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# 11

## Cultural Influences on Errors: Prevention, Detection, and Management

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On April 26, 1986, a chain of problems caused by design flaws and exacerbated by human error culminated in the worst nuclear power plant disaster in history. When Reactor 4 at the Chernobyl plant exploded, it released 400 times the radioactive fallout as the atomic bombing of Hiroshima (Stone, 2006). While an accurate death count is impossible because of Soviet efforts to cover up the effects of the fallout, 31 people died instantly after the reactor explosion (“The Chernobyl Accident,” 2000), at least 28 workers who were diagnosed with acute radiation sickness died in the 4 months following the accident (United Nations Scientific Committee on the Effects of Atomic Radiation, 2000), and the Chernobyl Forum (2006) estimated that the accident could cause another 4,000 cancer deaths among those who experienced the highest levels of exposure.

In 2002, nearly 300 people died and hundreds were injured after a Tanzanian passenger train lost power on a hill and rolled back into a freight train. A government report found that the driver of the train failed to apply the manual brakes, a mistake attributed to human error and inexperience (“Human Error Blamed,” 2002).

In 2003, after the crash of the *Andrew J. Barberi* ferry, in which 10 people died, a review of the U.S. Coast Guard safety records showed that more than 30 of the 50 accidents that have occurred on Staten Island ferries “have been blamed on what investigators deemed to be mistakes or acts of negligence by captains, mates, deckhands or other ferry employees” (McIntire, 2003).

These stories illustrate an intuitive conclusion: Errors are universal. Errors, whether they cause thousands of deaths or minor inconveniences, are a global phenomenon. Yet, despite the fact that errors are a human universal, a careful look at this volume illustrates that scholarship on the topic is generally a Western enterprise, with theories and research generated largely in the United States and Western Europe (for notable exceptions, see Helmreich, 2000; Helmreich & Merritt, 1998;

Helmreich, Wilhelm, Klinec, & Merritt, 2001; Jing, Lu, & Peng, 2001; Li, Harris, Li, & Wang, 2009). Examining cultural influences on errors is critical for theory and practice. Theoretically, cross-cultural research on errors will help to elucidate further what is universal (i.e., *etic*) and culture specific (i.e., *emic*) about error processes while expanding error theories, constructs, and measures to be globally relevant. Practically, a cultural perspective on errors is critical to help identify how to prepare best for and manage errors in ways that are targeted to specific cultural contexts. For example, there are large differences in aircraft accidents across different nations even though most airplanes are similar in make and age and are often serviced by the same specialized service firms (Civil Aviation Authority, 1998). Although such differences are likely multiply determined, cultural characteristics of the pilots and the crews in error prevention, detection, or management may at least partially explain such cultural variation. Cross-cultural research is also needed to help identify ways in which multicultural teams can better manage cultural differences in responses to errors. Finally, the study of errors also enhances our understanding of culture itself. As Freud (1901/1954) has noted, errors often point out critical *system characteristics* that may go unnoticed. In other words, errors may tell us something about fundamental characteristics of cultural systems themselves. For example, as we discuss in this chapter, errors in high-power-distance cultures can occur when low-power members fail to communicate openly with their superiors—a phenomenon that is a key defining feature of such cultures. More generally, a cultural perspective on errors has much to offer the science and practice of errors in organizations.

In this chapter, we integrate research on culture with research on errors to identify key propositions for future research. We first discuss critical distinctions regarding the construct of errors, and we advance a process model of errors that includes error prevention, error detection, and error management. We then discuss how key cultural dimensions, including uncertainty avoidance, humane orientation, tightness-looseness, fatalism, power distance, and individualism-collectivism differentially affect each stage of the error process. We identify numerous “cultural paradoxes” regarding the error process for each of these cultural dimensions that we expect could have important short- and long-term consequences for organizations. We also discuss error management in culturally diverse groups, identifying group compositions that are the most ideal in managing the three stages of the error management process. Finally, we conclude with implications of this perspective for theory, research, and training to manage errors within a global context.

## Key Conceptual Distinctions

### Defining Errors

Based on the presentation by Hofmann and Frese in Chapter 1 of this volume, we define actions as *erroneous* when they unintentionally fail to achieve their goal when this failure was potentially avoidable (i.e., did not arise from some unforeseeable chance agency; Reason, 1990; Zapf, Brodbeck, Frese, Peters, & Prumper, 1992). Inherent to this definition are some critical distinctions. The first regards the *intentionality of errors*. As discussed in the introduction by Hofmann and Frese, we think of errors as unintended deviations from achieving goals and standards. After an error has been made, people have the sense that they should have known better. In contrast, violations are intentional deviations from goals and standards.

The differentiation of errors from risk also needs our attention. A risk is part of an objective situation, and it can be analyzed in terms of probability (Hofmann & Frese, Chapter 1, this volume). If an individual acts as a result of such a risk analysis, he or she will probably say that even if the goal was not achieved, the same action would have been called for (thus, there is no feeling that one should have known better, as in the case of an error). However, there may be miscalculations of risks, and that would be an error within a risk situation (Reason, 1995). For example, the economic depression that resulted from the mortgage crisis in the United States in 2008 and that led to the default of Lehman Brothers was based on miscalculations of risks that often occur in risky situations. In this case, it constituted the issue of common mode error, which means that the risk analysis was done on single probabilities that were perceived to be unconnected, but those probabilities were conditional on each other and turned out to be connected: People lost trust, banks lost trust in each other, and negative expectations fed into lower buy rates, which in turn led to lower sales, and so on. All of this then led to the first dramatic economic downturn of the 21st century. Thus, the miscalculation of risk was particularly important in this situation.

In sum, what follows from the definition of these concepts is that cross-cultural research needs to differentiate between errors (nonintended), violations (intended deviations), and risks (depth and veracity of risk analysis).

### The Error Process

Errors will always appear because the human mind works in such a way that easy principles of action are chosen that are fast, frugal, and most often right (Gigerenzer & Todd, 1999; Kahneman & Klein, 2009; Reason, 1990). But, that means that there are also a number of decisions and actions

that are wrong. As discussed in Chapter 1 of this volume, a comprehensive approach to error processes includes error prevention, detection, and management. First, errors can be avoided through *error prevention* mechanisms. Second, once errors have been made, they need to be *detected* (Allwood, 1984; Sellen, 1994). Finally, all processes that appear after an error has been detected fall under a rubric of *error management*. As we discuss throughout this chapter, different aspects of culture (e.g., uncertainty avoidance, humane orientation, tightness, fatalism, power distance, individualism-collectivism) have implications for error prevention, detection, and management.

### **Error Prevention**

The error process starts with an intention that will lead to a certain action that may result in (most often negative) error consequences. One strategy to deal with errors is to prevent an error from occurring, what we refer to as an *error prevention* strategy. Error prevention implies that one attempts to analyze the risks adequately, develops the right intentions (from the standpoint of long-range intentions), and prevents doing the wrong action. As discussed in Chapter 1 (this volume), the factors that facilitate error prevention include individual anticipatory strategies of prevention, technology to detect errors, and social/contextual factors that afford communication and planning for errors.

