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CHAPTER ON LEADERSHIP AND CORPORATE CULTURE

BENJAMIN E. HERMALIN

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## Contents

|          |  |           |
|----------|--|-----------|
| <b>1</b> | <b>Introduction</b>  | <b>1</b>  |
| 1.1      | What is Leadership? . . . . .                                  | 1         |
| 1.2      | What is Corporate Culture? . . . . .                           | 2         |
| 1.3      | Culture and Leadership . . . . .                               | 3         |
| <b>2</b> | <b>Leadership</b>  | <b>4</b>  |
| 2.1      | How Voluntary is Voluntary? . . . . .                          | 5         |
| 2.1.1    | Psychological predispositions . . . . .                        | 5         |
| 2.1.2    | Fear of sanctions . . . . .                                    | 5         |
| 2.2      | What do Leaders do? . . . . .                                  | 7         |
| 2.2.1    | Leaders as judges . . . . .                                    | 8         |
| 2.2.2    | Leaders as experts . . . . .                                   | 9         |
| 2.2.3    | Leaders as coordinators . . . . .                              | 9         |
| 2.3      | The Economic Analysis of Leadership . . . . .                  | 11        |
| 2.3.1    | Leading by example and sacrifice . . . . .                     | 11        |
| 2.3.2    | More on leaders conveying information . . . . .                | 15        |
| 2.3.3    | The role of conformism . . . . .                               | 22        |
| 2.3.4    | Leadership styles . . . . .                                    | 24        |
| 2.3.5    | Overconfident leaders . . . . .                                | 27        |
| 2.3.6    | Is leadership illusory? . . . . .                              | 32        |
| <b>3</b> | <b>Corporate Culture</b>                                       | <b>34</b> |
| 3.1      | Assessment and Measurement of Corporate Culture . . . . .      | 35        |
| 3.2      | The Economic Analysis of Corporate Culture . . . . .           | 36        |
| 3.2.1    | Coordination, reputation, & unforeseen contingencies . . . . . | 36        |
| 3.2.2    | Culture as convention . . . . .                                | 41        |
| 3.2.3    | Artificial selection . . . . .                                 | 43        |
| 3.2.4    | Culture as self-selection . . . . .                            | 44        |
| 3.2.5    | Shared knowledge, language, and custom . . . . .               | 46        |
| 3.3      | The Directive Versus Internalization Debate . . . . .          | 49        |
| <b>4</b> | <b>What's Left?</b>  | <b>51</b> |

# 1 Introduction

Much of the economics of organization deals with the formal rights and rules that govern organizations, both in normative and positive analyses. Who should have legal claim to what resources? Who should have authority over whom or what? Who should monitor whom? What contracts should be utilized? But, importantly, the operation of organizations is also determined by informal means as well. Two such means are *leadership*, a concept distinct from authority, and *corporate culture*, a broad concept covering the informal rules and expectations that affect operations.

This chapter surveys the literature on these informal aspects of organization. Because, until recently, they received attention almost exclusively from the non-economic social sciences, this chapter will necessarily be eclectic with respect to the disciplines from which it draws. On the other hand, because this handbook is intended primarily for economists and there has been growing attention to these topics within economics, much of the focus will be economic analyses of leadership and corporate culture.

## 1.1 What is Leadership?

The word “leadership” has many meanings and connotations. Some pertain to roles assigned certain offices. For instance, a prime minister could be described as the leader of her party or of her nation. Yet it is important to consider leadership as a concept that is distinct from any office or formal authority. For while being prime minister might enhance a politician’s capacity to serve as a leader, one presumes that she became prime minister in part because of her leadership abilities. Furthermore, within organizations and institutions, a person can be a leader without office or portfolio; a politician can, for instance, be *a* leader of her party (although perhaps not *the* leader) even if she holds no title within the party or the government. Leadership is, thus, distinct from formal authority.<sup>1</sup> Indeed, history is replete with examples of important leaders who held no official position (*e.g.*, Jeanne d’Arc).

Leadership is, therefore, a phenomenon that exists independent of office or title. Without office or title,

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<sup>1</sup>Some authors, rather than distinguish leadership from (formal) authority, use leadership to refer to both formal authority (*e.g.*, deriving from an office) as well as the less-formal idea of leadership adopted in this chapter. Typical means of referring to this distinction are, respectively, “formal leadership” and “emergent leadership” (House and Baetz, 1979) or “*de jure* leadership” and “*de facto* leadership” (Peters, 1967).

a leader's ability to influence the behavior of others is limited. Without office or title, she lacks authority to order others to undertake actions and she lacks the right to provide them incentives via contract. Even when a leader possesses an office or title, the formal authority so provided could be limited; for instance, the president of a school's Parent-Teacher Association (PTA) cannot order its members (*i.e.*, other parents) to show up for a school clean-up day. As Weber (Gerth and Mills, 1946, pp. 248–249) puts it

The [leader] does not deduce his authority from codes and statutes, as is the case with the jurisdiction of office; nor does he deduce his authority from traditional custom or feudal vows of faith, as in the case with patrimonial power.

As the PTA example suggests, one of the essences of leadership is the ability to induce others to follow absent the power to compel or to provide formal contractual incentives. This notion of “leadership” is perhaps most closely related to Weber's idea of *charismatic* leadership. Indeed, in this chapter, the operational definition of leadership is that a leader is someone with followers, *who follow voluntarily*. The critical question then becomes how does a leader induce others to follow?<sup>2</sup>

Even when the leader has *formal authority*—the power to coerce (directly or indirectly through incentives)—such authority is rarely absolute. Certainly sociology, political theory, and organizational behavior still see a need for leaders to encourage and motivate a following.<sup>3</sup>

## 1.2 What is Corporate Culture?

Culture, too, is a word with many meanings. With respect to organizations, the most relevant meaning in the dictionary would be “the distinctive customs, achievements, products, outlook, etc., of a society or group; the way of life of a society or group”; a meaning that the word acquired in the late 19th century (Brown, ed, 1993, p. 568). Some definitions from the social sciences include:

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<sup>2</sup>Handy (1993, p. 97) describes answering this question as one of the “Holy Grails” of organization theory.

<sup>3</sup>See, *e.g.*, Chapter 19, “On Avoiding Being Despised and Hated,” and Chapter 21, “How a Prince Should Act to Acquire Esteem,” of Niccolò Machiavelli's, 1532, *The Prince* (Bondanella and Musa, 1979); Part III, Chapter 9 of Max Weber's, 1921, *Wirtschaft und Gesellschaft* (Gerth and Mills, 1946); Part II of McGregor (1966); Chapter 4 of Handy; and Chapter 2 of Wrong (1995). Motivating a following is also a large part of “how-to” analyses of leadership such as Bennis (1989); Heifetz (1994); Kotter (1996); and Kouzes and Posner (1987).

A pattern of shared basic assumptions that the group learned as it solved its problems of external adaptation and internal integration, 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 (Schein, 1992, p. 12).

[V]alues that are shared by the people in a group and that tend to persist over time even when group membership changes (Kotter and Heskett, 1992, p. 4).

[C]orporate culture [is] partly . . . the interrelated principles that the organization employs and partly the means by which [its] principle[s are] communicated to hierarchical inferiors and hierarchical superiors. It says how things are done, and how they are meant to be done . . . . Because it will be designed through time to meet unforeseen contingencies as they arise, it will be the product of evolution inside the organization and will be influenced by the organization's history (Kreps, 1986 [1996], p. 224).

Within economics, the *modeling* of corporate culture has taken a number of different paths. Kreps (1986), for instance, focuses on culture as a way of dealing with unforeseen contingencies. Others consider culture as convention (Young, 1993, 1998) or as a means of equilibrium selection (Kreps, 1986). Related to this, some model culture as an economizing device (Crémer, 1993). Culture is sometimes seen as equivalent to organizational reputation (Crémer, 1986, Kreps, 1986). There is also the question of how culture arises; some have sought to model its transmission (Lazear, 1995) or its emergence through forces that lead to homogeneity of beliefs (Van den Steen, 2005a).

### 1.3 Culture and Leadership

There is some reason the editors chose to combine the discussion of corporate culture and leadership into one chapter (other than, perhaps, the convenient fact that I've written on both in the past). There are at least five reasons why the topics might profitably be linked:

1. *Leaders are proselytizers.* Leaders are the people who disseminate culture within an organization. For example, Chapter 11 of Schein (1992) deals with the role of leadership in building culture (consider

*e.g.*, the role often attributed to Herb Kelleher at Southwest).<sup>4</sup> Chapter 12 of Schein discusses how leaders embed and transmit culture.

2. *Leaders are judges.* Leaders are the people who determine whether behavior adheres to the organization's norms, and set sanctions on those who violate those norms.
3. *Culture makes leaders trustworthy.* Being part of the corporate culture can serve to make leaders trustworthy. Followers follow because they trust the leader to share their concerns and interests (see, *e.g.*, Rotemberg and Saloner, 1993).
4. *Leaders are change agents.* Along the lines of the first point, but somewhat contrary to the previous one, leaders are those who can break from an existing culture and lead an organization to a new way of doing things; that is, leaders can be "change agents" (what Burns, 1978, refers to as "transforming leaders"). "How-to" books often focus on this role (*e.g.*, Kotter, 1996).
5. *Aṣabîyah.* The effectiveness of the leader may depend on the strength of the corporate culture. One version of this idea was set forth by Ibn Khaldûn, the 14th century North African historian, who argued that a group's success depended on its *aṣabîyah* or "group feeling" and the leader who can best harness a group's *aṣabîyah* will be the most successful (Ibn Khaldûn, 2004).

## 2 Leadership

Leadership should be seen as a phenomenon distinct from authority or exercise of some office or title. The defining feature of leadership is that a leader is someone with *voluntary* followers. A central question is, therefore, why do they follow? What is it, then, that leaders do that make followers want to follow?

Before turning to those questions in Section 2.2, it is worth considering the notion of "voluntary" a bit further.

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<sup>4</sup>There are numerous business school cases on the role played by Mr. Kelleher in building Southwest's culture. See also the chapter on Mr. Kelleher in Pandya et al. (2004).

## 2.1 How Voluntary is Voluntary?

### 2.1.1 Psychological predispositions

It is possible that followers follow, at least in part, because of a psychological predisposition to be a follower. Such a predisposition could represent learned behavior. For instance, as children, we are taught to follow instructions and we may consequently become predisposed to follow orders. An objective of military drilling and discipline is to impose a reflexive response to orders (see, *e.g.*, Akerlof and Kranton, 2005, on West Point).

Additionally, a psychological predisposition to be a follower could be innate. One of the few economic articles to take a behavioral approach to “followership,” Huck and Rey-Biel (2006), explicitly assumes that followers have a desire to conform; that is, have an inherent distaste for choosing actions that are different from others’.

One reason that following could be, to an extent, innate is that humans are primates and primate social groups typically possess dominance relations (de Waal, 1998; McFarland, 1999, §10.5). To be sure, the alpha male of a chimpanzee tribe is not a leader in the sense meant here; such males coerce, rather than induce, a following through violence or the threat of violence. Nevertheless, being able to assume subordinate status when necessary is a critical survival skill;<sup>5</sup> therefore, it is possible that many of us are predisposed to take a subordinate status in social groupings even subconsciously.<sup>6</sup> Certainly, there is evidence that we respond to many nonverbal cues with respect to who we tend to follow as leaders (*e.g.*, age, height, gender, etc.).<sup>7</sup>

### 2.1.2 Fear of sanctions

In normal parlance, voluntary means without compulsion or duress; that is, freely decided. However, as a profession that has ruled out the free lunch, we know that there are tradeoffs in most decisions and presumably that applies to following the leader. If, for instance, I disregard the PTA president’s request to

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<sup>5</sup>This is both because young males typically are not in a position to challenge for leadership (de Waal), so must bide their time; and because even subordinate males can find mating opportunities if they are crafty (Sapolsky, 2005).

<sup>6</sup>To be more accurate, we likely have a predisposition to grasp social structures and hierarchies and to slot ourselves into them accordingly. It has been argued that the relatively large and sophisticated brains of primates is the consequence of an evolutionary “arms race” to outsmart others in social settings (see, *e.g.*, Sapolsky).

<sup>7</sup>See, for example, House and Baetz (1979) for a discussion of such leadership attributes.

participate in a school clean-up day, then there are likely some adverse consequences, such as having her speak poorly of me, having her be less responsive to my suggestions for PTA activities, and so forth.

In other words, rarely, if ever, is a leader without recourse to sanctions against followers who fail to follow her lead. A distinction, however, exists between circumstances in which the power to sanction comes with the office (*e.g.*, a military officer has the right to demand punishment for insubordination; a manager can dismiss a disobedient worker; etc.) and circumstances in which the power to sanction arises because other followers will carry out sanctions imposed by a leader (*e.g.*, agree to treat a disloyal follower as an outcast). The power of, say, a PTA president to sanction me for not participating in a PTA activity arises not from her office, but is granted her by her followers who effectively agree they will apply a social stigma to me at her behest. Consequently, if they lose faith in her leadership—they conclude, *e.g.*, that she is acting like a martinet—then her power to impose sanctions is also lost. In contrast, the power of my commanding officer to sanction me is essentially independent of what my fellow subordinates think of her leadership.<sup>8</sup>

Some of the most dramatic examples of a leader being granted social-sanctioning power can be seen among teenage girls, where cliques (sometimes called posses) form around a leader, the “queen bee” (Wiseman, 2003).<sup>9</sup> The queen bee’s ability to sanction members of her posse is wholly a function of the power the other girls grant the queen bee over them. Similar phenomena no doubt exist in gangs and other voluntary groupings. Queen bees also illustrate a particularly important dynamic by which a leader obtains power: The leader is bestowed by her followers with the power to determine who is in—that is, who obtains the benefits of membership—and who is out.

It has long been known that the power to exclude (by label or to outright ostracize) is a strong form of control, particularly with regard to discipline within prestigious “in groups” (Becker, 1963; Goffman, 1963; Erikson, 1966; Goode, 1978; Sidanius and Pratto, 1999). To an extent, this power has recently been recognized in economics (Bowles and Gintis, 2004; Kandel and Lazear, 1992; see also the survey articles Hermalin, 2001, and Akerlof and Kranton, 2005), although it would also be fair to say this is an area where

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<sup>8</sup>Although perhaps not completely independent; in extreme circumstances (*e.g.*, such as those depicted in the *Caine Mutiny* [Wouk, 1951]) the loss of faith by all subordinates can preclude an officer from sanctioning insubordination by any one.

