. 1952. *Culture: A critical review of concepts and definitions*. Cambridge, MA: Peabody Museum of American Archaeology.
- Kronman, Anthony T. 1983. *Max Weber*. Stanford, CA: Stanford University Press.
- Lebow, Cynthia C., Liam P. Sarsfield, William L. Stanley, and Emile Etedgui. 1999. *Safety in the skies: Personnel and parties in NTSB aviation accident investigations*. Santa Monica, CA.: RAND Corporation.
- Lo, Andrew W. 1999. "The three P's of total risk management." *Financial Analysts Journal* 55, 13–26.
- Lo, Andrew W. 2004. "The adaptive markets hypothesis: Market efficiency from an evolutionary perspective." *Journal of Portfolio Management* 30, 15–29.
- Lo, Andrew W. 2013. "The origin of bounded rationality and intelligence." *Proceedings of the American Philosophical Society* 157, 269–280.
- Lowenstein, Roger. 2000. *When genius failed: The rise and fall of Long-Term Capital Management*. New York, NY: Random House.

- Lyng, Stephen. 1990. "Edgework: A social psychological analysis of voluntary risk taking." *The American Journal of Sociology* 95, 851-886.
- Milgram, Stanley. 1963. "Behavioral study of obedience." *The Journal of Abnormal and Social Psychology* 67, 371-378.
- Nowak, Martin and Roger Highfield. 2011. *SuperCooperators: Altruism, evolution, and why we need each other to succeed*. New York, NY: Free Press.
- Nowak, Martin. A., Corina E. Tarnita, and Edward O. Wilson. 2010. "The evolution of eusociality." *Nature* 466, 1057-1062.
- Ocrant, Michael. 2001. "Madoff tops charts; skeptics ask how." *MARHedge*. May.
- Office of Personnel Management. 2014. *2014 federal employee viewpoint survey: Agency ratings*. Accessed March 18, 2015.
http://www.fedview.opm.gov/2014FILES/Global_Satisfaction_Index_Score_Trends_2014.xls.
- O'Reilly, Charles A. and Jennifer Chatman. 1996. "Culture as social control: Corporations, culture, and commitment." In B. M. Staw and L.L. Cummings, editors, *Research in organizational behavior* 18, 157-200. Greenwich, CT: JAI Press.
- Perrow, Charles. 1999. *Normal accidents: Living with high-risk technologies*. Princeton, NJ: Princeton University Press.
- Schein, Edgar H. 2004. *Organizational culture and leadership*. San Francisco, CA: Jossey-Bass.
- Securities and Exchange Commission (SEC), Office of Investigations. 2009. *Investigation of failure of the SEC to uncover Bernard Madoff's ponzi scheme*. Public version. Report OIG-509. August 31. Washington, DC: Government Printing Office.
- Securities and Exchange Commission (SEC). 2014. *Agency financial report: Fiscal year 2014*. Washington, DC: Securities and Exchange Commission.
- Shapira, Zur. 1995. *Risk taking: A managerial perspective*. New York, NY: Russell Sage Foundation.
- Shelp, Ronald Kent, and Al Ehrbar. 2009. *Fallen giant: The amazing story of Hank Greenberg and the history of AIG*. Second edition. Hoboken, NJ: Wiley.
- Shiller, Robert. 2005. *Irrational Exuberance*. Second edition. Princeton, NJ: Princeton University Press.
- Simon, Herbert A. 1997. *Administrative behavior: A study of decision-making processes in administrative organizations*. Fourth edition. New York, NY: Free Press.

- Smith, Charles W. 2005. "Financial edgework: Trading in market currents." In *Edgework: The sociology of risk taking*, edited by Stephen Lyng, 187–200. London, UK: Routledge.
- Snow, Richard. 2013. *I invented the modern age: The rise of Henry Ford*. New York, NY: Scribner.
- Société Générale. 2008. "Mission green: Summary report." May 20. English translation. Accessed September 20, 2014.
- Sørensen, Jesper B. 2002. "The strength of corporate culture and the reliability of firm performance." *Administrative Science Quarterly* 47, 70-91.
- Steinberg, Laurence. 2008. "A social neuroscience perspective on adolescent risk-taking." *Developmental Review* 28, 78-106.
- Sterngold, James. 1987. "Boesky sentenced to 3 years in jail in insider scandal." *New York Times*. December 19.
- Trivers, Robert L. 1971. "The evolution of reciprocal altruism," *Quarterly Review of Biology* 46, 35–57.
- Valukas, Anton R. 2010. "Report of Anton R. Valukas, examiner: Chapter 11, Case No. 08-13555 (JMP), In Re Lehman Brothers Holdings Inc., et al, debtors." Volume 3. March 11. United States Bankruptcy Court, Southern District Of New York. Accessed September 23, 2014. <http://jenner.com/lehman/VOLUME%203.pdf>.
- Venkatesh, Sudhir Alladi. 2006. *Off the books: The underground economy of the urban poor*. Cambridge, MA: Harvard University Press.
- Weeks, John. 2004. *Unpopular culture: The ritual of complaint in a British bank*. Chicago, IL: University of Chicago Press.
- Weiser, Stanley. 2008. "Repeat after me: Greed is not good." *Los Angeles Times*. October 5.
- Wilson, Margo and Martin Daly. 1985. "Competitiveness, risk taking, and violence: The young male syndrome." *Ethology and Sociobiology* 6, 59-73.
- Zhang, Ruixun, Thomas J. Brennan, and Andrew W. Lo. 2014. "Group selection as behavioral adaptation to systematic risk." *PLoS ONE* 9:e110848. doi:10.1371/journal.pone.0110848.
- Zimbardo, Philip G. 2007. *The Lucifer effect: Understanding how good people turn evil*. New York, NY: Random House.