### **Error Detection and Error Management**

Even if there are elaborate prevention mechanisms in place, errors still occur and need to be detected, through human and machine mechanisms alike (see Chapter 1 of this volume for error detection modes). For error detection, the actor needs to have a clear representation of the goals of actions, needs to expect that an error could occur, and needs to get feedback to be able to detect an error. After errors have been detected, they can be managed in ways to interrupt the occurrence of the negative error consequences. After an error is detected, it is necessary to act quickly and to have adequate actions in one's repertoire to manage the error. A number of issues are important here, such as general orientations toward errors (positive or negative attitudes toward errors); error competence (e.g., error self-efficacy); emotional reactions toward errors (e.g., defensive versus open); and communication processes regarding the management of errors (e.g., the psychological safety for communicating about errors once they have occurred). The error detection process has to be quick because undetected errors tend to have increased negative consequences and can turn into more catastrophic errors if they are unaddressed (Reason, 1995).

An important component of error management is maximizing learning from errors. Learning from errors is an approach that can ultimately reduce future error consequences. This can be done by learning how to develop strategies of error prevention to avoid the error in the future or by learning how to develop strategies of error management, such as processes designed to identify the error quickly and stop further consequences from accruing. A good example is crew resource training (Helmreich, Merritt, & Wilhelm, 1999). This training starts with the assumption that the pilot may make an error; once this error is made, it has to be detected. Since it is less likely that the pilot detects the error, the error detection of the copilot becomes important. Since the copilot is usually not able alone to do the actions to prevent the occurrence of the negative error consequences, he or she needs to communicate the error to the pilot. The pilot then has to accept the error report (i.e., has to accept that the copilot has the authority to talk about an error by the pilot) and has to go into additional secondary preventive action (check the veracity of the copilot's report and do the appropriate action so that the airplane is not endangered). This may then lead to a wider learning process in the whole company, or it may not (again, it depends on how the colleagues and the company react to the error, whether the error is communicated, and whether there is an acceptance of learning from these errors by the whole company). All of these processes can be influenced by the culture; therefore, we discuss important cultural variation in relevant issues such as blaming, accepting errors, compensatory strategies, the acceptability to criticize a hierarchically superior pilot, and so on.

### **Latent Errors**

A final distinction is that of latent errors: errors that exist within an organization but are not acknowledged and not handled (e.g., safety procedures that produce errors or an organizational culture that allows certain errors to go unnoticed or without correction). Latent errors can arise because of faulty error prevention or detection and error management. One factor is *error explanation*: An error needs to be explained to be corrected. Error explanation is far from easy in an organization. People may start to blame others for making an error. After the error explanation, actions need to be put into effect to deal with the error consequences and to manage the error. Here again, the question is whether the organization has routines available to deal with an error, whether there is enough competency to deal with the situation, whether people communicate effectively about errors, and whether the action can be put into effect quickly. All of these factors also contribute to whether there are latent errors in an organization and, if so, whether they are conditioned by culture as discussed further in this chapter.

### Time and Errors

The longer error detection takes, the stronger are the negative consequences of errors. Many errors need to be detected quickly to eliminate the negative consequences; other errors allow more time. For example, a management mistake, such as employing the wrong person, does not need to be corrected within a few seconds. But, over the period of a few weeks, employing the wrong person may be damaging to the business. On the other hand, a mistake while driving a car (e.g., not seeing a red light) needs to be corrected within seconds to reduce the negative consequences; otherwise, an accident may happen. What is true of most errors (both the management error and the driving error), however, is that the longer the error is not detected, the more negative can be the consequences of the error. Thus, error detection is crucial.

In sum, as we build theory and a research agenda for the study of culture and errors, it is important to note that error prevention, detection, and management are all critical processes for organizations in all cultures. These processes share the same goal: to reduce the short- and long-term negative consequences of errors. While error prevention is aimed at trying to avoid having errors occur in the first place, error detection and management processes accept that errors will occur and are designed to catch and deal with errors after they occur. Latent errors can transpire due to faulty processing in either stage. As we discuss further in the chapter, although we expect that error prevention, detection, and management are universal processes, culture influences the extent to which there is a focus on each of these processes and can affect the ways these processes can have culture-specific manifestations. Put simply, cultural differences, we believe, arise from differences in attention to prevention, detection, or management and the ways these practices are implemented. We discuss not only cross-cultural variations in the error process but also the implications for these variations for cultural interfaces, particularly in multicultural teams.

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### Cultural Influences on Error Processes

There are many definitions of the term *culture*, each with its own implications for the study of the subject. Kroeber and Kluckhohn (1952) claimed that "the essential core of culture consists of traditional (i.e., historically derived and selected) ideas and especially their attached values" (p. 357), while Campbell (1965) suggested that elements of culture are made up of useful ideas that were adopted by increasing numbers of people. Hofstede

(1980) defined culture as "the collective programming of the mind," which distinguishes human groups from one another and influences how they respond to their respective environments (p. 25). Triandis (1972) suggested that culture consists of both the objective and the subjective elements of the human-made environment and defined subjective culture as "a cultural group's characteristic way of perceiving that man-made part of its environment" (p. 4). Triandis and Suh (2002) later defined elements of culture as "shared standard operating procedures, unstated assumptions, tools, norms, [and] values" (p. 136). Similarly, the Global Leadership and Organizational Behavior Effectiveness (GLOBE) study defined culture as common practices and common values (House & Javidan, 2004). While there is variation in the definitions of culture, many point to the shared nature of culture, its ability to impart adaptive (or once adaptive) knowledge, and its transmission across time and generation (Triandis, Kurowski, & Gelfand, 1994).

Culture has received attention in numerous areas in organizational behavior, including job attitudes, motivation, leadership, conflict and negotiation, teams, human resource management practices, and organizational culture (see Gelfand, Erez, & Aycan, 2007, for a review). To date, however, there have been few efforts to tie specific cultural dimensions to different stages of the error process (for exceptions, see Helmreich, 2000; Helmreich & Merritt, 1998; Helmreich et al., 2001; Jing et al., 2001; Li et al., 2009). To begin filling this void, we discuss numerous cultural dimensions that we see as particularly relevant to the error processes articulated, namely, error prevention, detection, and management. We theorize that organizations within and across cultures can differ in their "trajectories" of each stage of the error process, and there is considerable variation in the importance placed on different stages across cultures. Generally, one culture might be highly attentive to error prevention and not at all attentive to detection and error management, whereas another cultural might be just the reverse.

Although there are numerous cultural dimensions, we discuss six that have specific implications for the error management process. First, how people react to uncertainty in the environment, as measured by the cultural value of uncertainty avoidance, plays an important role in how people in different cultures address the unpredictability associated with the occurrence of errors. Second, humane orientation, or how people value affiliation with and support of others over the fulfillment of personal needs, affects the interpersonal aspects of error management, such as error communication. Third, tightness-looseness, a measure of the strength of norms and consistency of punishment for their violation, has an impact on how people plan for and address the inherent norm violation that occurs when an error, even if unintentional, is committed. Fourth, fatalism, or the belief that outcomes are dictated by external forces

rather than personal decisions or behaviors, plays a role in how people try to control and explain errors. Fifth, power distance, which relates to the extent to which people expect and accept power inequalities between levels in the social hierarchy, has far-reaching implications for communication between people of different organizational levels about error management. Finally, the extent to which people feel autonomous versus interdependent with their respective groups, or individualism-collectivism, has an impact on how individuals and groups differentially address issues surrounding error prevention, detection, and management. In sum, different parts of the "cultural elephant" are theorized to influence different aspects of the error process.