<sup>9</sup>See Lohéac (2005) for an economic study of this phenomenon.

further work would be productive. Yet the question of why members of a group would bestow this power on a leader has, to the best of my knowledge, been largely ignored. Certainly within the economics literature, social sanctions have been modeled in a leaderless fashion (*e.g.*, Kandel and Lazear, 1992; Kandori, 1992; Bowles and Gintis, 2004).

## 2.2 What do Leaders do?

So what is it that leaders do? There are many ways that question can be answered, as, in part, evidenced by the large number of books on leadership that have been written over the years. For the purposes of this chapter, I divide what leaders do into three categories with, admittedly, considerable overlap:

1. Leaders serve as judges.
2. Leaders serve as experts.
3. Leaders serve as coordinators.

This list is not exhaustive, there are other leadership activities not covered here:

4. Leaders are symbols. This has two meanings. First, the leader can be a living representation of the group, so that the honors she receives provide positive utility—basking in the glory—for followers and the dishonors she suffers harm followers (*e.g.*, cause anger, shame, etc.). Second, the leader symbolizes the group's ideals with respect to beliefs and deportment. In essence, the leader exemplifies the norms of the group.<sup>10</sup> Observe this second meaning overlaps with the idea of leaders as experts.
5. Leaders are shapers of preferences. In standard theory, preferences are fixed. Yet preferences must, ultimately, come from somewhere and it seems logical that they derive, in part, from the actions of others (*e.g.*, what we are fed as children, the music our parents play, etc.). It is plausible, therefore, that a person with a strong personality, a charismatic leader, will influence the preferences of others.<sup>11</sup> But proving this, if true, is difficult: We observe behavior, not motives. So, for example, does seeing

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<sup>10</sup>Pfeffer (1981) makes a similar point.

<sup>11</sup>To the extent that others *teach* us about our preferences (*e.g.*, help us learn we like sushi by taking us to a Japanese restaurant), the shaping-of-preferences role overlaps with the expertise role.



a hero do something make one inherently wish to do it or does it simply signal that one gains more status from doing so than previously thought?<sup>12</sup>

### 2.2.1 Leaders as judges

Within an organization or group, a leader can serve as a judge; that is, she is the arbiter of disputes and the determiner of sanctions.<sup>13</sup> This is not to say all informal judges are leaders; nevertheless, there is a tendency to have a leader serve as the group's judge. For instance, in days gone by, Eastern European Jews would call upon their local rabbi to settle disputes.<sup>14</sup>

There are a number of reasons why a single individual would be selected to be the group's judge:

**PREDICTABILITY.** When the judge is known *ex ante*, there is less uncertainty and risk about how cases will be resolved than if the judge were to be chosen at random.

**REPUTATION BUILDING.** A group presumably wants a judge who is impartial or incorruptible. Depending on the benefits of being a judge (leader), an individual might wish to establish a reputation for impartiality and incorruptibility. Reputation building, however, requires frequent repeat play, which is an argument for bestowing the judgeship on a single individual.

**EFFICIENT DIVISION OF LABOR.** If there are economies of scale or scope in being the judge, then it could be most sensible to have only one individual make the relevant investments.

**AVOIDANCE OF FREE-RIDING.** If no one were responsible for monitoring behavior and passing judgment on it, then it would be the group's responsibility, which could lead to free-riding problems if group members shirked their responsibility.

From the earlier discussion of "queen bees," for instance, it is clear that leaders frequently play a role as

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<sup>12</sup>In an earlier survey, Hermalin (2001, p. 258), I referred to this as the "directive versus internalization issue." It is a debate to which I will return later. See also Kreps (1997).

<sup>13</sup>Interestingly, the section of the Bible that presents the history of the Israelites in the period between Exodus and the Davidic dynasty, a period when the Israelites had informal leaders, is called *Judges*.

<sup>14</sup>While the Rabbi held an office and, thus, his judicial powers might, in part, be seen to come from that, it is also true that (i) the Rabbi had no authority by which to enforce his decisions; and (ii) the parties could, in some circumstances, have selected another arbiter, such as the secular courts.

a group or organization's judge. This "judicial" role is also an important way in which the organization's culture is transmitted because followers infer the cultural norms from the leader-judge's decisions (see the discussion in Schein, 1992, Chapter 12; this also relates to labeling theory, Becker, 1963). Yet *why* a single leader is necessary or how followers empower her with this authority is less well studied. It is to be hoped that the four possibilities listed above will eventually be fleshed out by future research.

### 2.2.2 Leaders as experts

One reason to follow a leader is that you believe the leader knows better than you what should be done. This is what I mean by the *leader as expert*. There are three ways in which a leader can be an expert: (i) she is endowed with the relevant expertise; (ii) she undertakes an activity to learn the relevant knowledge; and (iii) she defines what is the truth. The last of these refers to situations where the leader is a law giver (*e.g.*, in a religious sense or by defining the corporate culture). One might argue that this third way is subsumed by the first two. A devout person would certainly argue that religious law givers were given their knowledge by a higher authority. Alternatively, law givers use their expertise to derive laws (customs, norms, etc.), where their expertise has been endowed previously or results from their actively acquiring the relevant knowledge. Yet, to the extent there is no clear rationale for a law (*e.g.*, Deuteronomy 22:11, the prohibition on wearing wool and linen together), its purpose being only to divide adherents from non-adherents, this third category of expertise could be considered separate from the first two.<sup>15</sup>

### 2.2.3 Leaders as coordinators

Many organizational issues can be modeled as games and games often have multiple equilibria. A role, therefore, for the leader could be to select the equilibrium to be played. Consider, for instance, the game in Figure 1. It has three Nash equilibria: both players play A as pure strategies, both play B as pure

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<sup>15</sup>A law such as Deuteronomy 22:11 is known as a *chok*. *Chukim* (plural of *chok*) are rules that are seen by commentators on the Torah (*e.g.*, Talmudic scholars) as having apparently no rational justification. A less religious example would be the requirement that once existed that IBM salesmen wear white shirts. Harris (1978) suggests that one justification is to maintain group integrity by brightening the line demarcating in-group from out-group. This interpretation is bolstered in the case of Deuteronomy 22:11 given that book was written in a time of conflict between two priestly castes (Friedman, 1997). Such a *chok* could have served to distinguish one side from the other (and give one side a better claim at righteousness).

|            |   |               |   |
|------------|---|---------------|---|
|            |   | Column Player |   |
|            |   | A             | B |
| Row Player | A | 3             | 0 |
|            | B | 0             | 2 |

**Figure 1:** A coordination game

strategies, and a mixed-strategy equilibrium. Total expected welfare is, respectively, 6, 4, and  $12/5$  across these equilibria. Clearly, it behooves the players to coordinate on the first. A leader could announce that players are to play A. Given that a Nash equilibrium is a self-enforcing contract—that is, the followers would have an incentive to voluntarily follow the leader’s direction—this should be sufficient to insure that the A-equilibrium is played.<sup>16</sup>

It is also conceivable that the leader can cause coordination when coordination is not necessarily warranted by starting an informational cascade or causing herding (Bikhchandani et al., 1992; Banerjee, 1992; Smith and Sørensen, 2000).<sup>17</sup> For instance, in network economies, the technology adopted in equilibrium will depend heavily on the behavior of early adopters (Katz and Shapiro, 1986). In situations in which the leader is wrong or when more heads are better than one (*i.e.*, private signals should be shared), the group can readily end up conforming to a standard or to actions that are not optimal. As an extreme example, suppose that members of an organization must choose between two options (*e.g.*, a word-processing program, how to treat customers, etc.), each of which is equally likely *ex ante* to be the correct option. Imagine the population is divided between those with information relevant to choosing the right option and those without. If the first person who chooses is known to be at least as knowledgeable as anyone else and his choice is more likely to be correct than wrong, then his choice will determine the organization’s choice; that is, everyone will follow his lead.<sup>18</sup> The probability that the leader’s information is correct, thus, becomes the probability the

<sup>16</sup>Other arguments for why the A-equilibrium would be played include that a Pareto-optimal equilibrium is focal and the money-burning argument of Ben-Porath and Dekel (1992).

<sup>17</sup>Chamley (2004) is a good introduction to this literature.

<sup>18</sup>A given follower can believe, when it’s his turn to choose, the common choice of those who went before is *wrong*

|        |            |               |               |
|--------|------------|---------------|---------------|
|        |            | Follower      |               |
|        |            | work hard     | work easy     |
| Nature | good state | 5      4<br>3 | 2      3<br>2 |
|        | bad state  | 2      0<br>1 | 1      1<br>1 |

**Figure 2:** A leadership game. The first number in each cell is the leader's (*i.e.*, not nature's) payoff.

organization makes the correct choice. If, however, the organization could have polled people before choices were made, then the organization's probability of making the correct decision would be greater.<sup>19</sup>

## 2.3 The Economic Analysis of Leadership

### 2.3.1 Leading by example and sacrifice: Hermalin (1998)

Hermalin (1998) recognizes that followers often face the danger that the leader is tempted to *mislead* them. Figure 2 illustrates this tension. Suppose the leader knows which state “nature” has chosen. If she would report honestly, the follower would adjust his effort based on her report, working hard if she says the state is good and working “easy” if she says the state is poor. The leader, however, always does better if the follower works hard and, thus, she has an incentive to mislead the follower, always claiming the state is good regardless of what it truly is. A rational follower anticipates this, however, and disregards her announcement. If the probability of the good state is less than 1/2, then a rational follower will always work easy regardless of the leader's announcement.

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with no more than probability 1/2 (and typically less). Even if it's 1/2, if there are network effects or he breaks ties by following the consensus, he will follow suit.

<sup>19</sup> Assume  $2M + 1 > 1$  informed individuals, each of whom gets a signal that is correct with probability  $p$  (assume the signals are independent draws conditional on the truth). Then, under majority rule, the probability the group would make the correct decision assuming information could be pooled before any actions are taken is

$$1 - \sum_{m=0}^M \binom{2M+1}{m} p^m (1-p)^{2M+1-m} > p,$$

where the right-hand side is the probability the correct decision is made absent pooling of information when the group follows the leader. For example, if  $M = 20$  and  $p = .6$ , then collective decision making implies a better than 90% chance of making the correct decision.

The outcome that the follower disregards the leader's announcement is suboptimal. Welfare would be greater if the leader would announce truthfully and the follower could believe her announcement.

Observe the leader gains 3 if she convinces the follower the state is good when it is truly good, but she gains only 1 when she misleads the follower into thinking the state is good when it isn't. A convincing signal that the state is good is for the leader to destroy  $D$  units of her utility when the state is good, where  $D \geq 1$ .<sup>20</sup> Imposing the Cho and Kreps (1987) intuitive criterion as an equilibrium refinement, the unique equilibrium is the one in which the leader publicly destroys one unit of utility when the state is good, but not when it is bad. The follower responds to this signal by working hard when he sees a unit destroyed and by working easy when he doesn't. Hermalin (1998) calls this form of leadership *leading by sacrifice*; depending on the circumstances it may be only one of the ways in which the leader can signal.<sup>21</sup>

**Leading by example.** As noted earlier, leaders often serve as examples. Moreover, their example can be effective because it can serve as a signal that what the leader is advocating (*e.g.*, working hard) is a true reflection of her knowledge. Historical examples include civil rights leaders (*e.g.*, Martin Luther King, Jr. or César Chávez) being at the front of a march or Stalin's decision to remain in Moscow to lead resistance to the approaching *Wehrmacht*. Presumably these leaders would not have put themselves in danger if they did not truly believe the struggle could be won.

A model of this (Hermalin, 1998) is the following: a team has  $N$  identical individuals indexed by  $n$ . Each simultaneously supplies effort. The value to the team of these efforts is  $V = \theta \sum_{n=1}^N e_n$ , where  $\theta \in [0, 1]$  is

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<sup>20</sup>It is beyond the scope of this chapter to review signaling fully. Signaling games, first studied by Spence (1973), are games of asymmetric information in which the better informed party can act so as to convey—"signal"—her information to the less well informed party. The classic example (Spence) is a worker who signals her ability to potential employers through the amount of education she gets. An equilibrium of a signaling game is *separating* if the equilibrium actions of the informed player vary with her information (*e.g.*, talented workers acquire more education than less talented workers). A *pooling* equilibrium is one in which the equilibrium actions of the informed player don't vary with her information (*e.g.*, all workers get the same level of education). The multitude of equilibria can sometimes be reduced via a forward-induction refinement such as the Intuitive Criterion (Cho and Kreps, 1987).

<sup>21</sup>In Hermalin (1998), the sacrifice went from the leader to the followers. While this affects the welfare analysis of the model, it is not essential to the signaling function of the sacrifice. A real-life example might be a PTA president who springs for simple refreshments for an event as a way of signaling the importance of the event (the refreshments are too simple to constitute a reasonable payment to the other parents; that is, it is the signal not the desire for a free donut that gets the parents to participate).

a stochastic productivity factor realized *after* efforts, the  $e_n$ s, have been supplied. Individual  $n$ 's utility is  $w_n - e_n^2/2$ , where  $w_n$  is his payment.<sup>22</sup>

Assume, keeping with Holmström (1982), that while contracts can be written contingent on  $V$ , they cannot be written contingent on the individual team members' efforts. Assume, too, that contracts cannot be contingent on  $\theta$  *directly*. Credible contracts must be *balanced* (*i.e.*, pay out exactly  $V$  in total to the team members). Given these conditions, there is no loss of generality in restricting attention to the following contracts: Individual  $n$  is paid  $s_n(\hat{\theta})V + t_n(\hat{\theta})$ , where  $\hat{\theta}$  is a possible announcement about the value of  $\theta$ ;  $\sum_{n=1}^N s_n(\hat{\theta}) = 1$  for all  $\hat{\theta} \in [0, 1]$ ; and  $\sum_{n=1}^N t_n(\hat{\theta}) = 0$  for all  $\hat{\theta} \in [0, 1]$ . Ruling out negative shares (*i.e.*,  $s_n < 0$  for some  $n$ ), it can further be shown that, if all team members hold the same belief about  $\theta$ , then the optimal contract is an equal-shares contract:  $s_n(\hat{\theta}) = 1/N$  for all  $n$  and  $\hat{\theta}$ .<sup>23</sup>

Let  $\tilde{\theta}$  denote the expected value of  $\theta$  given common beliefs. Then each team member maximizes

$$\frac{\tilde{\theta}}{N} \left( e_n + \sum_{j \neq n} e_j \right) + t(\hat{\theta}) - \frac{e_n^2}{2}. \quad (1)$$

Observe the cross-partial derivative of expression (1) with respect to  $\tilde{\theta}$  and  $e_n$  is positive; hence, *an individual's effort is increasing in his expectation of  $\theta$  under an equal-shares contract.*

Make one of the team the leader and suppose she is endowed with knowledge of what  $\theta$  will be. This is her private information. Suppose, hypothetically, that she truthfully announces what  $\theta$  will be. Then all team members would be symmetrically informed, the optimal contract would, thus, be equal-shares, and the effort of a follower,  $e(\hat{\theta})$ , would be increasing in the leader's announcement of  $\theta$ ,  $\hat{\theta}$  (because the followers are identical, the subscript  $n$  can be dispensed with). The only question, then, is would the leader announce truthfully? Her utility is

$$\frac{\theta}{N} ((N-1)e(\hat{\theta}) + e_L) + t_L(\hat{\theta}) - \frac{e_L^2}{2}, \quad (2)$$

where  $L$  indexes the leader. Suppose that  $t_L(\hat{\theta})$  is a constant. Then the leader does best to make  $e(\hat{\theta})$  as large as possible *regardless of the true value of  $\theta$* . Hence, the leader would always announce the maximum value of  $\theta$ . The hypothesis that she will tell the truth is false.