Table 11.1 provides a summary of our main points, which are elaborated in the following sections, as well as several cultural paradoxes that we have identified regarding each cultural dimension and the error process. We note several important caveats of our theoretical analysis. First, while we focus on these particular dimensions of culture, we recognize that there are other dimensions that could also be relevant for errors that require analysis in future work. Second, although we discuss each dimension separately for exposition purposes, it is critical to note that cultures are complex wholes that vary in multiple dimensions; thus, an analysis of any particular cultural system should take this into account. Third, it is critical to note that there is much within-culture variation on all of the dimensions discussed, and that organizational cultural differences within national cultures can vary dramatically depending on industry, region, strategy, and the like, which also have critical influences on error detection and error management. While we do not discuss these distinctions vis-à-vis societal culture and their potential interactions in this chapter, they are fertile ground for future research, as we point out in the general discussion. Finally, we should hasten to add that due to the general lack of studies, many of our comments are theoretical and speculative—future research will have to tell whether our suggestions are right. With these caveats in mind, we now define the cultural dimensions of interest in this chapter; discuss their hypothesized relationship with error prevention, detection, and management; and highlight the implications of our analysis for error processes in multicultural teams.

### Uncertainty Avoidance

The cultural dimension of uncertainty avoidance (UAI) refers to how well people tolerate ambiguous, unstructured situations (Hofstede, 1980). People in cultures with high UAI, such as Sweden and Germany (as reported by House, Hanges, Javidan, Dorfman, & Gupta, 2004), view uncertainty with anxiety and attempt to minimize their exposure to it by establishing policies, rules, and laws to impose certainty across many

TABLE 11.1  
Summary of Theory on Culture and Errors

Cultural Dimension	Error Prevention	Error Detection	Error Management
Uncertainty avoidance	High	Less monitoring Less communication and feedback	Negative emotional reaction Stress interferes with deployment of skills and resource Defensive attribution Lower reporting of individual error Formalized and restricted communication and information exchange delays error handling
	High on individual planning and strategizing High on technology High on communication and information search Negative attitude toward errors engenders creation of formalized rules, regulations, and procedures Fewer individual attempts to plan or strategize Technology not developed to same degree Less communication and information search Fewer bureaucratic measures to prevent errors	Greater monitoring Less negativity surrounds errors, facilitating open communication and feedback	Fewer and less-intense negative emotional reactions Lower stress levels allow individuals to use skills to address error Fewer defensive attributions Greater reporting by individuals Open communication fosters speedy error handling Fewer and less-intense negative emotional reactions
Humane orientation	Low	Lower monitoring Slower detection	Low expectations of serious consequences of errors reduces defensiveness Greater consideration of situational context of errors, attenuating negative consequences and leading to less blaming Supportive interpersonal relationships help individuals deal with errors

(continued)

**TABLE 11.1 (Continued)**  
Summary of Theory on Culture and Errors

Cultural Dimension	Error Prevention	Error Detection	Error Management
	Low	Greater monitoring Stress surrounding errors inhibits communication and feedback	Negative emotional reactions Greater defensive reactions because of high potential for negative consequences Errors attributed to the individual rather than to the situation and more blaming
Tightness-looseness	High (tight)	High individual self-regulation enhances individual ability to detect errors Greater sensitivity to deviations from norms increases attention paid to feedback that error might occur High degree of social monitoring facilitates detection of errors	Negative reactions and attitudes toward errors because of implication of deviant behavior Expectation of monitoring and punishment increases desire to suppress errors and limit their visibility to others Increased negative social consequences for errors, including bullying of deviant
	Low (loose)	Lower self-regulation inhibits individual error detection Lower acceptability of social monitoring decreases error detection Lowered sensitivity to norm deviation decreases attention to feedback about errors Lower degree of social monitoring inhibits detection of errors	Higher error tolerance results in less-intense negative reactions to errors Lower expectations for monitoring and punishment decrease attempts to suppress errors Fewer social and interpersonal consequences for deviation

Fatalism	High	Belief that error occurrence is inevitable and due to external factors decreases detection	External attribution for errors and fewer negative or defensive reactions Less blaming may facilitate communication about errors, but there is little motivation to communicate because little can be done to mitigate damage or prevent future errors
	Low	Belief that error occurrence can be affected and potentially halted by human efforts increases error detection	Internal attributions for errors because under personal or organizational control Negative and defensive reactions, which inhibits communication
Power distance	High	Managers may work to detect errors, but subordinates may be hesitant to step outside their roles to detect errors and alert their superiors	Potential for face loss over error makes high-status members reluctant to deal with errors Communication about errors likely to be stifled, with subordinates uncomfortable expressing opinions and emotions about error Subordinates unlikely to request supervisor feedback about actions that may have contributed to error
	Low	Participative nature of workplace induces all organizational members to monitor for errors	Lower concern for face makes high-status members more comfortable confronting error Participative workplace makes subordinates more comfortable expressing opinions and emotions about errors Subordinates more likely to seek supervisor feedback about behavior
Individualism-collectivism	High (individualistic)	Tendency to self-enhance reduces likelihood of detection and communication of individual errors	Accountability and blame fall on individual, increasing defensiveness Lack of face concerns facilitates communication about error

(Continued)

**TABLE 11.1 (Continued)**  
Summary of Theory on Culture and Errors

Cultural Dimension	Error Prevention	Error Detection	Error Management
Low (collectivistic)	Prevention focus enhances desire to avoid failures or mistakes, thus facilitating the creation of error prevention strategies	Lower motivation to self-enhance increases self-criticism, thus facilitating the detection and communication of individual errors Interdependence and high network density may also facilitate detection of others' errors	Propensity to make external attributions decreases defensiveness Dialectical thinking decreases surprise at error occurrence and hindsight bias Less communication about errors because of potential for individual or collective face loss Accountability falls on collective and, by proxy, the representative or leader of the collective Conformity and group think processes may lead to collective denial of error

domains of life. In contrast, people in cultures with low UAI like Greece, Guatemala, and Russia are more comfortable with ambiguity and less likely to establish structures to control or predict uncertain situations. The most important approaches to dealing with uncertainty are to plan well and to anticipate potential negative events in the future to prevent them from occurring.

**Uncertainty Avoidance and Error Processes**

A number of features of cultures with high UAI lead us to predict that these societal contexts will be both simultaneously high on error prevention yet, ironically, slower on error detection and worse on error management. As discussed, people in cultures with high UAI manage uncertainty through planning and the establishment of rules that make situations and behavior more predictable. Research has shown, for example, that managers from these cultures spend more time planning and scheduling activities than those from cultures with low uncertainty avoidance (Hofstede, 1984). As the basis of planning activities, information search may also be more important in cultures with high UAI, such that workers in the same occupation spend a greater proportion of their working hours on information searching depending on levels of cultural uncertainty avoidance. Beckmann, Menkhoff, and Suto (2008) found that asset managers from Japan, a country with a high UAI culture, spent the highest percentage of their working hours on research, while asset managers from the United States, which has a culture of comparatively lower UAI, spent the smallest proportion of their working hours on research. People in high UAI cultures may also be more likely to rely on "tried-and-true" methods of planning and prevention. For example, travelers from high UAI cultures purchase planned, prepackaged tours more frequently than travelers from moderate UAI cultures (Money & Crotts, 2003), highlighting the connection between UAI and the desire to minimize the possibility of unanticipated events, even on vacation. Similarly, Ryan, McFarland, Baron, and Page (1999) suggested that organizations in high UAI cultures may use fewer types of selection methods because of the need to rely only on proven methods. By planning for different possible situations and depending on reliable methods, people in high UAI cultures establish a sense of control over their environments. The sense of control that results from planning is particularly critical to attenuate the higher anxiety and stress levels experienced by people in high UAI cultures (Hofstede, 1980; Lynn & Hampson, 1975; Millendorfer, 1976).