<sup>22</sup>Hermalin (1998) assumes a more general disutility of effort function than  $e^2/2$ .

<sup>23</sup>See the discussion in Hermalin (1998) for why negative share contracts can be ruled out.

Of course, rational followers understand this. Hence, if  $t_L(\hat{\theta})$  is a constant, then they will rationally disregard the leader's announcement and always choose effort  $e(\bar{\theta})$ , where  $\bar{\theta} = \mathbb{E}\{\theta\}$ . Hermalin (1998) shows it is inefficient for the followers not to base their effort on the true value of  $\theta$ , hence welfare would be improved if the leader could be given an incentive to tell the truth.

One way around this would be leading by sacrifice. From expression (2), this would require making  $t_L(\hat{\theta})$  vary in such a way as to provide the leader an incentive to tell the truth. It can be shown that she will tell the truth if

$$t_L(\hat{\theta}) = T - \int_0^{\hat{\theta}} z \frac{N-1}{N} e'(z) dz, \quad (3)$$

where  $T$  is a constant and  $e(\cdot)$  is a follower's optimal response function to a truthful revelation of  $\theta$  (Proposition 3 of Hermalin, 1998).

The focus here, however, is on leading by example. To that end, set  $t_n(\hat{\theta}) \equiv 0$  for all  $n$  and  $\hat{\theta}$ . Furthermore, suppose that the leader can choose her effort before the rest of the team in a way that is observable to them (but not verifiable). From expression (2), the leader has an incentive to raise her effort the greater is  $\theta$ . Consequently, her choice of effort—her example—can serve as a signal to her followers. To begin, consider the contract

$$s_L = \frac{1}{1 + N(N-1)} \quad \text{and} \quad s_n = \frac{N}{1 + N(N-1)} \quad \text{for } n \neq L. \quad (4)$$

It can be shown that under this contract the equilibrium is for the followers to mimic the leader; that is, choose the same effort level that she does. Moreover, aggregate expected welfare is greater under this contract than under optimal leading by sacrifice or symmetric information.

The welfare gain from leading by example is a demonstration of the theory of the second best. Since the followers make inferences about  $\theta$  based on the leader's effort, the leader's effort serves as a signal of the state. In particular, the harder the leader works, the harder the followers work. This gives the leader an additional incentive beyond that generated by her share of the value created. In fact, her incentives are sufficiently increased that the team can reduce her share, thereby increasing the shares (incentives) for the other workers. Consequently, each member of the team works harder than under symmetric information. Because the free-riding endemic to teams means too little effort to begin with, inducing harder work is welfare improving.

As it turns out, (4) is not the welfare-maximizing contract. The general formula for the welfare-maximizing contract is a lengthy and not worth repeating here. It can be shown that the leader's share is decreasing in  $N$ , but is bounded below by a positive constant. Consequently, in small teams ( $N \leq 6$ ), the leader's share is less than that of any of her team members' if the objective is maximize welfare; but in large teams ( $N \geq 7$ ), her share is greater.

If, for some reason, the team were required to have equal shares, it is still true that leading by example is welfare superior to symmetric information or leading by sacrifice (Proposition 6 of Hermalin, 1998). Again, this is because the need to set an example provides the leader extra incentives to supply effort.

### 2.3.2 More on leaders conveying information: Extensions of Hermalin (1998)

**Repeated leadership games.** A drawback to Hermalin (1998) is that it is a one-shot model, while leadership is often a repeated phenomenon; today's leader tends to be tomorrow's as well. As is well known from the theory of repeated games, behavior that is unsupportable in the equilibrium of a one-shot game can often be supported in a repeated setting. In particular, could a leader simply develop a reputation for truthful announcements in a repeated game?

Hermalin (2007) addresses some of the issues that arise when the one-shot game of Hermalin (1998) is infinitely repeated.<sup>24</sup> The same leader plays in all stage games, but the followers are new each stage game. Each generation of followers knows, however, the history of the game prior to it; in particular, the time- $t$  generation knows the realizations of  $\theta$  in the first  $t - 1$  periods and it knows the leader's announcements of  $\theta$  in those periods.<sup>25</sup> There is no correlation in the productivity parameter,  $\theta$ , across periods.

To begin, assume there is no scope for the leader to signal. Hence, if her reputation for making honest announcements about  $\theta$  is ruined, play reverts to infinite repetition of the equilibrium of the one-shot announcement game. In that game, talk is cheap, so the equilibrium is a garbling one in which the followers ignore the leader's announcement. The threat of such reversion is most effective at keeping the leader honest

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<sup>24</sup>In Hermalin (2007), attention is limited to equal-share contracts and the state space is the binary set  $\{\theta_0, \theta_1\}$ ,  $\theta_1 > \theta_0 > 0$ .

<sup>25</sup>The assumption of short-lived followers avoids issues of cooperation in the teams problem. Hermalin (2007) offers some economic justifications for this assumption.



when uncertainty about  $\theta$  is greatest—an equilibrium with honest announcements exists for a wider range of parameters the greater is the uncertainty about  $\theta$ . Intuitively, if there were little uncertainty about  $\theta$ , then the leader’s gain from honesty is relatively small—the followers essentially know what  $\theta$  will be anyway. When, however, uncertainty is large, considerable surplus—some of which would go to the leader—is lost when the followers don’t know  $\theta$  and their efforts tend, thus, to be highly inefficient.

Now suppose the leader can signal if she wishes. This changes the equilibrium of the one-shot stage game; it is now one in which the followers adjust their efforts to the state, but only because the leader has engaged in signaling that is costly to her. Because a distrusted leader needs to signal in the good state only, her loss from a tarnished reputation is increasing in the probability of the good state. Consequently, an equilibrium of the infinitely repeated game in which the leader is truthful (and doesn’t signal) is sustainable for a wider range of parameters the greater is the probability of the good state.

The followers, as well as the leader, benefit if they know the true state. They have an incentive, therefore, to pay the leader for being truthful. Indeed, in real life, followers often bestow tribute upon their leaders.<sup>26</sup> Tribute can be financial, in kind, or emotional. In a one-shot game (*e.g.*, Hermalin, 1998) tribute would never be paid because there is no way to contract on the truthfulness of the announcements. But once the game is repeated, the followers can make future tribute contingent on past honesty and, thus, can effectively contract on truthfulness (see Hermalin, 2007, for details).

Tribute is especially effective in supporting honest leadership when tribute costs the followers nothing (*e.g.*, tribute is the prestige of office). In this case, the followers’ incentive constraint to pay tribute is trivially met. A game with “free” tribute might be seen as corresponding closest to Weber’s image of charismatic leadership.

**Informational issues.** In Hermalin (1998), the leader’s signaling action (*i.e.*, amount of sacrifice or exemplary effort) fully reveals the state (*i.e.*,  $\theta$ ). What would happen if the leader’s action only partially revealed the state?

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<sup>26</sup>Max Weber (Gerth and Mills, 1946), for instance, considers tribute, either in material or emotional terms, as a principal reward for “charismatic” leaders.

Komai et al. (2007) explores this issue. Suppose  $e \in \{0, 1\}$  and  $\theta \in (0, 1)$ . If the leader leads by example, then the followers know only that the state is in the subset of states in which the leader chooses  $e$ . Agent  $n$ 's payoff is

$$\pi(\theta, e_n, \mathbf{e}_{-n}) = \frac{\theta}{N} \left( \sum_{j=1}^N e_j \right) - ce_n,$$

where  $\mathbf{e}_{-n}$  is the vector of actions chosen by the *other* team members and  $c > 0$  is the cost of effort (participation). The sharing rule is equal shares.

If  $\theta$  is common knowledge, then  $e_n = 1$  if  $\theta \geq Nc$  and  $e_n = 0$  otherwise. Efficiency, however, requires that  $e_n = 1$  if  $\theta \geq c$ . Full information does not, therefore, yield an efficient solution because of the teams problem.

Assume  $\bar{\theta} \equiv \mathbb{E}\{\theta\} < Nc$ ; absent any information, no team member would choose  $e = 1$ . Critically, assume

$$\frac{1}{1 - F(c)} \int_c^1 tf(t)dt \geq Nc, \quad (5)$$

where  $F(\cdot)$  is the distribution function over  $\theta$  and  $f(\cdot)$  is the corresponding density. Suppose only the leader learns  $\theta$  and she publicly chooses her  $e$  first. Let  $\theta^e$  be the followers' expectation of  $\theta$  based on the leader's action,  $e$ . It is not an equilibrium strategy for the leader to play  $e = 1$  if and only if  $\theta \geq Nc$ . If it were, then  $\theta^1 > Nc > \theta^0$  and the followers would mimic the leader. Consider the state  $\theta = Nc - \varepsilon$ , where  $\varepsilon > 0$  but small. If the leader deviated and chose  $e = 1$  for such a  $\theta$ , then her payoff would be

$$Nc - \varepsilon - c > 0.$$

Zero is her payoff were she to play  $e = 0$ ; hence, for  $\varepsilon$  small enough, it is not an equilibrium for her to play the strategy  $e = 1$  if and only if  $\theta \geq Nc$ .

In fact, (5) implies an equilibrium exists that achieves full efficiency. In this equilibrium, the leader plays  $e = 1$  if  $\theta \geq c$  and  $e = 0$  otherwise, and the followers mimic her. This is an equilibrium because, if the followers will mimic her, the leader plays  $e = 1$  if and only if  $\theta - c \geq 0$ . Given this rule,  $\theta^0 < c$ , and

$$\theta^1 = \frac{1}{1 - F(c)} \int_c^1 tf(t)dt \geq Nc.$$

Hence, mimicry is a best response for the followers. This illustrates that there exist scenarios in which it is better for the leader to signal limited rather than full information.<sup>27</sup>

If (5) doesn't hold, then an equilibrium exists in which the followers play a mixed strategy. Whether the mixed-strategy equilibrium (MSE) is superior to symmetric information depends on the parameter values. This reflects the following tradeoff. In the MSE, there is a positive amount of effort for  $\theta \in [\hat{\theta}, Nc)$ , where there is none under symmetric information. But the amount of effort is less in the MSE when  $\theta \in [Nc, 1)$  than under symmetric information.

In Hermalin (1998), the asymmetry of information has no impact ultimately on the teams problem with respect to the followers' effort.<sup>28</sup> In contrast, in Komai et al., by preventing full revelation of the state, the followers are induced to work harder than they would were the leader's action to reveal the state fully. In the Komai et al. setup, there is, thus, a benefit to *keeping* information from the followers; an organization could have a motive to limit the amount of information the leader can credibly communicate.

**Sequential provision of a public good.** Hermalin (1998) provides insights about the private provision of a public good. Briefly, rather than efforts, imagine the team members are donating to a public good. One donor knows the marginal value of a donation. Having her make her donation first and publicly—leading by example—improves welfare both *vis-à-vis* the situation in which  $\theta$  is unknown and *vis-à-vis* the situation in which it is known to all donors.

This suggests an explanation for the real-world phenomenon of fund-raising campaigns being launched with a large *public* donation by a well-respected individual and, then, followed up by solicitations of others. Absent an information story, it is difficult to explain this pattern of sequential donation: theory predicts that, under symmetric information, sequential donating raises less than simultaneous donating (Varian, 1994). The issue of informational signaling by lead donors has been further studied by Vesterlund (2003) and Andreoni (2006).

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<sup>27</sup>In a very different modeling context, Blanes i Vidal and Möller (2007) reach a different conclusion, at least with respect to a self-confident leader. They argue that a self-confident leader fares better in a transparent organization.

<sup>28</sup>Assuming the shares aren't optimally adjusted; but even then information creates no changes in the incentives of the followers *given* their shares.

The private provision of public goods interpretation of Hermalin (1998) lends itself well to experiments. Experiments have generally found support (see Potters et al., 2001, 2005; Gächter and Renner, 2003) for the leading-by-example model, although some experimental work (Meidinger and Villeval, 2002) suggests that it is not signaling that is being observed but reciprocity (*e.g.*, as suggested by Rabin, 1993). Methodological issues in Meidinger and Villeval, specifically the use of repeated interaction between leader and follower, make their analysis less than definitive insofar as they could be observing the truth-telling-with-no-signaling equilibrium of Hermalin (2007).

**Choice of Leader.** Recently, economists have turned to the question of which group member becomes the leader (Andreoni, 2006; Huck and Rey-Biel, 2006; Kobayashi and Suehiro, 2005). The first two develop models based on Hermalin (1998). The third utilizes a different model and is discussed later.