Based on this discussion, we suggest that, given the higher stress level and greater tendency to worry and plan for uncertain situations, there will be a greater focus on error prevention in cultures with high versus low uncertainty avoidance. In particular, given their concern for avoiding

uncertain events, people in high UAI cultures will have enhanced individual anticipatory strategies of prevention, and organizations will seek to provide structured training to improve individuals' preparatory strategies. However, the effectiveness of the individual and organizational attempts to plan may be diminished in high UAI cultures. Burke, Chan-Serafin, Salvador, Smith, and Sarpy (2008) suggested that managers and trainers in high UAI cultures may prefer standardized and structured approaches (e.g., lectures) to safety training over more engaging strategies like role-playing. While the reliance on structured approaches reduces the variability in the training process, these methods do not provide workers with as great an opportunity to critically assess the knowledge or engage in counterfactual, "what if" thinking. Thus, workers in high UAI cultures may be more reliant on standard safety protocols and less able to anticipate and respond to unusual events. Burke et al. supported these propositions with a meta-analysis, finding that UAI was negatively related to worker engagement in safety training, and that UAI moderated the relationship between training and negative safety outcomes, such that as UAI increases, the effectiveness of safety training in reducing negative outcomes decreases. Thus, although planning and prevention may receive greater attention in high UAI cultures, these planning activities may not impart individuals with the flexibility needed actually to deal with errors as they occur.

In addition to the focus on planning in high UAI cultures, people will readily talk about potential errors and attempt to avoid them by planning for the "correct action." This implies that there is a high degree of communication about potential errors, and all of this communication is under the rubric of *avoiding* the occurrence of these errors. This has several important implications for this analysis. First, errors are seen as negative and must be avoided at all costs as they indicate a dangerous deviation from norms (Hofstede, 1991). Second, if there is inadequate planning, there will be more errors. Third, because the appearance of errors implies that people have not really dealt with future problems adequately, it is the fault of the people making an error. Thus, high UAI leads not only to high communication about potential errors but also to a negative attitude toward errors and a higher negative attitude toward people who make errors.

Therefore, in high-UAI cultures, the concern about managing uncertainty in the future will result in greater attention to error prevention than in low-UAI cultures. Thus, at least in the stage of error prevention, there is "worry work"—individuals in high-UAI cultures are expected to reduce ambiguity through a high degree of communication, which can provide important clarifying information about the situation and relevant behaviors (Sully de Luque & Sommer, 2000). Organizations in high UAI cultures should likewise develop and use error prevention technology to the extent that it provides a reliable method of reducing ambiguity in

the environment (Hofstede, 1980). For example, pilots in high UAI cultures show more acceptance of and reliance on automation (Helmreich & Merritt, 1998). However, high UAI may actually impede the adoption of innovative technology (Erumban & de Jong, 2006) since these unproven methods may actually increase uncertainty in the organization.

However, ironically, we expect, particularly when work has become routinized, that the high emphasis on error prevention in high UAI cultures will lead to a consequent slower ability to recognize errors and to manage errors. These individuals are expected to be focused on designing strategies and routines to prevent errors. Once a prevention strategy is seen as effective, anxiety is reduced, and perceptions of control over the environment are enhanced. Accordingly, there is less reason to monitor and a decreased need for communication and feedback; thus, high-UAI cultures should be slower to recognize if errors do occur and more surprised when they do occur. One anecdotal example (in which one of the authors was indirectly involved) is that both *Business Week* and its German equivalent *Wirtschaftswoche* had a cover story about dealing with management and errors within a few weeks of each other in August 2006. Both magazines asked chief executive officers (CEOs) of important companies to talk about their "biggest error"; by and large, the German CEOs described errors by others that they had not detected early enough (thus, they saw their fault in low error detection but not for making errors themselves), while the American CEOs reported about real errors they themselves made.

Moreover, high-UAI cultures are expected to be poorer at error management for a variety of reasons. First, individuals are expected to have *highly negative attitudes* when errors are discovered due to the fact that they were unexpected and were seen as highly dangerous and stressful deviations (Hofstede, 1991). Because errors are seen as a sign of insufficient preparation and planning, there will be more *defensive attributions*: more blaming and less reporting of individual errors (Hofstede, 2001; Merkin, 2006). High UAI may also be associated with less-flexible problem-solving coping to deal with managing errors. As discussed in the error prevention section, workers in high UAI cultures may be less able to respond flexibly to unanticipated events due to the standardized safety training they receive (Burke et al., 2008). Furthermore, workers in high UAI cultures may adhere to standard operating procedures or organizationally provided standards regardless of whether flexibility is allowed (Beckmann et al., 2008; Helmreich & Merritt, 1998). The lack of ability or desire to deviate from standard procedures may make the occurrence of errors even more-stressful and ultimately have a negative impact on workers' ability to deal flexibly with the uncertainties and ambiguities associated with errors after they occur.

Social contextual factors in high-UAI cultures also likely inhibit the collective detection and management of errors. For example, the high

degree of formalized communication associated with high-UAI cultures may delay the handling of errors because workers have to rely on a more time-consuming process to disseminate formal communication about the error to those involved. Moreover, high UAI cultures tend to encourage restrictions on the exchange of information between people not directly involved in managing the specific situation (Gray, 1988; Salter & Niswander, 1995). The restriction of information exchange protects the security of the organization by minimizing conflict and competition (Gray, 1988) but may ultimately reduce the information on error occurrence disseminated throughout the work group or organization. In addition, when communication does occur, it may be hindered by the ritualistic behaviors and high degree of stress in uncertainty avoidance cultures. Merkin (2006) found that in embarrassing situations, people from high UAI cultures utilized more ritualistic face-saving strategies, harmonized less, and employed more aggressive communication than people from low UAI cultures. Because of their inability to deviate from ritualistic face-saving scripts and extend conciliatory expressions, error communication in high UAI cultures may be overly stiff, negative, and adversarial and thus may not foster the information exchange necessary to manage errors. In all, these processes should lead to a lower degree of collective error detection and hindered error management in high UAI cultures.

Slowness in error detection may lead to the increased likelihood that catastrophes (very negative error consequences as a result of latent errors) occur given that a certain risk exists. However, once the error is accepted by high-UAI organizations and cultures, there is a higher degree of error prevention again—with conscious attention to improving systems, products, safety regulations, and so on. Ryan et al. (1999) found that organizations in high UAI cultures were more likely to audit their selection procedures to ensure their effectiveness; it may also be the case that, after adequate time has elapsed and the anxiety surrounding an error subsides, these organizations may likewise examine the effectiveness of their error prevention process. After this examination, the organization may go the route of ever-increasing bureaucracy (ever more rules, regulations, procedures, standards, etc). In all, this suggests that high-UAI societies may be slower to detect errors and manage them and thus may actually see short-term consequences that are more disastrous. Once errors have been recognized, however, they might prompt a deeper analysis of the error situation and activate secondary error prevention, which may help in long-term error prevention but not necessarily reduction of catastrophes.