Andreoni adds a stage prior to the beginning of the Hermalin (1998) game in which, by expending  $c$ , any team member can learn  $\theta$ . Andreoni limits attention to the case of small  $c$ : not only is it socially optimal to expend  $c$ , but it is also privately optimal for any given individual to invest it if she knew the alternative was she invests or no one invests. The problem is that, absent any compensation mechanism, each team member would prefer that someone else make the investment. This is both because each team member wishes to avoid paying  $c$  and because, absent an adjustment in shares, the leader does worse than her followers under either leading by example or leading by sacrifice. For the public-goods problem in Andreoni, it makes sense to suppose that the other team members (the rest of society) can neither compensate an individual for expending  $c$ , nor adjust shares so as not to disadvantage the leader.

In Andreoni's model, the goal is a mechanism to coordinate on the leader. Absent such a coordination, the outcome will be inefficient with positive probability; either no one will invest or more than one person will invest.

Consider a simple model based on Andreoni's. The utility function is the same as Section 2.3.1. Assume a single moment at time at which anyone can buy the signal. Like Andreoni, limit attention to equal shares.

Assume, first, that if  $\theta$  is learned by anyone, then it is honestly shared with all. That is, the problem is solely one of coordination. Absent coordination on who is to be leader, the team members play a mixed-

strategy equilibrium. The equilibrium symmetric mixed strategy is spend  $c$  with probability  $p$  and don't with probability  $1 - p$ . The total expected social loss *vis-à-vis* a situation in which there was coordination is  $(N - 1)c$ . Intuitively, relative to a situation of coordination,  $N - 1$  team members are taking independent gambles with an expected loss of  $c$ , so the expected welfare loss must be  $(N - 1)c$ .<sup>29</sup>

This loss is increasing in  $N$  and equals the welfare loss (relative to coordination) that would result if everyone collected the information with probability 1.

Clearly there is a social benefit to leadership and it is increasing in the size of the group. Presumably, when feasible, this will lead the group to coordinate on a leader. Although each individual would, in this setting, prefer someone else be the leader (*i.e.*, someone else incur  $c$ ), no individual would shirk leadership if appointed. If followers believe the appointed leader will collect the information, then they have no incentive to do so themselves. The appointed leader will, therefore, have a strict incentive to collect the information.

What if the information collected by the *appointed* leader cannot be honestly and freely transmitted to the followers, so she faces the problem in Hermalin (1998)? Would the leader have an incentive to save  $c$  by not collecting the information and simply play as if she had collected it? The answer is no, at least if  $c$  is small enough. A leader who does not collect information when expected to by followers is in exactly the same situation as a leader who has observed the mean value,  $\bar{\theta}$ . Signaling is fully revealing, so the followers each expend effort  $\tilde{\theta}/N$ , where  $\tilde{\theta}$  is their belief about  $\theta$ . Let  $\Pi(\theta, \tilde{\theta})$  be the leader's payoff if the true state is  $\theta$  and everyone believes it to be  $\tilde{\theta}$ . Under signaling by sacrifice, this makes the leader's payoff

$$\Pi(\theta, \bar{\theta}) = \frac{\theta}{N}\bar{\theta} - \int_0^{\bar{\theta}} \frac{z(N-1)}{N^2} dz - \frac{\bar{\theta}^2}{2N^2}$$

if she hasn't learned the state (but is expected to have) and

$$\Pi(\theta, \theta) = \frac{(2N-1)\theta^2}{2N^2} - \int_0^{\theta} \frac{z(N-1)}{N^2} dz$$

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<sup>29</sup>An individual's expected loss if no information is obtained *vis-à-vis* if it is obtained is

$$\text{Var}(\theta) \frac{2N-1}{2N^2}.$$

So an individual is willing to mix if

$$c = (1-p)^{N-1} \text{Var}(\theta) \frac{2N-1}{2N^2}.$$

if she has learned the state. The leader, therefore, has an incentive to learn the information if and only if

$$c \leq \mathbb{E} \{ \Pi(\theta, \theta) - \Pi(\theta, \bar{\theta}) \} = \frac{N}{2N^2} \text{Var}(\theta).$$

A similar result can be shown to hold when signaling is leading by example.

While it is clear that the team should coordinate on a leader, it is worth returning to the question of who might arise endogenously as the leader. To study that, return to the assumption that the leader reveals what she learns truthfully and costlessly (*i.e.*, she need not signal). If all group members are identical, then the analysis is not particularly illuminating, so assume that each team member  $n$  has a unique cost of information acquisition,  $c_n$ . Were the team able to coordinate on a leader, efficiency would dictate that the leader be the member with the lowest  $c$ . Assume, however, no *ex ante* coordination is possible and consider the mixed-strategy equilibrium. A team member is willing to mix when his cost of obtaining the information equals his expected loss if he doesn't, namely the probability that no one else obtains the information times the expected loss from not having the information:

$$c_n = \prod_{j \neq n} (1 - p_j) \times \text{Var}(\theta) \frac{2N - 1}{N^2}. \quad (6)$$

The solution to this system of equations can be expressed as

$$\log(1 - p_n) = \frac{1}{N - 1} \sum_{j \neq n} \log \left( \frac{c_j N^2}{\text{Var}(\theta)(2N - 1)} \right) - \frac{N - 2}{N - 1} \log \left( \frac{c_n N^2}{\text{Var}(\theta)(2N - 1)} \right).$$

Surprisingly, the equilibrium probability that a given team member obtains the information is *increasing* in his own cost and *decreasing* in the other team members' costs. Intuitively, from (6), for a player to mix he must be indifferent between the cost of obtaining the information and the expected cost of not doing so. If the former goes up, then the latter must also if he is to remain willing to mix. The latter goes up if the probability that the others won't get the information goes up. To keep the others' playing a mixed strategy, it follows that the team member in question must, therefore, obtain the information with a greater probability.

If  $c_n$  is too large, then (6) doesn't have a solution in which all  $p_j \in (0, 1)$ ; in this case, team member  $n$  plays the pure strategy of *not* obtaining the information. Consequently, the probability of becoming the

leader is, first, increasing in the cost of obtaining the information, but then falls to zero. While counter-intuitive, this result is not necessarily at odds with reality. My informal observation of organizations with endogenous leadership (*e.g.*, academic departments, PTAs) suggests that it is the people in the middle of the opportunity-cost-of-time distribution who are the most likely to take the lead on a given issue.<sup>30</sup>

Kobayashi and Suehiro (2005) consider a different variant of Hermalin (1998). Suppose, now, all team members are endowed with information, but the information is imperfect. Specifically, each team member gets a realization of a binary signal,  $s \in \{B, G\}$ , where  $G$  is good news about the productivity state and  $B$  is bad news. Conditional on the true state, each team member's signal is determined independently. Assume a team member can publicly (but not verifiably) expend effort in one of two periods,  $t = 1$  or  $2$ . If a team member knew that his teammates would expend effort at  $t = 1$ , he does better to wait until  $t = 2$  because he, then, can base his effort on the inferences he draws from their efforts. On the other hand, if he knew that his teammates would wait until  $t = 2$ , then he may wish to expend effort at  $t = 1$  if he can convey information that increases their efforts; that is, if he can lead by example.

Among the possible equilibria of the game is one in which a team member who observes  $s = G$  expends effort at time  $t = 1$  and a team member who observes  $s = B$  expends effort at time  $t = 2$ . In this equilibrium, there is endogenous leadership insofar as who leads by example (if anyone does) is not predetermined, but arises as part of the equilibrium play of the game.

Kobayashi and Suehiro is a clever attempt to endogenize leadership, but it is not without problems. One is the possibility that both team members attempt to lead by example. Although leadership battles are by no means unheard of, they typically arise when would-be leaders hold different views; not, as in Kobayashi and Suehiro, when they hold the same view. Leadership battles, it should be noted, have not been explored in the economics literature, although they have certainly received considerable attention in other literatures (*e.g.*, Machiavelli [Bondanella and Musa, 1979], de Waal, 1998, and Wrong, 1995).

### 2.3.3 The role of conformism: Huck and Rey-Biel (2006)

Huck and Rey-Biel consider the endogenous emergence of leadership in a two-member team. Unlike earlier

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<sup>30</sup>This is consistent with one of my father's sayings: "If you want something done, ask a busy person."

models, there is no uncertainty about the state of the world; it is commonly known that the value of the team's efforts are  $V = 2(r_1e_1 + r_2e_2)$ , where  $r_n$  is the commonly known productivity of team member  $n$ . The sharing rule is equal shares.<sup>31</sup> Unlike earlier models, team members have a bias,  $b_n \geq 0$ , toward conformism: team member  $n$ 's utility is

$$u_n = \frac{V}{2} - \frac{1}{2}e_n^2 - \frac{b_n}{2}(e_n - e_m)^2,$$

where  $e_m$  is his teammate's effort.

Team member  $n$ 's best response to  $e_m$  is readily shown to be

$$e_n(e_m) = \frac{r_n + b_n e_m}{1 + b_n}. \quad (7)$$

If  $b_n = 0$  (*i.e.*, no conformity bias), then  $e_n(e_m) = r_n$ , the usual result for the teams problem.

Given simultaneous play, the equilibrium is the solution to the simultaneous equations (7):

$$e_n^{\text{SIM}} = \frac{r_n(1 + b_m) + r_m b_n}{1 + b_n + b_m}. \quad (8)$$

Observe that if the biases are the same and the marginal productivities are the same, then the standard solution to the teams problem results; that is,  $e^{\text{SIM}} = r$ . If the team members' conformity bias is the same, then the greater this common bias, the lower is output (unless bias is irrelevant because  $r_1 = r_2$ , so the team members naturally choose the same level of effort). Because teams produce an inefficiently low level of output and bias is directly taxing on the team members, it follows that an increase in bias lowers welfare.

Now consider sequential play. One team member leads by choosing her effort first, followed by the other who chooses his effort after observing the leader's. The follower's response is given by (7). The leader's problem is, thus,

$$\max_e r_L e + r_f \frac{r_f + b_f e}{1 + b_f} - \frac{1}{2}e^2 - \frac{b_L}{2} \left( \frac{r_f - e}{1 + b_f} \right)^2,$$

where the subscripts  $L$  and  $f$  refer to the leader and follower, respectively. Algebra readily reveals that the resulting output is greater than the output under simultaneous play (if  $b_f > 0$ ).

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<sup>31</sup>Observe equal shares is not an optimal contract under the usual teams problem if  $r_1 \neq r_2$ ; in that case, optimal shares are

$$s_n = \frac{r_n^2}{r_n^2 + r_m^2}.$$



If  $r_f = r_L = r$  and  $b_f = b_L = b$ , then welfare is increasing in bias. This is not surprising: the follower's conformity bias increases the leader's incentives to work hard. Moreover, hard work by the leader increases, via the conformity bias, the follower's incentive to work hard. Given that the teams problem means too little effort, it follows that a conformity bias can increase welfare.

Because of how leading and following change incentives, the Huck and Rey-Biel model offers insights on who the leader should be. If the bias parameters are the same, but one worker is more productive than the other, then the leader should be the *less* productive team member. If the productivity parameters are the same, but one worker has a greater bias toward conforming, then the less biased worker should be the leader.

### 2.3.4 Leadership styles: Rotemberg and Saloner (1993, 2000)

Rotemberg and Saloner (1993, 2000) focus not on what leaders do, but how they do it. Specifically, they seek to fit leadership style into models of organizations. The first article considers the effect of an empathetic or participatory leadership, while the second deals with the effect of vision. In both, leadership style is taken to be an innate, immutable, and known characteristic of the leader. Because leadership style shapes the leader's behavior, it can serve as a commitment to certain behaviors. The organization can lever that commitment to compensate, at least partially, for an assumed inability to write complete contracts.

To illustrate their ideas, consider a model with a leader and a follower. The follower can incur private cost  $c$  to devise a project for the organization to undertake; if he does not spend  $c$ , there is no project. Prior to sinking  $c$ , the gross profit,  $\pi$ , from the to-be-devised project is uncertain; that it is distributed  $F(\cdot)$  is commonly known. Assume  $F(0) > 0$  and  $\mathbb{E}\{\pi\} > c$ . Once devised (once  $c$  is sunk), the project's  $\pi$  is learned with certainty by the leader and follower. At this point, the leader has the authority to decide either to undertake the project, yielding the organization  $\pi$ , or to forgo the project, yielding it zero. Critically, neither whether the follower has devised a project nor the prospective or actual outcome of the project are verifiable (can serve as a contractual contingency). The leader's decision to undertake the project is, however, verifiable. A contract can, thus, stipulate a payment,  $w$ , should the project be implemented. The leader's utility is  $\lambda w + (1 - \lambda)(\pi - w)$  if the project is undertaken and zero otherwise, where  $\lambda \in [0, 1)$  is the

extent to which she is empathetic with the follower (has a participatory leadership style).<sup>32</sup> A  $\lambda$  of zero is a pure profit-maximizing (“autocratic”) leader. A follower devises a project if and only his expected payment,  $w$  times the probability he devises a project the leader implements, exceeds his cost.

In the first best,<sup>33</sup> a project is undertaken if and only if  $\pi \geq 0$ . In the first best, the expected payoff to devising a project is  $\int_0^\infty \pi dF(\pi)$ , which exceeds  $\mathbb{E}\{\pi\}$ , which exceeds  $c$ ; projects should be devised in the first best.

In the actual situation, the leader undertakes a project if and only if

$$\pi \geq \frac{1 - 2\lambda}{1 - \lambda} w. \quad (9)$$

If  $\lambda = 1/2$ , then this rule replicates the first-best rule; otherwise—including if the leader is a pure profit-maximizer—the decision is distorted. The follower’s expected payment if he devises a project is

$$\bar{W} \equiv w \left( 1 - F\left(\frac{1 - 2\lambda}{1 - \lambda} w\right) \right). \quad (10)$$

If  $\bar{W} \geq c$ , the follower will devise a project, but not otherwise. Depending on  $F(\cdot)$  and  $\lambda$ , there may be no  $w$  such that the right-hand side of (10) exceeds  $c$ . For instance, if

$$F(\pi) = 1 - \exp\left(-\pi - \frac{1}{2}\right), \quad (11)$$

$c = 1/3$ , and the leader is a pure profit-maximizer, then no solution exists ( $\mathbb{E}\{\pi\} = 1/2$  for this example). Welfare with a pure profit-maximizing leader would be zero in this example. Empathetic leadership can help: The first best is always achievable if  $\lambda = 1/2$  — set  $w = c/(1 - F(0))$ , so the follower has an incentive to invest and, because, the right-hand side of (9) is 0, the implementation decision is efficient.