*Proposition 1:* Uncertainty avoidance will be positively related to error prevention and negatively related to error detection and error management. Specifically, error prevention will be higher

in high- versus low-UAI cultures, yet error detection and error management will be lower in high- versus low-UAI cultures. As a result, errors will have short-term consequences that are more disastrous in high- than low-UAI cultures.

This proposition leads to an interesting *cultural paradox*: High-UAI cultures plan for errors more but have potentially more negative and disastrous consequences due to poor error detection and error management processes.

### Humane Orientation

Humane orientation is related to how societies reward expressions of altruism, fairness, and caring (House et al., 2004, p. 13). Cultures that value a humane orientation tend to focus on the fulfillment of needs related to affiliation rather than self. Therefore, people in cultures that endorse a humane orientation, such as those in Egypt, Malaysia, and Ireland, express more prosocial values and emphasize the importance of providing support and help to others, spending time with others, and sharing information. In contrast, people in cultures that are low in humane orientation, like those in Germany, Singapore, and South Africa, tend to be more self-centered and spend their time and resources in the pursuit of personal enjoyment, comfort, wealth, and power.

Broadly, levels of humane orientation are associated with the quality of the human condition; as survival becomes more difficult and requires greater resources, humane orientation increases. For example, societies with low levels of modernization and economic development tend to have high levels of humane orientation, whereas greater modernization and economic development are related with lower levels of humane orientation (Schlösser et al., 2007). This relationship exists because as the hardships of survival increase, there is more need for solidarity and support. High humane orientation is also associated with helping behaviors, such as providing financial and material help to others. As an example of this point, humane orientation is negatively related to the role of the state in caring for its citizens (as in welfare societies). In high humane orientation cultures, citizens care for people they know. In contrast, governments in low humane orientation cultures develop welfare institutions as a substitute for personal support and protection (Schlösser et al., 2007). Overall, high humane orientation is associated with societal-level variables related to ensuring human survival through personal relationships rather than external intervention.

Humane orientation accepts human nature as it is and therefore also accepts and is more tolerant of errors. Indeed, the item of the GLOBE study that inquired about the practice of error tolerance and intolerance in the

society turned out to be part of the humane orientation scale in the factor analyses done in the GLOBE study (Hanges & Dickson, 2004). However, humane orientation should not be confused with a high degree of protection for anyone in society; humane orientation is positively related to racism and authoritarianism (Schlösser et al., 2007).

### *Humane Orientation and Error Processes*

Humane orientation has important implications for the error process. First, high humane orientation is related to increased compassion and acceptance and thus acceptance of mistakes, which may affect the attention given to prevention and error detection. If mistakes are expected and are tolerated, there is a reduced need for prevention strategies. Likewise, if errors are not particularly stressful or important, errors should be slower to be detected once they have occurred in cultures with high humane orientation. However, once errors have occurred, features of humane-oriented societies make them more prepared to deal with them in a variety of ways. First, there should be less-negative attitudes toward errors once they have occurred in cultures with high humane orientation. The tolerance of mistakes should be related to less defensiveness when errors are discovered since tolerance for errors would lead workers to expect fewer serious consequences for them. Humane orientation is also characterized by greater consideration for individual circumstances. Managers in cultures with high humane orientation are more likely to take individual workers' situations into account when making decisions (Schlösser et al., 2007); thus, when errors are handled, there may be a greater consideration of the individual's situation when the error occurred (e.g., fewer dispositional attributions and blaming of individuals), which may attenuate negative consequences. Finally, once errors have been identified, the emphasis on supportive relationships may help individuals to deal collectively with errors. However, it is important to note that people in cultures with high humane orientation may be reluctant to point out the errors of others because of the potential for such interactions to cause rifts in relationships between organization members. Accordingly, we predict the following:

*Proposition 2:* Humane orientation will be negatively related to error prevention and error detection yet positively related to error management. Error prevention and detection will be lower in cultures with high as compared to low humane orientation, yet error management will be higher in cultures with high as compared to low humane orientation.

This proposition leads to another interesting cultural paradox: Cultures high on humane orientation are less attentive to errors and therefore have

less error prevention and detection. However, once errors have occurred, they may have more positive attitudes and strategies that are less defensive as compared to cultures with low humane orientation.

### **Tightness-Looseness**

The cultural dimension of tightness-looseness reflects the degree to which a society provides clear norms and consistent sanctions for deviation from norms (Chan, Gelfand, Triandis, & Tzeng, 1996; Gelfand, Nishii, & Raver, 2006; Pelto, 1968; Triandis, 1989). Tight societies, like those of Japan, Singapore, and Pakistan, tend to provide strong norms and sensitive monitoring systems to detect deviations, which are severely punished. As such, these societies tend to value order, formality, discipline, and conformity. In contrast, norms in loose societies, like those of Brazil, Israel, or the United States, tend to be more ambiguous, and the monitoring of behavior is less stringent. Deviations from norms are more likely to be tolerated, and punishments for deviations are less severe. Thus, loose societies tend to value innovation, openness to change, tolerance, risk taking, and variety (Gelfand et al., 2006).

Tightness-looseness is associated with a variety of ecological and socio-political correlates. Pelto (1968), who first introduced the concept after anthropological investigations into traditional societies, suggested that tightness is associated with dense populations, unilineal kinship systems (i.e., kinship is traced through either the male or female parent), and economic systems based on agriculture. Looseness, in contrast, is associated with sparse populations, bilateral kinship systems (i.e., kinship is traced through both parents), and economic systems based on hunting, fishing, or gathering. Triandis (1977) expanded the proposed antecedents of the construct, arguing that social differentiation, or the extent to which specialized roles have developed in a society, may predict tightness-looseness in preliterate societies. Societies with differentiated social organization tend to be tighter since the greater complexity of the social structure requires stronger norms to ensure the survival of the group. Chan et al. (1996) also pointed to homogeneity, isolation, interdependence, and cultural stability as important antecedents to the development of tight societies. In a 33-nation study of modern societies, Gelfand and colleagues (2011) found that tightness is indeed a separate cultural dimension than others studied previously (e.g., uncertainty avoidance, collectivism) and is related to such factors as population density, percentage of arable land, environmental vulnerability, order (low crime), conservative attitudes, and less tolerance for deviant groups.

### Tightness-Looseness and Error Processes

Tightness-looseness has an impact on a wide variety of social and organizational factors associated with the error process. Tight societies tend to have higher levels of felt accountability (Frink & Klimoski, 1998; Tetlock, 1985), or the belief that one's actions will be evaluated and that evaluation may lead to punishment (Gelfand et al., 2006). Two outcomes of higher levels of felt accountability in tight societies are increased cognitive accessibility of norms and ought-focused self-guides (Gelfand et al., 2006). That is, people in tight societies are expected to have higher accessibility of the public self, stronger associations between situations and the appropriate norms in the eyes of *generalized others* (as compared to *close others*, as in the case of collectivism, discussed in a separate section), and should be more focused on avoiding failure or mistakes than achievement of goals. In addition, people in tight cultures (e.g., Japan) are concerned about a broader array of consequences that their actions might have on others as compared to people in loose cultures (Maddux & Yuki, 2006). Accordingly, people in tight societies are more likely to create and enforce strategies to prevent potential errors at the individual, team, and organizational levels. On the other hand, people in loose societies are not expected to engage in extensive error planning since expectations are less well defined, felt accountability is lower, and tolerance for mistakes is expected.