Even if the organization cannot optimize its leader’s empathy level (*i.e.*, set  $\lambda = 1/2$ ), continuity implies that some levels of empathy are superior to no empathy. In some situations, even extreme empathy,  $\lambda \rightarrow 1$ ,

<sup>32</sup>Rotemberg and Saloner’s identification of empathy with a participatory leadership style is motivated by studies that show a participatory leadership style exhibits empathetic behaviors (*e.g.*, “solicit opinions, facts, and *feelings* from . . . participants”; House and Baetz, 1979, p. 364, emphasis added).

<sup>33</sup>To be precise, first-best actions are here defined as those that maximize the organization’s expected net profit; that is, maximize the expected value of the difference  $\pi - c$ . This is a standard welfare measure if  $\lambda = 0$  and upfront non-contingent transfers can be made. When  $\lambda > 0$ , this definition is less obviously the right one.

is superior to no empathy at all. A total empathetic leader would always implement the project regardless of  $\pi$  or  $w$ . Setting  $w = c$ , the follower has the appropriate incentives to devise a project. For the example in which  $F(\cdot)$  is defined by (11), expected net profit is  $\mathbb{E}\{\pi\} - c = 1/6 > 0$ ; the organization's expected net profit is greater with a totally empathetic leader than a purely profit-maximizing leader.

Rotemberg and Saloner (2000) considers the importance of vision, particularly the extent to which an organization benefits from a leader with a contrarian vision.<sup>34</sup> Consider the following extension of the previous model.<sup>35</sup> Interpret  $\pi$  not as actual profits, but as a signal of expected profits if the project is undertaken. The objective (industry consensus) view is that the signal equals expected profits. The leader, however, is more optimistic and believes expected profits are  $\pi + \Delta$ ,  $\Delta \geq 0$ . The leader is a risk-neutral profit-maximizer and undertakes the project if

$$\pi + \Delta - w \geq 0. \quad (12)$$

The follower will devise a project if and only if

$$w(1 - F(w - \Delta)) \geq c. \quad (13)$$

If  $\Delta = c/(1 - F(0))$ , then  $w = \Delta$  solves (13). Moreover, when  $w = \Delta$ , (12) becomes the first-best rule for maximizing expected profit (objectively). Hence, a visionary leader with a  $\Delta$  of  $c/(1 - F(0))$  yields the first best (objectively). Continuity implies there is a range of  $\Delta$ s that do better than a "visionless" leader (*i.e.*, whose  $\Delta = 0$ ). Indeed, if  $F(\cdot)$  is given by (11) and  $c = 1/3$ , then an infinitely optimistic leader ( $\Delta \rightarrow \infty$ ), who yields an expected net profit of  $1/6$ , is superior to a visionless leader, who yields no profit at all.

From the literature on relational contracts, these outcomes can be sustained given repeated play if a rational autocratic and visionless leader can develop a reputation for playing *as if* she had a  $\lambda = 1/2$  or a

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<sup>34</sup>Van den Steen (2005b) is a model in a similar vein. Van den Steen's work is discussed *infra* in §3.2.4.

<sup>35</sup>Rotemberg and Saloner (2000) deals with how organizations choose among competing strategies and the value of managerial vision with respect to providing incentives to develop multiple strategies. The article's insights into leadership *per se*, however, are captured by the extension of Rotemberg and Saloner (1993) considered here.

$\Delta = c/(1 - F(0))$ .<sup>36,37</sup> From a game-theoretic perspective, a leader with “style” is replicable by a leader who has no style, but knows how to play optimally in a repeated setting.

While, consequently, examples of *successful* leadership could fail to prove leadership style matters, examples of *unsuccessful* leadership suggests it does matter. Plenty of smart people, who presumably know how to be strategic, have been undone by their poor leadership style. A salient example for economists would be Larry Summers’s effective ouster from the presidency of Harvard due to a problematic leadership style. Professor Summers’s brilliance and ability to think strategically is undisputed. Nevertheless, it would appear in his case that style trumped strategy.<sup>38</sup> Bertrand and Schoar (2003) provides more systematic evidence that leadership style matters; specifically, they find significant and persistent differences in how different managers make decisions and that these differences correlate with individual attributes (*e.g.*, age, education) that might influence managers’ outlooks and beliefs.

### 2.3.5 Overconfident leaders

In the variant of Rotemberg and Saloner (2000) presented above, the parameter  $\Delta$  represented vision. It could, just as readily, represent the degree to which the leader suffers from the cognitive bias of overoptimism. Another well-researched cognitive bias is overconfidence—believing you know more than you really do. Camerer and Lovallo (1999) present experimental evidence and Malmendier and Tate (2005) statistical evidence on the prevalence of overconfidence. Given overconfidence is a prevalent bias among managers (Malmendier and Tate), the obvious question is why hasn’t this bias been driven out by rationality? Could

<sup>36</sup>For more on relational contracts see Bull (1987), MacLeod and Malcolmson (1989), and Levin (2003).

<sup>37</sup>In an infinitely repeated game or game with uncertain end such a reputation is worth establishing if

$$\delta \int_0^{\infty} \pi dF(\pi) - \delta c - \frac{c}{1 - F(0)} \geq \delta V,$$

where  $\delta$  is the discount factor and

$$V = \begin{cases} \int_w^{\infty} (\pi - w) dF(\pi), & w \text{ the smallest solution to (10) for } \lambda = 0 \\ 0, & \text{if (10) has no solution for } \lambda = 0 \end{cases}.$$

<sup>38</sup>Disclaimer: It is not my intention to comment positively or negatively on Professor Summers’s tenure as Harvard’s president. It is, however, objectively true that a significant number of Harvard faculty were upset by his leadership style and that this was a major factor behind his having to resign as Harvard’s president.

it, similar to the overoptimism bias in a Rotemberg and Saloner-like model, be organizationally useful?

Blanes i Vidal and Möller (2007) offer a model in which an overconfident leader can be superior to an unbiased leader.<sup>39</sup> A simplified version of their model is as follows. Initially, nature decides which of two projects,  $A$  or  $B$ , is the correct project. Assume the projects are equally likely to be the correct one. A public signal,  $s_{\text{PUB}} \in \{A, B\}$ , is then realized. Denote the probability that the signal is accurate by  $p$ .<sup>40</sup> Assume  $1/2 < p < 1$ . The leader receives a private signal,  $s_{\text{PRI}} \in \{A, B\}$ , that she cannot share with her single follower. Denote the *objective* probability that the private signal is accurate by  $q$ . Assume  $1/2 < q < p$ . Note the private signal is less precise than the public one. Once both signals are realized, the leader chooses the project to be undertaken. If she chooses the correct project, then the team produces  $2e$ , where  $e$  is the follower's effort. If she chooses the wrong project, then the team produces 0 regardless of  $e$ . As previously, contracts cannot be based on  $e$  and the follower's utility is  $w - e^2/2$ , where  $w$  is his share of output. Assume an equal sharing rule between leader and follower. If the follower believes the probability of the leader's having selected the correct project to be  $b$ , then he chooses his effort to solve

$$\max_e be - \frac{e^2}{2}. \quad (14)$$

The solution to (14) is  $e = b$ .

Consider, initially, an objective (unbiased) leader. Because  $p > q$ , she should choose the project solely on the basis of the public signal. If  $s_{\text{PUB}} = s_{\text{PRI}}$  and the follower could learn  $s_{\text{PRI}}$ , then

$$b = \frac{pq}{1 - p - q + 2pq} > p;$$

so the follower would work harder than if he knew only the public signal. Given that the leader always does better in expectation the harder the follower works, she has, similar to Hermalin (1998), an incentive to always claim her private signal agrees with the public signal. The follower, understanding this incentive, rationally disregards such announcements. The leader's private signal does, however, represent valuable information *vis-à-vis* the optimal amount of effort for the follower to expend. The leader's inability to

<sup>39</sup>A recent working paper by Bolton, Brunnermeier and Veldkamp considers the advantage of an overconfident leader in a situation in which coordinating the followers' actions is important.

<sup>40</sup>That is,  $p = \Pr\{s_{\text{PUB}} = X | X \text{ is the correct project}\}$ .

communicate her signal credibly, thus, leads to a loss in team welfare relative to the first best. In this scenario, expected welfare is  $W^u \equiv 3p^2/2$ .

Now suppose the leader is overconfident: she believes the probability that her private signal is correct is  $\hat{q} > p > q$ . One can interpret this as her believing that she is better able to assess the market/situation/environment than she truly is. The value of  $\hat{q}$  is common knowledge. Because  $\hat{q} > p$ , she bases her choice of signal on her private information and not the public signal.<sup>41</sup> Knowing this, the follower assesses the probability of the leader's chosen project being the correct project as

$$b_+ \equiv \frac{pq}{1 - p - q + 2pq}$$

if the chosen project agrees with the public signal and

$$b_- \equiv \frac{q(1 - p)}{p + q - 2pq}$$

if the chosen project disagrees with the public signal. Observe that an overconfident leader credibly communicates her private signal, albeit at the cost of potentially acting on the wrong signal. Expected team welfare (using objective probabilities) is

$$W^o \equiv 2pqb_+ - (1 - q - p + 2pq)\frac{b_+^2}{2} + 2(1 - p)qb_- - (q + p - 2pq)\frac{b_-^2}{2}.$$

There exist values of  $p$  and  $q$  such that  $W^o > W^u$ ; the team is better off with an overconfident leader than an objective leader for those values.<sup>42</sup>

The preceding analysis presumes naïveté on the part of the leader; specifically, she chooses the project on the basis of her private signal without regard for how the follower will respond. If  $q$  is also common knowledge,<sup>43</sup> then the leader realizes  $b_+ > b_-$  and she may, therefore, have an incentive to deviate from

<sup>41</sup>If you're worried that I just pulled a fast one, don't; I tidy things up in the next paragraph.

<sup>42</sup>For example, if  $p = .85$ , then  $W^o \geq W^u$  for all  $q \in (.817, .85)$ . The shortness of that interval is, in part, a function of the production function used to illustrate the model; other production functions can yield larger intervals.

<sup>43</sup>Subtle issues arise if we assume that both  $q$  and  $\hat{q}$  are common knowledge and these issues are somewhat contentious within economics; see, *e.g.*, Gul (1998) and the response of Aumann (1998). I will, however, pass over these subtleties here.

relying solely on her private signal when it disagrees with the public signal. This incentive exists only if

$$\frac{\hat{q}(1-p)}{p+\hat{q}-2p\hat{q}}b_- < \left(1 - \frac{\hat{q}(1-p)}{p+\hat{q}-2p\hat{q}}\right)b_+. \quad (15)$$

Hence, the above equilibrium exists if (15) doesn't hold, which is to say

$$\hat{q} \geq \frac{p^3 + p^2q - 2p^3q}{1 - 3p + 3p^2 - q + 4pq - 4p^2q} \quad (16)$$

(the RHS of (16)  $< 1$  given  $p < 1$ ). For example, if  $p = .85$ ,  $q = .82$ , and  $\hat{q} = .95$ , then the leader would rely solely on her private signal in equilibrium and this would yield greater expected welfare than having an objective leader.

While overconfidence can be an asset, it can also be disastrous given different parameter values (expected welfare, *e.g.*, is reduced if  $p = .85$ ,  $q = .75$ , and  $\hat{q} = .95$ ), a point also recognized by Blanes i Vidal and Möller. From Sophocles's *Oedipus Rex* to the political fallout from the Iraq war, literature and history are replete with examples of leaders brought low by their overconfidence (hubris). Literature and history, of course, are also replete with examples of bold leaders who triumphed against the odds. It may well be that overconfidence is neither a virtue nor a vice, but simply increases the variance of outcomes *vis-à-vis* those achieved by objectively correct leaders.

This last point can be illustrated from some work of mine in progress. Consider the simultaneous-play game shown in Figure 3. Two leaders are squaring off in a variation of a hawk-dove game. Assume the payoffs in the bold-bold cell arise as follows: In any conflict, one side triumphs, which pays that side 1, and the other is crushed, which pays it  $-5$ . The objective probability of being the triumphant side in such a conflict is  $1/2$ . In a world of objective leaders (*i.e.*, who know the probability of triumph is  $1/2$ ), the unique evolutionarily stable equilibrium is the mixed-strategy Nash equilibrium in which each leader is bold with probability  $1/3$  and timid with probability  $2/3$ . Payoff variance is  $2/3$ .

Now suppose a proportion  $\mu$  of all leaders hold the following objectively incorrect beliefs: (i) some leaders are more able than others; (ii) they themselves are such leaders; and (iii) when equally able leaders are in conflict, the probability of triumphing is  $1/2$ ; but an abler leader against a less able leader triumphs with probability  $2/3$ . Such an overconfident leader, thus, believes if he plays against an abler leader, then the game is as shown in Figure 3; but is as shown in Figure 4 if he plays against a less able leader. Assume that  $\mu$

|            |       |               |       |
|------------|-------|---------------|-------|
|            |       | Column Leader |       |
|            |       | Bold          | Timid |
| Row Leader | Bold  | -2            | 0     |
|            | Timid | -2            | 1     |
|            |       | 1             | 0     |
|            |       | 0             | 0     |

**Figure 3:** A hawk-dove-like game

|              |       |                  |       |
|--------------|-------|------------------|-------|
|              |       | Less Able Leader |       |
|              |       | Bold             | Timid |
| Abler Leader | Bold  | -3               | 0     |
|              | Timid | -1               | 1     |
|              |       | 1                | 0     |
|              |       | 0                | 0     |

**Figure 4:** The misperceived game

is common knowledge, as are the beliefs of overconfident leaders and objective (unbiased) leaders.<sup>44</sup> Assume that when leaders are paired off to play the game, they don't know whether their opponent is overconfident or objective.

Let  $p_t$  be the probability that a type- $t$  leader is bold,  $t \in \{o, u\}$  (overconfident or unbiased, respectively). The unique symmetric (within leader type) Nash equilibria are

$$p_o = \frac{1}{3\mu} \text{ and } p_u = 0 \text{ if } \mu \geq \frac{1}{3} \text{ and}$$

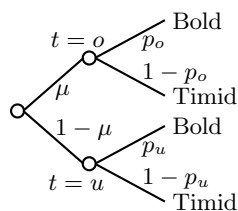
$$p_o = 1 \text{ and } p_u = \frac{1 - 3\mu}{3(1 - \mu)} \text{ if } \mu < \frac{1}{3}.$$

It is worth noting the equivalence of this game to one in which all leaders are unbiased, but in which they execute their mixed strategies according to the compound lottery shown in Figure 5. It follows, therefore, that *each* type of leader has an equilibrium expected payoff of 0, so a leader neither suffers nor gains from being overconfident. It further follows that these equilibria are evolutionarily stable. In particular, overconfidence

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<sup>44</sup>Again this creates subtle issues. In this model they could be avoided when  $\mu \geq 1/3$  by making the structure of the game common knowledge among the objective leaders, but have the overconfident leaders hold a fourth belief that less able leaders are always timid.