Error detection is also expected to be enhanced in tight versus loose societies. From a cognitive perspective, error detection is facilitated through *internal goal comparisons*, by which individuals complete an internal comparison between feedback signals and the goals of the action (Hofmann & Frese, Chapter 1, this volume). Tight cultures are theorized to have higher degrees of self-regulation, by which individuals monitor their own goals vis-à-vis important standards to avoid making mistakes, as compared to loose cultures, which have less self-regulation (Gelfand et al., 2006). As such, they should be better able to detect errors that they make. Tight cultures also experience greater monitoring of social behavior than loose cultures, in part due to a high population density, which makes monitoring by others more possible than in loose cultures. Monitoring is not only more possible but it is also more expected and accepted in tight versus loose cultures. That is, given the importance of abiding by social norms in tight cultures, it is much more typical, as compared to loose cultures, to communicate to others what they have done wrong, thus making error detection through external communication more prevalent in tight versus loose cultures. For example, Syrian children inform their parents of anyone who may be violating government mandates (Hopwood, 1988), and Chinese children monitor their peers' behavior to ensure it is appropriate (Chen, 2000). Organizations in tight societies also monitor their employees (e.g., Aoki, 1988; Jennings, Cyr, & Moore, 1995; Morishima, 1995).

In contrast, such monitoring of employees leads to more negative reactions in loose societies (Frink & Klimoski, 1998). For example, research in the United States suggests that employee monitoring causes negative emotional reactions, such as feelings of loss of control and perceptions of being oppressed (Aiello & Kolb, 1995; Martin & Freeman, 2003), and disrupts performance (Sutton & Galunic, 1996). Because of this increased negative reaction to monitoring, loose societies are expected to place less emphasis on error detection than tight societies. Particularly when errors are ambiguous (Hofmann & Frese, Chapter 1, this volume), tight cultures, which are highly sensitive to deviations, will take more seriously any feedback that signals an error might be occurring. By contrast, loose cultures have much more tolerance for deviance and will have a much more lenient response criterion, such that it must be that much clearer and definite that an error has occurred before corrective actions occur.

At the same time, once errors have been detected, error management processes are likely to be hindered in tight versus loose cultures. Because violations are punished more severely in tight cultures, people will likely have attitudes that are much more negative toward errors. By contrast, because there is much more tolerance for deviant behavior, errors are more natural in loose cultures, resulting in attitudes that are more positive toward error management. As a result, individuals will be more likely to want to suppress errors and limit that others see that they have occurred in tight versus loose cultures. Emotional processing may be further hindered in tight societies because of higher degrees of social sanctions for norm deviation. While the punishment of deviants occurs in all cultures, it is likely more pronounced in tight cultures. For example, Japanese children who are different from their schoolmates often experience *ijime*, or bullying with the purpose of punishing those who are deviant. To the extent that others also view errors negatively and punish them when they occur, it will collectively detract problem solving for how to manage errors once they have occurred. Accordingly, we predict the following:

*Proposition 3:* Tightness-looseness will be positively related to error prevention and detection but negatively related to error management. Error prevention and detection will be higher in tight versus loose cultures, yet error management will be lower in tight as compared to loose cultures.

This discussion raises yet another possible cultural paradox: Cultures high on tightness are better able to prevent, detect, and communicate errors but have a lower ability to manage them once they have occurred.

## Fatalism

The cultural dimension of fatalism reflects the extent to which people believe that external factors dictate life events. Fatalism is associated with the beliefs that it is not possible to fully control personal outcomes (Ayca et al., 2000), and that whatever happens must happen (Bernstein, 1992). While people in fatalistic cultures such as Russia and India may point to a variety of external sources that exert ultimate control over their lives, including God, fate, or chance, they are united by a common recognition of the role of these external factors in their lives (Caplan & Schooler, 2007). In contrast, people in less-fatalistic cultures, including Germany and the United States, are more likely to endorse the belief that they maintain personal control over their outcomes and lives. At the national level, fatalistic beliefs are negatively correlated with gross domestic product (GDP) per capita, life expectancy at birth, urbanism, percentage of GDP spent on health, voter turnout, and environmental sustainability, human development, and human rights, and women's status in society and positively correlated with heart disease death rate and suicide rate (Leung & Bond, 2004).

### *Fatalism and Error Processes*

Fatalism has been linked to beliefs and behaviors related to health, safety, and coping, which have implications for error prevention, detection, and management. In particular, we expect that fatalism is related to low prevention of errors, given that fatalism has been related to inadequate or hindered preparation for negative events. For example, Hardeman, Pierro, and Mannetti (1997) found that fatalism related to HIV was related to safe sex practices, such that participants who believed that they had control over whether they became infected with the virus were more likely to report intentions to use condoms during sexual encounters. Other studies have shown that fatalistic beliefs regarding earthquakes (i.e., beliefs that the amount of damage incurred during earthquakes was under the control of external forces) were less likely to prepare for earthquakes (Turner, Nigg, & Paz, 1986). Likewise, individuals who exhibit stronger beliefs in fatalism and destiny (Rotter, 1966) tend to use seatbelts less frequently (Colón, 1992; Council, 1969; but see Byrd, Cohn, Gonzalez, Parado, & Cortes, 1999).

People in highly fatalistic cultures may be less likely to create strategies to prevent errors or develop technology for error detection since the occurrence of errors is believed to be under external control and not affected by human interventions or monitoring. In contrast, people in low-fatalism cultures believe that the occurrence of errors is under personal or organizational control and thus may be more likely to establish technological

and social mechanisms to prevent and detect errors. In addition to the link between fatalism and preventive measures, fatalism may affect the monitoring process that is important for the detection of errors. For example, Rundmo and Hale (2003) found that managers' fatalism was one of the most important predictors of their monitoring of safety on their jobs. Managers high on fatalism were less likely to engage in actions like safety observations and audits, inspection routines, and supervision of housekeeping as compared to managers low on fatalism. In all, fatalism is expected to result in low error prevention and error detection.

Fatalism may also be related to error management. Fatalistic beliefs are associated with greater external attribution for events. For example, Kouabenan (1998) found that, in a sample of Ivory Coast drivers, those who were more fatalistic were more likely to attribute traffic accidents to external forces, such as headlight care, poorly maintained roads, and other's violation of traffic signals, than to internal forces, such as driver carelessness or impatience. Based on the increased tendency for people in fatalistic cultures to attribute errors to external forces, there may also be less communication about errors because there is little that can be done to prevent similar errors in the future. Thus, although negative or defensive emotional processes are likely to be lower in high-fatalism cultures (in part because they are expected and attributed to the situation), there is less likelihood that they will be managed since they are seen as stemming from external sources and predetermined. In this respect, our very definition of errors—namely, that they could have potentially been avoided—runs counter to fatalistic thinking and reducing error prevention, detection, and management. Thus, although blaming in case of an error will be much lower in cultures high on fatalism, which may make error communication easier since there is little reason to talk about errors because one fatalistically accepts them, there is little motivation for error communication. Accordingly, we predict the following:

*Proposition 4:* Fatalism is negatively related to error prevention, detection, and management. Error prevention, detection, and management will be lower in cultures high versus low on fatalism. The capacity for catastrophic error consequences is therefore more pronounced in cultures high versus low on fatalism.

This discussion raises yet another possible cultural paradox: Fatalism is the only cultural dimension that is uniformly negative on all aspects of the error process, even though in principle, fatalism should make error communication easier.

### Power Distance

*Power distance* refers to the degree to which members of a society expect and accept inequalities (Hofstede, 1980). In high-power-distance cultures, such as Morocco and Nigeria, people accept large power differentials between levels of the social hierarchy. On the other hand, people in lower-power-distance cultures, including Denmark and the Netherlands, are less accepting of such power differentials. As a core cross-cultural difference, power distance is related to key historical, political, social, and geographic factors and has far-reaching consequences for organizational behavior. For example, Hofstede (1980) noted that cultures with high power distance are likely to have experienced occupation, colonialism, and imperialism, whereas low-power-distance cultures tend to have histories of independence and federalism. In addition, high-power-distance cultures often have traditions of centralized power in the hands of a monarchy or oligarchy, a small middle class, and agrarianism, while low-power-distance cultures are characterized by histories of representative governments, a large middle class, and more modern industry. Hofstede (1980) also linked power distance with geography, finding a negative relationship between geography and latitude; this relationship is likely attributable to the higher levels of social mobility and technological innovation associated with the more extreme latitudes.

#### *Power Distance and Error Processes*

Power distance is also associated with unique patterns of organizational behavior, many of which have important implications for the error process. People in high power distance cultures see subordinates and superiors as inherently separate and unequal groups, leading to greater social distance between these groups in the workplace. Superiors are seen as largely unquestionable authorities, and in this respect, we would expect that superiors in high power distance cultures would be particularly concerned with preventing errors "under their watch." At the same time, subordinates in high power distance cultures are less likely to engage in planning for errors. First, subordinates tend to avoid voicing concerns to superiors and uncritically accept their directives and actions (Hofstede, 1991). Human resource and decision-making practices are less participative in high power distance cultures (Aycan, Kanungo, & Sinha, 1999; Brockner et al., 2001; Newman & Nollen, 1996); likewise, subordinates in these cultures do not experience the desire for participative practices as do subordinates in lower power distance cultures (Brockner et al., 2001; Eylon & Au, 1999; Huang & Van de Vliert, 2003; Huang, Van de Vliert, & Van der Vegt, 2005; Robert, Probst, Martocchio, Drasgow, & Lawler, 2000). The general lack of subordinate participation in organizations in high power

distance cultures may have a negative impact on error planning. Put simply, since subordinates may not feel comfortable voicing their concerns or ideas to their superiors, who may likewise discourage subordinate participation, error communication may suffer in high power distance cultures (Helmreich et al., 2001). Thus, in high power distance cultures, superiors and subordinates will have differential levels of prevention of errors as compared to those in low power distance cultures.

Power distance may also have an impact on the error detection process. Again, although people of high status will be motivated to detect errors given their enhanced sense of authority and responsibility, in the highly centralized and stratified organizations typical in high power distance cultures, employees may not be motivated to step outside their roles and take on the extra responsibility of monitoring for errors if it is not part of their job (Slater & Narver, 1995). In particular, power distance is negatively associated with national levels of role ambiguity (Peterson & Smith, 1997), suggesting that employees in high power distance cultures have a clear understanding of the responsibilities associated with their jobs. Thus, if those responsibilities do not include error detection, it may be less likely that employees in high power distance cultures will take on that role, especially if this action may be interpreted as encroaching on a superior's role. In contrast, employees in low power distance cultures are likely to have less-clear boundaries between occupation roles (Hofstede, 1980), which may induce them to monitor for errors even when this role is outside the scope of their job. Thus, as with error prevention, there will be discrepancies in detection of errors between superiors and subordinates in high versus low power distance cultures.

Finally, power distance has important implications for error management. In high power distance cultures, superiors and subordinates alike might be reluctant to manage errors once they have occurred. For superiors, there is a great loss of face if errors occur on one's watch. That is, high-status members of high power distance societies may not want to lose face if they have caused an error, particularly because of their greater responsibility in preventing them in the first place given their enhanced authority. In addition, there is likely to be less communication about errors in high power distance cultures. Not only are subordinates in these cultures unlikely to point out their leaders' errors, but also they may avoid probing their supervisors for feedback about their behavior related to errors (Morrison, Chen, & Salgado, 2004). Accordingly, subordinates in high power distance cultures are also unlikely to voice their opinions, feelings, or concerns about their own or others' errors, thus having a negative impact on error communication. In sum, we predict the following:

*Proposition 5:* The nature of one's status is highly linked to error processes in high versus low power distance cultures. In high power distance cultures, low-status individuals will have lower error prevention, high detection, and low management as compared to high-status individuals. There are fewer differences between high- and low-status individuals in error prevention, detection, and management in low power distance cultures.

As with the other cultural dimensions, this discussion raises yet another possible cultural paradox: High-power parties in high power distance cultures are likely worried about errors and losing face, but they are not likely to learn that they have occurred and thus cannot manage them.

### Individualism-Collectivism

The last dimension we consider is individualism and collectivism, which reflects the nature of the relationship between the individual and the group. There has been extensive discussion of these constructs in sociology (e.g., Parsons, 1949), anthropology (Kluckhohn & Strodtbeck, 1961; Mead, 1961) and psychology (Chinese Culture Connection, 1987; Hofstede, 1980; Markus & Kitayama, 1991; Schwartz, 1994; Triandis, 1995). Although sometimes using slightly different parlance, across all of these disciplines there is agreement that cultures can be differentiated on the extent to which people are autonomous versus embedded in groups (Schwartz, 1994). Furthermore, within psychology, there is increasing evidence that the nature of the self, and consequently information processing, varies across individualistic and collectivistic cultures (Heine & Lehman, 1999; Markus & Kitayama, 1991; Triandis, 1989). For example, in individualistic cultures like those of Denmark, New Zealand, and the Netherlands, individuals value their autonomy from groups, want to stand out, and focus on their individual rights and their own needs and interests. On the other hand, people in collectivistic cultures, such as those of Philippines, Georgia, Iran, and India, are tightly embedded in social groups, want to "blend in" and maintain harmony and face, and tend to emphasize duties and obligations to the group over personal needs or desires (Gelfand, Bhawuk, Nishii, & Bechtold, 2004).

Individualism and collectivism are related to several societal-level constructs. Individualism tends to appear in either hunting-and-gathering societies or wealthy, industrialized societies, while collectivistic societies are based more on agriculture and may be classified as developing. Individualism is also associated with capitalism, democracy, and social mobility. Individualism and collectivism are also related to family structure, with the nuclear family being more central in individualistic

cultures and the extended kinship network being more central in collectivistic cultures (Hofstede, 1980; see also Gelfand, Bhawuk, et al., 2004). In addition, individualism tends to be associated to a faster pace of life than collectivism (Levine & Norenzayan, 1999). Finally, communication in collectivistic cultures tends to be more indirect, which speaks to the need to preserve group members' face, while people in individualistic cultures tend to communicate their views in more direct ways (Holtgraves, 1997).