**Figure 5:** Compound lottery. Given equilibrium values of  $p_o$  and  $p_u$ , probability of playing bold is  $1/3$  and probability of playing timid is  $2/3$ .

is neither evolutionarily advantaged nor disadvantaged. If  $\sigma_t^2$  is the payoff variance for type  $t$ , it follows that

$$\sigma_o^2 = \begin{cases} \frac{2}{3\mu}, & \text{if } \mu \geq 1/3 \\ 2, & \text{if } \mu < 1/3 \end{cases} \quad \text{and} \quad \sigma_u^2 = \begin{cases} 0, & \text{if } \mu \geq 1/3 \\ \frac{2-6\mu}{3(1-\mu)}, & \text{if } \mu < 1/3 \end{cases} .$$

Observe  $\sigma_o^2 > \sigma_u^2$  in both equilibria—payoffs are more volatile with an overconfident leader than an unbiased leader, consistent with the idea that overconfident leaders have the most dramatic successes and the most catastrophic failures.

### 2.3.6 Is leadership illusory?

Overoptimism and overconfidence are cognitive biases suffered by leaders. A potential cognitive bias suffered by followers is the *fundamental attribution bias*—the well-documented tendency of people to ascribe outcomes to the attributes of the individual actors rather than to the situation they faced; effectively, to underweight the base rates of success or failure at a task when updating beliefs about an actor’s ability from his or her success or failure at the task. Organizational behavior scholars have long postulated that followers will, consequently, unduly attribute the group’s success or failures to its leaders, the so-called “illusion of leadership” (see Weber et al., 2001 for citations to some of this literature).

Weber et al. test this idea experimentally. They consider a teams problem with a “weakest-link” technology;

$$\text{team member } n\text{'s payoff} \equiv \begin{cases} \frac{5}{4}(\min\{e_1, \dots, e_N\} + 1) - e_n, & \text{if } \min\{e_1, \dots, e_N\} > 0 \\ 1, & \text{if } \min\{e_1, \dots, e_N\} = 0 \end{cases} ,$$

where, for each  $n$ ,  $e_n \in \{0, 1, 2, 3\}$ . The game has four pure-strategy Nash equilibria, each characterized by all  $N$  team members playing the same  $e$ . The equilibria are Pareto ranked, with a higher- $e$  equilibrium

dominating a lower- $e$  equilibrium. Earlier experimental evidence by Van Huyck et al. (1990) shows that large teams end up coordinating on the  $e = 0$  equilibrium, while small teams can successfully coordinate on the  $e = 3$  equilibrium.<sup>45</sup> In other words, cooperation is harder to sustain the larger the team. In Weber et al., one of the team members is made leader and the leader is allowed to make a speech exhorting her fellow team members to cooperate (*i.e.*, play  $e = 3$ ). Despite this, cooperation is far less common in large teams than small teams, consistent with cooperation being harder to sustain in large teams. Through various methods, Weber et al. have team members indicate why their teams were successful (*i.e.*, tended to cooperate) or were unsuccessful. To a significant degree, team members ascribe the outcome to the ability of the leader; that is, they appear to be ignoring the effect of the situation (large vs. small team) and overweighting the leader's "leadership abilities."

Although insightful, this work is not without problems. First, in the Van Huyck et al. experiments, which had no leaders, large teams *never* coordinated. In the Weber et al. experiments, large teams are sometimes able to sustain coordination, suggesting that there is a role for leadership (or at least announcements). Second, the questionnaires given team members do *not* ask whether the size of the team contributed to success or failure. Hence, unless leadership ability were truly irrelevant to the outcome, it is not clear that one may conclude that the team members were assigning the wrong weights to the situation *vis-à-vis* leadership ability. Indeed, given the first point, it is not clear that team members were necessarily erring in attributing—at least in part—the outcome to the leader's ability.

To expound on these two points, consider a world in which ability,  $\alpha$ , is drawn uniformly from  $\{-1, 0, 1\}$ . Assume there are two tasks, easy and difficult ( $t \in \{E, D\}$ ). Let the probability of success conditional on task and ability be  $p_t + \alpha\varepsilon$ , where  $0 < \varepsilon < p_D < p_E < 1 - \varepsilon$ . Suppose people are surveyed after the task's outcome is realized and asked what is the most likely ability of the actor (leader)? Bayes Rule requires  $\hat{\alpha} = 1$  if success and  $\hat{\alpha} = -1$  if failure. Given a large number,  $M$ , of such trials, approximately  $Mp_t$  successes should be observed for task  $t$ . If  $p_E > 1/2 > p_D$ , then the median rating of actors doing the easy task will be 1 and the median rating of those doing the difficult task will be  $-1$ . The averages will be approximately  $2p_E - 1 > 0$  and  $2p_D - 1 < 0$ , respectively. This would give results analogous to those in Weber et al., but

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<sup>45</sup>The actual game in Van Huyck et al. differs slightly in details, but that is immaterial for this discussion.

these results are perfectly consistent with *unbiased* attribution.<sup>46</sup>

To be clear, however, this is not to say that Weber et al.'s results can't be due to the fundamental attribution bias. The case for the fundamental attribution bias is strong in general; and there is no reason to think it, as well as biases like the hindsight bias, do not apply to followers' assessments of their leaders. The volatilities of established politicians' poll ratings do not seem, for instance, readily reconcilable with rational Bayesian updating. As, however, the above discussion shows followers are not necessarily mistaken when they attribute at least some of the team's success or failure to their leader.

### 3 Corporate Culture

As the quotes in Section 1.2 demonstrate, corporate culture is not a precisely defined concept. It can be seen as encompassing the norms and customs of a firm, its informal and unwritten rules of behavior. As such culture governs actions both within the firm and instructs members of the firm how to act with those outside the firm (*e.g.*, suppliers or customers). Corporate culture is also defined to encompass the experiences, knowledge, and language shared by those belonging to the firm. Although shapeable by individuals, especially leaders, culture is more than an amalgam of current personalities within the firm; it is a property of the firm. Consequently, given normal personnel turnover, the culture will persist over time, evolving slowly if at all. Finally, although a firm's culture can be influenced by broader social mores and customs, it is nevertheless distinct from national or regional culture.<sup>47</sup>

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<sup>46</sup>Weber et al. ask the team members to "rate the leader's overall leadership ability" on a nine-point scale, 1 = extremely poor; 9 = extremely good. (Note: in the reported tables, Weber et al. write "9 = average"; I believe, however, that must be a typographical error.) Medians for large teams are 3 or 4, depending on experimental design, and they are 5 to 7 for small teams. Means are similar but closer in value than medians, consistent with the hypothetical example in the text.

<sup>47</sup>There is, however, a literature that considers the link between social customs and corporate culture. The influence of the broader society has been invoked, for example, to explain systematic differences in the corporate cultures of American and Japanese firms. See, *e.g.*, Ferris and Wagner (1985), Okuno-Fujiwara (1994), Morita (2001), and Tackney (2001).

### 3.1 Assessment and Measurement of Corporate Culture

Given that corporate “culture is not just a concept but a family of concepts” and “like a Rorschach [test] means different things to different people” (O’Reilly and Chatman, 1996, p. 159), it is not surprising that corporate culture has proved difficult to assess and measure. These difficulties, in turn, can create problems for a quantitative science such as economics.

In assessing and measuring corporate culture, a researcher could conceivably wish to know some or all of the following:

- What is the strength of the culture? How committed to it are people? How uniform is commitment across the ranks of the hierarchy? Across employee cohorts?
- What is the impact of the culture? How does it aid or hinder the firm?<sup>48</sup>
- How stable is the culture? Is it prone to decay? If so, at what rate?
- What resources does management expend on the maintenance of the culture?
- What resources would management need to expend to *change* the culture? How would it accomplish that task?

As detailed in Sparrow (2001) and Payne (2001), the principal measurement tools are surveys. Some surveys are carried out through out the organization and others (*e.g.*, Kotter and Heskett, 1992) are sent only to top management. Sometimes, as in Kotter and Heskett, managers of one firm are asked questions about the culture of other firms as well as their own. For instance, people could be asked to rate a firm on the extent to which it is managed according to long-standing policies and practices; to rate it on whether it has a style or way of doing things; and so forth (see Payne). Sometimes people are asked directly to rate the strength of a firm’s culture.

An indirect means of measuring the strength of a culture is to ascertain the degree of consensus on various attitudinal questions. Sometimes (see Payne, p. 113) people are explicitly surveyed about the degree

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<sup>48</sup>A certain suspicion must apply to any prediction that a strong corporate culture is always advantageous. If that were true, then how would one explain variation in the strength of culture across firms? Why wouldn’t all weak culture firms become strong culture firms (or die)? Hermalin (2001, pp. 243–248) discusses this issue in greater depth.

of consensus among people in the firm. The rationale behind these approaches is that a strong culture should lead to strong consensus in beliefs and attitudes.

Another indirect approach is to measure an organization's investment in correlates of strong culture (O'Reilly and Chatman, 1996). From studies of organizations with notoriously high levels of indoctrination, such as religious cults, certain practices are known to lead to indoctrination or at least correlate with it. For instance, Table 1 of O'Reilly and Chatman offers a list of such practices, such as "use multiple recruiting steps requiring escalating commitment on the part of the recruit," a practice used in religious recruitment. The rationale is that firms that employ strong indoctrination techniques will wind up with strong cultures.

Purely "ethnographic" methods have also been employed. Although such research can serve to enrich our understanding of corporate culture, the fact that it does not lend itself to quantitative conclusions limits its usefulness for any kind of statistical analysis.

Within economics, where survey and ethnographic methods are rarely used, other approaches have been taken to the empirical study of corporate culture. An example is Cronqvist et al. (2007), which posits that if cultures are influential and persistent, then firms' investment, financial, and operational policies should also be persistent; moreover, spinoffs should follow policies similar to their parents. The empirical evidence presented by Cronqvist et al. is consistent with these hypotheses.

## 3.2 The Economic Analysis of Corporate Culture

### 3.2.1 Coordination, reputation, and unforeseen contingencies: Kreps (1986)

Consider Figure 6, a "Battle of the Sexes" game between a senior and a junior person. An issue with such games is how do the players determine which of the game's three Nash equilibria is to be played? Absent some institution for selecting the equilibrium, there is no clear prediction of what the players will do. Experiments indicate, however, that the players will frequently *fail* to coordinate (*i.e.*, they will often get 0).<sup>49</sup> It would, therefore, be welfare superior to have an institution that selected one of the two pure-strategy equilibria prior to play.

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<sup>49</sup>See, *e.g.*, Charness et al. (in press).

|        |   |        |   |
|--------|---|--------|---|
|        |   | Junior |   |
|        |   | A      | B |
| Senior | A | 2      | 0 |
|        | B | 0      | 3 |
|        |   | 0      | 2 |

**Figure 6:** Coordination game between junior and senior personnel.

Kreps suggests that corporate culture is just such an institution. Suppose, for instance, it is understood, as matter of culture, that juniors are to defer to seniors. Consequently, juniors and seniors expect that the A–A equilibrium will be played, given it is best for the senior player.

**Unforeseen contingencies.** Given that coordination on the A–A equilibrium could also be achieved by other means, including contractually, the usefulness of corporate culture is not immediately obvious. As Kreps suggests, its usefulness is more apparent if we imagine a world of unforeseen contingencies: Consider Figure 7. Provided  $S > s > 0$  and  $J > j > 0$ , this generalizes the game of Figure 6. Imagine, now, that there are many such coordination games that junior and senior personnel will play. What A will be and what B will be are not known *ex ante*, nor are the values of  $S$ ,  $s$ ,  $J$ , and  $j$  known. A player may not even know in advance if he will be the junior or senior player. In short, the details of all possible coordination games could be unforeseen contingencies. In such an environment, contracting could be impractical (although see discussion at the end of this section).<sup>50</sup> A cultural norm of deferring to seniors could serve as an efficient substitute for explicit contracting, ensuring that a Pareto efficient outcome is reached.

**Corporate reputation.** A prevalent view is that a corporation’s culture belongs to the corporation in the sense that it is robust to turnover in personnel. Building on Kreps, consider the game in Figure 8: This is a game between a boss and an underling. The boss can treat the underling fairly or exploit him. The underling can trust the boss or not. The latter strategy partially protects the underling against exploitation,

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<sup>50</sup>Contracting includes a corporation’s written rules, policies, and procedures, as well as explicit contracts between employees and the corporation.

|        |   |            |            |
|--------|---|------------|------------|
|        |   | Junior     |            |
|        |   | A          | B          |
| Senior | A | $j$<br>$S$ | $0$<br>$0$ |
|        | B | $0$<br>$0$ | $J$<br>$s$ |

**Figure 7:** Family of coordination games between junior and senior personnel.

|      |              |            |            |
|------|--------------|------------|------------|
|      |              | Underling  |            |
|      |              | Trust      | Not        |
| Boss | Treat fairly | $5$<br>$7$ | $3$<br>$2$ |
|      | Exploit      | $0$<br>$9$ | $1$<br>$4$ |

**Figure 8:** Trust Game.

but is harmful to him if the boss plays fairly. Observe that exploit is a dominant strategy for the boss. In a one-shot game, she can, therefore, be expected to exploit. The underling's best response to being exploited is not to trust. Hence, the one-shot equilibrium outcome is the bottom-right cell. Both players would, however, be better off in the top-left cell.

Suppose, conditional on survival to any given period, the game is repeated in (survives to) the next period with probability  $\beta$ .<sup>51</sup> For the moment, assume the boss and her underling live at least as long as the game is repeated. It is readily shown that if the per-period survival probability  $\geq 40\%$  (*i.e.*,  $\beta \geq \frac{2}{5}$ ), then there is subgame-perfect equilibrium in which the boss treats the underling fairly and he, in turn, trusts the boss to do so (see Hermalin, 2001, for details).

In this model, the underling need not be a long-lived player. Period by period he simply plays his best response to what the boss is supposed to do given the history of the game; he could, thus, live only one period *provided he, like the member of each generation, knows the history of the game to that point.* The

<sup>51</sup>Equivalently, the game is infinitely repeated with certainty and  $\beta$  is the common discount factor.

boss, on the other hand, does need to care about the future. She need *not*, however, be infinitely lived.<sup>52</sup> Specifically, suppose the current-period boss's compensation is an increasing function of the value of the firm, the sum of current payout plus expected future value (*e.g.*, she has stock-based compensation or is an owner who cashes out). Suppose that each generation's underling expects his boss to treat him fairly if every boss in the firm's history has done so, but otherwise he expects to be exploited. The firm's expected future value is

$$V_F = \frac{7\beta}{1-\beta} \quad \text{or} \quad V_E = \frac{4\beta}{1-\beta}$$

depending, respectively, on whether bosses have treated underlings fairly or a boss has ever exploited an employee. Consider a firm in which bosses have so far treated their underlings fairly. This generation's boss will continue this tradition provided her compensation from doing so exceeds her compensation from exploiting; that is, provided  $7 + V_F \geq 9 + V_E$ . A little algebra reveals that inequality holds provided  $\beta \geq 2/5$ . Observe that the reputation for treating employees fairly resides with the firm, not an individual. The *corporation's* culture can, thus, sustain desirable outcomes.

“Fair treatment” and “exploitation” are fairly amorphous concepts. Typically, whether behavior is fair is specific to the situation. Treating an employee harshly could be seen as fair if he is performing poorly, but not if he is performing well. *Ex ante*, it is difficult to foresee all the possible treatments that could be judged fair or unfair and, likewise, to enumerate all the situations in which they are fair or unfair. Again, the environment is plagued by unforeseen contingencies. What is fair and what is exploitation cannot be defined in advance; yet, under the rules of a given culture, *ex post* behavior can be judged fair or not. This is analogous with pornography regulation in the US—material is legally obscene if it violates community standards and whether it does is judged *ex post* by the criterion that people know obscene material when they see it.<sup>53</sup> Corporate culture matters in two ways: As reputation or tradition; and as the means of defining compliance with the reputation or tradition when it is infeasible to define future circumstances *ex*

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<sup>52</sup>Crémer (1986) is a model with a similar flavor. In that article, there is a team with  $N$  individuals, each of a different age cohort. An individual lives  $N$  periods. Except for the last period of his life, an individual has some incentive to cooperate if failure to cooperate today destroys future cooperation. Under certain conditions, cooperation is sustainable among the younger cohorts.

<sup>53</sup>To paraphrase the standard for pornography set down by Supreme Court Justice Potter Stewart. Personally, the standard I've favored—which is not original to me—is pornographic material is material read with one hand.



*ante*.

A concrete example will prove useful: A company seeks to lure a top employee from a rival. Before moving, the employee attempts to reach firm agreements with his new boss about the details of his employment. But situations can arise, which he failed to anticipate, in which he would want his new boss to take actions beneficial to him but costly to her. For instance, imagine he does not foresee that his current daycare arrangement will fall apart and that the best alternative arrangement will require him to leave work early. Although he's willing to make up the work, regularly leaving early imposes a cost on the boss (*e.g.*, meetings are harder to schedule). The boss can bear that cost, she can demand he not leave early—although this means a worse daycare arrangement for his child—or she can exploit the employee's problem to hold him up by, then, renegotiating aspects of his contract. In short, this is the game of Figure 8: The employee can “trust”—go to a new firm knowing that he'll be vulnerable—or “not trust”—stay put; likewise, the boss can be accommodating—let him adjust his schedule without penalty—or “exploit” him—force him to stay until five or otherwise give something up. The key point, however, is the following: Whereas the employee can't anticipate that he will want accommodation, he should realize he will be relying on his new boss to treat him fairly. His decision to switch employers would depend, in part, on his assessment of the reputation (corporate culture) of his potential new employer.

From the perspective of economic theory, however, this analysis is not without problems. Although *specific* contingencies could well be unforeseen, *general types* of contingencies—will he be treated fairly or not—should be foreseeable. Why can't the parties write a contract that says that the boss will treat the employee fairly? The obvious—but seriously incomplete—answer is that it would be difficult for a judge (jury, arbitrator, etc.) to determine whether treatment was fair. That is, a judge's assessment of how the employee was actually treated is subject to error. However, as Hermalin and Katz (1991), Edlin and Hermalin (2001), and Hermalin (in press) demonstrate, imprecise assessments do *not* preclude efficient contracting. As long as the judge's assessment is correlated with what the boss actually did, the parties can rely on this assessment as follows. They write a contract calling for the boss to treat the employee fairly and, after the boss has acted, they renegotiate the contract in anticipation of what might happen should they go to court. Under fairly general conditions (see *e.g.*, Edlin and Hermalin, 2001), the parties can construct a contract

that duplicates the outcome they would have enjoyed were the boss's action verifiable without error. That is, as a matter of contract theory, there is no need to rely on culture at all, the parties can instead rely on formal contracts.

In reality, the costs associated with negotiating, monitoring, and enforcing these contracts could make them a less desirable means of inducing fair treatment—reputation can be equally effective and cost less.<sup>54</sup> Note, however, the transaction costs associated with contracting need to be substantial in the following sense: the *possibility* of formal contracting can destroy the possibility of using reputation when the two are close substitutes. Reputations are more sustainable the greater the difference between the cooperative and the non-cooperative payoffs. If non-cooperation results in switching to contracts and contracting is a close substitute for cooperation, then this difference is small and, consequently, reputation could be *unsustainable* (see Schmidt and Schnitzer, 1995, for more on this point).

### 3.2.2 Culture as convention

The discussion of Figures 6 and 7—the “defer to seniors norm”—illustrates what could be called the culture-as-convention view. One question, left unexplored by Kreps (1986), is where these coordinating conventions come from. Young (1993, 1998) has taken an adaptive-learning approach to the issue: Players adapt their play as a function of past experiences. In adaptive play, players randomly draw (recall)  $k$  observations from the past  $m$  periods of play. For a two-player game, each player treats the frequency of his opponent's actions in his  $k$ -size sample as the mixed strategy his opponent will play in the current period and he, thus, plays his best response to that mixed strategy. It is readily seen, given this rule, that if the same pure-strategy equilibrium is played for  $m$  periods running, then it will be played forever after—play has converged on a convention.

What is the probability of getting a run of  $m$  instances of the same pure-strategy equilibrium? Young (1993, Theorem 1) proves that if  $m$  is sufficiently greater than  $k$ , then adaptive play will converge almost surely to a pure-strategy equilibrium. Drawing from the discussion in Fudenberg and Levine (1998, p. 115), this can be illustrated as follows. Let  $m = 3$  and  $k = 1$ . Suppose the A–A equilibrium is played at time  $t$ , in

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<sup>54</sup>Although, contracts (typically implicit or default) are not unheard of—there are plenty of employee lawsuits alleging unfair treatment.

the subsequent period both players sample the play of period  $t$ , and in the period thereafter neither player samples period  $t - 1$ . Then, in periods  $t$ ,  $t + 1$ , and  $t + 2$ , the A–A equilibrium is played and is established as a convention. The probability of this occurring is  $4/81$ . A similar argument applies to the B–B equilibrium. Provided A–A or B–B are played infinitely often, such a run of either A–A or B–B will almost surely occur. The only question left is whether A–A or B–B will be played infinitely often. The answer is yes because it is impossible to have a run of three or more occurrences of A–B or B–A and, therefore, over any sample period there is a positive probability of the players both sampling the same action (*i.e.*, both sample an A or both a B), thereby resulting in an A–A or B–B outcome.

While clever, this approach has a few drawbacks. First, it implies culture is all random evolution and no intelligent design. No doubt, random evolution is the best model for biology, but it is doubtful it is the best model for organizations. There is no role for leadership or other influences. Second, cultures that emerge this way seem more fragile than real corporate cultures. If, for instance, the A–A convention emerged, it could be set aside the next day if the head of the corporation announced that henceforth the B–B convention held in the corporation—provided people believed enough people would follow this diktat, playing B would be everyone’s best response and, thus, B–B the new convention. In reality, changing corporate culture is frequently seen as a difficult task (see, *e.g.*, Kotter, 1996, Selznick, 1984, and Schein, 1992).

A partial response to the second point is that going from a state of no convention to one with a convention can be Pareto improving, whereas switching from one convention to another can create winners and losers. In a more elaborate model, the losers could seek to block the change in convention. Concretely, for the game of Figure 6, let  $\sigma_i$  be the probability that player  $i$  plays A in the absence of a convention. If  $1/5 < \sigma_i < 4/5$  for both  $i$ , then *either* convention is Pareto superior to no convention and presumably would be supported by both players. But given an A–A (defer to seniors) convention, a move to a B–B convention would be opposed by seniors. Hence a more elaborate model could serve to explain both why conventions form and why, once formed, they are difficult to change. Exploration of this issue is an interesting area for future work.

### 3.2.3 Artificial selection

If pure natural selection—random evolution—is not the best description of how cultures arise, perhaps artificial selection is a better one. Consider the following model, which is drawn from Hermalin’s (2001) version of Lazear (1995). Consider the games shown in Figures 6 and 7. Suppose that there are two possible preferences (beliefs, mindsets, etc.), A and B. Of these, A is the preference that top management wishes to promote. Assume the organization in question has a continuum of individuals of measure one,  $p(t)$  of whom prefer A at time  $t$ . At each moment in time, individuals are randomly paired. Let  $s \in (0, 1)$  denote top management’s effort to promote the adoption of A. Suppose this works to cause  $s$  proportion of B preferers paired with A preferers to become A preferers. Consequently,  $dp(t)/dt = sp(t)(1-p(t))$ . Suppose  $p(0) = 1/2$ ; then

$$p(t) = \frac{e^{st}}{1 + e^{st}}.$$

Clearly,  $\lim_{t \rightarrow \infty} p(t) = 1$ —given enough time, almost everyone will wish to play A.

Lazear (1995) posits that management seeks a homogeneous organization (all As, for example) and chooses (invests)  $s$  in such a way to maximize the returns from homogeneity less the cost of investing  $s$ . By what mechanisms does management set  $s$ ? Lazear (1995, p. 105) offers two answers:

- Let  $s$  be the probability that a B who plays against an A is fired and replaced with an A. Investments in human resources that aid in routing out Bs and identifying As among potential replacements determine  $s$ .
- When non-coordination occurs (*i.e.*, an A meets a B), the B worker thinks “something went wrong here.” With probability  $s$ , he then recalls the training seminar, the distributed literature, or a motivational speech telling him this is an A organization, which leads him to become an A. The effectiveness of the training seminar, the salience of the literature, and the frequency of speeches determine  $s$ .

A third possibility is sanctions: A proportion  $s$  of As who play against Bs feel free to sanction the B they play against with sufficient vehemence that the B switches to being an A. Under this interpretation, the encouragement management gives As to sanction Bs or the severity they permit As to employ determine  $s$ .

### 3.2.4 Culture as self-selection

The idea, noted in the previous section, that an organization might select like-minded individuals is an example of a more general view of corporate culture as the outcome of processes that lead to like-minded individuals joining or being selected for the same organization.<sup>55</sup> There is a long tradition in economics of models that predict that people will cluster into homogeneous groupings (*e.g.*, Schelling, 1971, and Young, 2001), and such modeling would seem readily applicable to organizations.

Van den Steen (2005a,b) offers one way homogeneous organizations could emerge: Individuals hold differing priors about what is the best technology, strategy, or course of action for a firm to adopt. When individual efforts are complementary and each individual is motivated, in part, by her private assessment of the likelihood of success, then individuals do better, *in their expectation*, to cluster into organizations of like-minded folks.

Van den Steen's ideas can be partially illustrated as follows. Suppose technology is such that firms consist of two individuals and firm profit, which is equally divided between the individuals, is  $2\theta \min\{e_1, e_2\}$ , where  $\theta$  is a productivity parameter of uncertain value. Let  $\hat{\theta}_n$  be individual  $n$ 's expected value for  $\theta$  and assume that all such beliefs are common knowledge.<sup>56</sup> Individual  $n$ 's expected utility given her beliefs is

$$\hat{\theta}_n \min\{e_n, e_{-n}\} - \frac{e_n^2}{2}.$$

Her best response function is, therefore,

$$BR_n(e_{-n}) = \begin{cases} e_{-n}, & \text{if } \hat{\theta}_n \geq e_{-n} \\ \hat{\theta}_n, & \text{if } \hat{\theta}_n < e_{-n} \end{cases}.$$

It follows that the second-best equilibrium is  $e_1 = e_2 = \min\{\hat{\theta}_1, \hat{\theta}_2\}$ . If  $\hat{\theta}_2 > \hat{\theta}_1$ , then individual 2 is unhappy insofar as she believes the firm is squandering  $\hat{\theta}_2^2 - \hat{\theta}_1^2$  of potential surplus in expectation.

Suppose there are  $K \geq 2$  technologies indexed by  $k$ . A  $k$ -individual is one who believes that if her firm adopts technology  $k$ , its expected  $\theta$  is  $\bar{\theta}$ ; but that if it adopts another technology, its expected  $\theta$  is  $\underline{\theta} < \bar{\theta}$ . Given the previous paragraph's analysis, a  $k$ -individual prefers both to work for a firm using the  $k$

<sup>55</sup>See Chatman (1991), O'Reilly and Chatman (1996), and Cronqvist et al. (2007) for empirical evidence supporting this view.

<sup>56</sup>Again, this raises subtle issues concerning the overall consistency of beliefs. See footnote 43 *supra*.

technology and to have a coworker who is also a  $k$ -individual. Suppose, for simplicity, that there are the same even number of  $k$  and  $k'$  individuals for any  $k$  and  $k'$ . In equilibrium, each firm will be homogeneous with respect to beliefs about the correct technology to utilize. An outside observer, noting this homogeneity, might ascribe it to indoctrination by the firms, when, in fact, it simply reflects the desire of like-minded individuals to group with each other.

Is this intra-firm homogeneity a good thing? To answer this, suppose that the probability that a  $k$ -individual is correct is, objectively,  $1/K$ . Per-firm expected surplus is, therefore,

$$\frac{1}{K}\bar{\theta}^2 + \frac{K-1}{K}(2\underline{\theta}\bar{\theta} - \bar{\theta}^2) \quad (17)$$

given firms with workers holding homogeneous beliefs; that is, in the self-selection equilibrium that would emerge absent any interference. In contrast, if firms were compelled to hire workers holding different beliefs, with equal numbers of firms adopting each of the  $K$  technologies, then per-firm expected surplus would be

$$\frac{1}{K}(2\underline{\theta}\bar{\theta} - \underline{\theta}^2) + \frac{K-1}{K}\underline{\theta}^2. \quad (18)$$

Expression (18) less expression (17) is

$$\frac{K-2}{K}(\bar{\theta} - \underline{\theta})^2 \geq 0.$$

Hence, unless  $K = 2$ , the population's expected surplus is greater with heterogeneous workplaces than with homogeneous workplaces.

What should be made of this result? Note, first, that by limiting attention to weakest-link production, the free-riding problem that is endemic to teams problems has been avoided. Were there a teams problem—workers undersupply effort *vis-à-vis* the first best—then devices that increase their incentives (*e.g.*, working for a firm where they believe  $\theta = \bar{\theta}$ ) could be welfare improving. On the other hand, this result is broadly consistent with empirical work on corporate culture (see, *e.g.*, Sørensen, 2002). This work suggests that strong culture—homogeneous—firms do less well when there is uncertainty about the environment (*e.g.*, appropriate technology) than do heterogeneous firms. In other words, there is evidence to suggest that the greater is  $K$ —here, equivalent, to a measure of environmental uncertainty—the worse strong culture firms will do.<sup>57</sup>

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<sup>57</sup>Another, quasi-biological, explanation for this finding could be that firms are like species. As in biology, the

### 3.2.5 Shared knowledge, language, and custom

The previous models effectively define corporate culture largely in terms of shared norms (*e.g.*, play A) or shared beliefs. Another aspect of corporate culture is shared knowledge, knowledge of procedures, pertinent facts, goals and objectives, and social structure and personalities.<sup>58</sup> Such shared knowledge is beneficial to a firm insofar as it prevents people from working at cross purposes, reinventing the wheel, and going up the same blind alleys. It also streamlines communications because certain knowledge can be presumed and not spoken. Of course, if the flip side of shared knowledge is shared ignorance, then there can be a downside because such firms could be more vulnerable to changes in their environments (recall the discussion at the end of the last section).

Crémer (1993) and Crémer et al. (2007) consider an aspect of how shared knowledge streamlines communications. Specifically, they look at the value of jargons and technical language within an organization.<sup>59</sup> Organizations and trades tend to develop their own vocabularies, which are often impenetrable by outsiders. For example, UC Berkeley faculty know the meaning of the “words” *apeeëm*, *beecee*, *elleness*, and *youcop*, whereas outsiders typically don’t. As an economist, your vocabulary includes *ellem*, *emar*, *Pigouvian*, and *Walrasian*.

Crémer (1993) explains the value of language as a coding that saves on transmission costs. Sending a name requires fewer bits than sending a description of what is named. “Penguin,” for instance, uses fewer bits than “flightless black and white aquatic bird from the southern hemisphere.” Of course, at some point, people in an organization have to be taught the definition of names, which entails an upfront cost. If an organization needs to refer to something often enough, the savings on future transmissions makes it profitable to make the upfront expenditure on teaching its name. Infrequently referred-to things are left unnamed.

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less intra-species genetic variation (the greater the homogeneity of the employees in terms of knowledge, experience, world view, etc.), the greater a specie’s risk of decline or extinction should the environment change.

<sup>58</sup>Note, though, the overlap with norms and reputations, ingredients of the previous models.

<sup>59</sup>Some of their ideas build on Arrow (1974). Other work examining the role of language in economics is Dewaripont and Tirole (2005), Lazear (1999), and Rubinstein (2000). Garicano (2000) looks at the organization of knowledge within organizations.

Crémer et al. consider efficient coding when there is limit on how much can be learned. A simplified version of their model will serve to illustrate their main point. Suppose that people can learn only two words,  $w_1$  and  $w_2$ . Suppose there are three possible states,  $x_1$ ,  $x_2$ , and  $x_3$ , that people in an organization might wish to communicate. One word, say  $w_1$ , can be assigned one state and the other word can be assigned two states. Hence, the vocabulary could be  $w_1 \Rightarrow x_1$  and  $w_2 \Rightarrow x_2 \vee x_3$ . An individual who hears  $w_2$  needs to expend  $c > 0$  to determine whether the sender means to refer to state  $x_2$  or  $x_3$ . Is this an efficient coding? To answer, we need to know the frequency of the states. Let  $f_n$  be the relative frequency of  $x_n$ . If  $f_1 > \max\{f_2, f_3\}$ , then this vocabulary minimizes expected communication cost, which is  $(1 - f_1)c$ ; otherwise, if  $f_1 < \max\{f_2, f_3\}$ , another vocabulary would be more efficient. In general, the precise term—the word that refers to one state—should refer to the most frequent state and the broader term—the word that refers to two states—should refer to the less frequent states. As Crémer et al. show, this logic extends to more words and more states; in an optimal code, broader words describe less frequent states.

As normative models of coding, the logic of this work is irrefutable. As positive models, however, they are less convincing. It is clear from any book on the subject (*e.g.*, McWhorter, 2001, or Deutscher, 2005), that languages evolve in an unplanned manner. One of the drivers of this evolution is a tendency of speakers (and, to an extent, writers) to economize *for their private benefit* (see Deutscher, Chapter 3). That it is a private benefit is illustrated when you get a text message from your teen—she will spend less time typing it than if she were to spell out every word, but it will take you longer to decipher it than if she would. On the other hand, if you get enough text messages, then you will become as adept at reading them as standard English, so total communication time (yours and your daughter's) will clearly fall. In this sense, then, Crémer (1993) reflects an aspect of reality: senders economize for private reasons; receivers, if they interact repeatedly with the same senders, as in an organization, become adept at understanding the senders' shorthand lingo and terse messaging. Total communication cost—in terms of time—is reduced.

An idea that has not received attention is how culture permits the creation of jargon. If the message sender believes she shares knowledge with the receiver, then she is more likely to believe her linguistic economizings will be understood by the receiver. For instance, consider the sentence, "The dean of 'elleness' is likely to be the new provost." Even if you don't immediately know what "elleness" means, your immersion



in the culture of academia allows you to deduce its meaning: (i) deans head colleges; (ii) elleness must be a college; (iii) elleness resembles the abbreviation “L&S”; (iv) in academia, particularly in reference to colleges, “L” often abbreviates “letters” and “S” “science” or “sciences”; (v) therefore the sentence means the dean of the College of Letters and Science(s) is expected to be the next provost. In other words, much of our vocabulary is learned through the context within which we hear new words and, thus, whether jargon or neologisms spread depends on whether listeners grasp the context of conversations; that is, their level of acculturation.

Economizing is not the only force that influences the evolution of language. Another important influence is the tendency of people to employ metaphors and similes (Deutscher, 2005, especially Chapter 5). Metaphors and similes rely on shared knowledge. Suppose, for example, that Robin is known to be forgetful. When another person forgets something, a third person might quip, “You’re acting like Robin.” As that quip becomes stale, it may evolve and be economized (Deutscher, Chapter 4), becoming “that’s a Robin” or “he Robined that meeting.” Through this process, the in-house verb meaning to forget could end up “to Robin.” There are two points to this example: (i) observe that in-house slang and jargon can often arise not to streamline communications—“you’re forgetful” is shorter than “you’re acting like Robin”—but out of the universal tendency to use metaphors and similes; and (ii) such slang and jargon are at least as much a product of the culture as they are definers of the culture. In fact, slang and jargon could arise from people’s desire to prove they are plugged into the culture (*e.g.*, know Robin’s reputation). A related point is that use of slang and jargon could serve to maintain group integrity, to help distinguish in-group from out-group, and this could be its purpose as much as streamlining communication (see, *e.g.*, Harris, 1978, on the use of customs to distinguish in-group from out-group).

Weber and Camerer (2003) is an experimental study of culture formation, specifically of jargon. In the experiment, each subject privately views a fixed and common set of 16 pictures showing office environments. The pictures are distinct, but share common elements. Pairs of subjects played together as “firms.” In each round of the experiment, the subject serving as a firm’s “manager” for that round had, through the descriptions she offered, to get her partner, the “employee,” to select eight of the 16 pictures in an order specific to that round. For example, imagining the 16 pictures as being indexed in a fixed manner, the

manager might be required in a given round to get her employee to pick, in order, 5, 2, 6, 4, 3, 1, 14, and 12. The subjects' payoff per round was a function of how fast they completed the task. Because they received more the faster they completed the task, the pressure to economize on language was especially strong.

Consistent with the ideas in Crémer (1993), subjects develop names for the pictures. An example of such evolution is the following (from p. 408 of Weber and Camerer):

...one pair of subjects began by referring to a particular picture as: "The one with three people: two men and one woman. The woman is sitting on the left. They're all looking at two computers that look like they have some PowerPoint graphs or charts. The two men are wearing ties and the woman has short, blond hair ..." After several rounds, this [pair's] description of this picture was condensed to simply "PowerPoint."

Consistent too with the idea that language becomes idiosyncratic to firms, another pair named this picture "guy hunching" and yet another "woman sitting, smiling." Note, however, in contrast to a model of fully rational language or coding, the names could have been shorter (*e.g.*, "charts," "hunch(er)," "woman who sits, smiles," respectively). In addition, there is evidence of metaphors and similes: one pair "named" a picture "Uday Rao" because of similarity between a figure in that picture and a well-known professor of that name.

### 3.3 The Directive Versus Internalization Debate

One question in the study of corporate culture is whether individuals adhere to the prevalent culture because it is rational for them to do so (*e.g.*, it is a Nash equilibrium as in Kreps, 1986) or because they truly believe in the culture and adherence is almost instinctual (somewhat, *e.g.*, as in Van den Steen, 2005a)? This is sometimes referred to as the *directive versus internalization debate*.

Not surprising, given neoclassical economics's reliance on the rational-actor paradigm, most economic work on culture falls into the directive camp (*e.g.*, Kreps, 1986, Crémer, 1993, 1986, and Young, 1993, 1998). Even when the actors aren't fully rational, fail to foresee contingencies or engage in adaptive learning, their motive to adhere to the culture is strategic rather than intrinsic.<sup>60</sup> The work of Van den Steen and, depending

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<sup>60</sup>The same schism exists in the leadership literature: Hermalin (1998) and its extensions are rational-actor models,

on interpretation, Lazear (1995) are exceptions, some beliefs and behavior are intrinsic.

One might imagine that evidence of adherence to norms that are irrational would provide the internalization side with compelling evidence. Fair play in dictator and ultimatum games (see Rabin, 1993, 1998 for discussions) would suggest that people have internalized a fairness norm. Yet, as Sugden (1985) notes in his critique of Jones (1984), in real-life, non-experimental settings, one often observes sanctioning mechanisms lurking in the background when there is conformism to norms. Evidence from biology is also less than clear cut: on the one hand, chimpanzees seem to abide by hierarchical norms, yet they also scheme in various ways against it (de Waal, 1998). As noted earlier, some view the evolutionary advantage of a large hominoid brain in terms of its usefulness in terms of better strategizing against your social group (Sapolsky, 2005).

Some personal experience may help convince you that witnessing norm violation can create a visceral reaction: In the early 1990s, Berkeley was plagued(?) by people walking about naked in public. The first time I saw a naked woman walking down the street toward me, the sense of shock was palpable—I felt as if I'd been hit in the chest.<sup>61</sup> A visceral reaction or acting in an emotionally hot state can lead to actions that the actor would consider irrational in an emotionally cool state.<sup>62</sup> Consequently, such reactions could lead people to carry out sanctions against norm violaters that are not in their rational self-interest, even in a repeated-game setting.

To be speculative, a possible synthesis of the directive vs. internalization debate is that norm adherence or violation is directive (strategic), but sanctioning norm violaters is internalized. Evolutionarily, it would seem advantageous to be committed to punish those who harm you (*i.e.*, violate norms), as this serves as an effective deterrent against others, but to be flexible yourself as to whether you adhere to norms, as this allows you an opportunity to gain advantage (*e.g.*, seize a mating opportunity even if you aren't the dominant male). Although, like any reductionist argument, exceptions exist. It is difficult to explain tipping at restaurants we'll never visit again or not stealing when detection is impossible without some sense that

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whereas Blanes i Vidal and Möller (2007), Huck and Rey-Biel (2006), and Rotemberg and Saloner (1993, 2000) presume some degree of norm internalization.

<sup>61</sup>Although it may reflect poorly on me, the reaction was definitely shock and not arousal.

<sup>62</sup>Some economic work on the role of emotions in decision making includes MacLeod (1996), Loewenstein (1996, 2000), Loewenstein and O'Donoghue (2005), and Hermalin and Isen (in press).

adherence to (some) norms is internalized. Conversely, long-term (strategic) considerations often allow us to calm ourselves and forgive norm transgressors.

## 4 What's Left?

Throughout this chapter, I have sought to flag areas that strike me as ripe for future work. In addition to those, let me conclude by listing a few more.

- *The interaction between leadership and corporate culture.* In particular, how do leaders *shape* culture? Is a strong leader essential or detrimental to a strong culture? Does a strong culture make a leader more or less effective (does *aṣabîyah* apply in corporations)?
- *The time path of cultures.* What are the evolutionary forces that lead cultures to change? Are cultures self-sustaining? Do they erode absent intervention?
- *The emergence of leaders.* How do would-be leaders compete to become the leader? How do followers choose among competing leaders? When do leadership battles lead to organizational schisms?
- *The interaction between leaders and followers' affective states.* How, for instance, do leaders boost morale and affect the emotional states of their followers?
- *The role of emotions in organizations.* How do emotions govern norm adherence and sanctioning of norm violation? To what extent do cultures rely on and exploit emotional needs?

Even if this chapter fails to inspire you to engage in such work, it should enrich your understanding of organizations by illustrating the power and importance of the informal aspects of organization, such as leadership and corporate culture. Leadership is critical if managers and officers are to be effective in their jobs. Corporate culture is a vital component in the control of organizations and with respect to organizational efficiency.

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