### Individualism-Collectivism and Error Processes

Important elements of individualism and collectivism that have an influence on the error process are prevention versus promotion focus, attributions and individual blaming and accountability, situational blaming, face, self-criticism, error communication, and motivational processes directed toward individuals and toward the group. Based on extant research, we predict that error prevention will be higher in collectivistic cultures. Collectivists tend to be more concerned with avoiding failure and minimizing potential losses than individualists (Elliot, Chirkov, Kim, & Sheldon, 2001; Hamilton & Biehal, 2005; but see Hsee & Weber, 1999, for an exception), and research has found that collectivists are more prevention focused and individualists are more promotion focused (Lalwani, Shrum, & Chiu, 2009; Lee, Aaker, & Gardner, 2000). Collectivists' tendency to focus on preventing losses and failures likely manifests itself in the development of error prevention mechanisms and strategies, which serves to help avoid the negative experience of failure. In contrast, individualists' drive to attain gains and achieve successful outcomes may distract them from implementing necessary mechanisms to prevent failures or losses, leading to underdeveloped error prevention strategies.

Second, error detection is likely to occur more easily within collectivistic as compared to individualistic cultures due to an enhanced focus on self-criticism versus self-enhancement, respectively. In particular, research has shown that people in individualistic cultures are less attentive to their failures than to their successes and have a pervasive tendency to see themselves as better than others in the domains of academics (e.g., McAllister, 1996; Mizokawa & Ryckman, 1990; Yan & Gaier, 1994), athletics (e.g., De Michele, Gansneder, & Solomon, 1998; Mark, Mutrie, Brooks, & Harris, 1984), driving (Svenson, 1981), health (e.g., Weinstein, 1980), and social relationships (e.g., Ross & Sicoly, 1979; Sedikides, Campbell, Reeder, & Elliot, 1998), among others. By contrast, self-criticism is much more common in collectivistic cultures, in which improving oneself serves as an affirmation of one's interdependence with others and of being a "good" cultural self (Heine & Lehman, 1999). For example, the practice of *hansei*, or critical self-reflection, is pervasive throughout schools in Japan (Heine, Lehman, Markus, & Kitayama,

1999). Rather than helping children to identify their positive characteristics through praise and compliments, Japanese educators encourage students to focus on their shortcomings and weaknesses and to be critical of themselves to adapt and fit in with others. In addition, from a structural point of view, because of enhanced social interdependence and high network density, people in collectivistic cultures may be better able to notice when others make errors than those in individualistic cultures. Accordingly, we expect that errors are more likely to be detected in collectivistic as compared to individualistic cultures.

Predictions regarding individualism and collectivism and error management are more complex. On the one hand, one might expect that collectivists would be less defensive regarding errors due to their increased proclivity to make external versus internal attributions (Choi, Nisbett, & Norenzayan, 1999; Miller, 1984; Morris & Peng, 1994). By contrast, individualists will have particularly negative reactions to their own errors given that errors are inconsistent with the cultural mandate to be the best and because the blaming process is oriented toward the individual. Likewise, dialectical thinking, which is found among collectivists (e.g., that contradictions are possible), also produces a lower degree of surprise when an error happens. This also decreases the idea of hindsight bias—a bias to assume that one would have done it right (in contrast to others) when asked about an action retrospectively (Choi & Nisbett, 2000). Thus, attitudes toward errors may be more positive in collectivistic versus individualistic cultures.

Yet, on the other hand, we expect less communication of errors in collectivistic cultures. First, collectivism is often linked to concerns for face and reputation (Ting-Toomey, 1991), which should make individuals more reluctant to report errors for fear of losing face in the “eyes” of others. Second, individuals in collectivist cultures, who are in a more extended “web of accountability” (Gelfand, Lim, & Raver, 2004), assume that their errors will reflect not only on themselves but also on the *groups to which they belong*. Indeed, research has shown that while Americans tended to indicate that a single individual caused an event, East Asians were more likely to hold many people, particularly groups, accountable for a given action (Chiu & Hong, 1992; Chiu, Morris, Hong, & Menon, 2000; Menon, Morris, Chiu, & Hong, 1999). East Asians have been also shown to use “proxy logic” when assigning blame for an accident or error, in which they first assign blame to the collective responsible for the error rather than the individual and then to the leader/person who represents the collective (Zemba, Young, & Morris, 2006). Accordingly, given concerns for the accountability of the larger group and leaders for one’s own actions, we expect that individuals will have more denial of their own errors in collectivistic cultures. Moreover, given that collectivists might self-enhance on collectivistic dimensions (such as their beliefs about their

group) (Sedikides, Gaertner, & Vevea, 2007), they might be more defensive about errors committed by their group to avoid harming the reputation of the group. At the extreme, groupthink and collective denials of errors are more likely in collectivistic cultures. Accordingly, we predict the following:

*Proposition 6:* Collectivism is positively related to error prevention and error detection but negatively related to certain error management processes. Error prevention and error detection will be higher in collectivistic cultures as compared to individualistic cultures. Although errors are less surprising and elicit processing that is less defensive in collectivistic cultures, concerns with face and group accountability will reduce error communication as compared to individualistic cultures.

This discussion raises yet another possible cultural paradox: Collectivistic cultures should be better in error management than individualistic cultures given their strong ties, prevention focus, and penchant for situational attributions. However, communication processes may reverse these processes because of concern for face and concern for the group, which can inhibit error communication and ultimately produce disastrous consequences in the long term.

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### Implications for Multicultural Teams

Thus far, we discussed cross-cultural variation in the error process, from error prevention, to error detection, to error management. Yet, understanding cultural influences on errors is also critical for contexts in which cultures interact—such as in multicultural and virtual teams that transcend national borders. On the one hand, multicultural team contexts are ripe with potential for more errors with more disastrous consequences than their homogeneous team counterparts, given that there are highly divergent expectations regarding errors in such contexts along with additional processes that make it hard to coordinate in multicultural teams, such as ethnocentrism (Cramton & Hinds 2005), ingroup biases (Salk & Brannon 2000), and high levels of task or emotional conflict (Elron, 1997; Von Glinow, Shapiro, & Brett, 2004), which all lead to reduced (constructive) communication.

However, as with others who argue that multicultural teams can provide strategic advantages for organizations (see Earley & Gibson, 2002; Shapiro, Von Glinow, & Cheng, 2005), we suggest that *cultural diversity*

can actually help with error processes, and multicultural teams can even far surpass homogeneous teams due to the complementarities that exist regarding error prevention, detection, and management. Put simply, given that many cultural contexts fall short in general in maximizing all of these processes, it is possible that some multicultural teams, due to their natural complementarities on different error foci, will maximize the prevention, detection, and management of errors. Thus, in the right combination, cross-cultural teams may be able to compensate for the weaknesses/lack of focus of other members. By contrast, homogeneous teams that focus on select parts of the error process will fail to fully prevent and manage errors. Thus, by tapping the different strengths associated with national cultures, the right combination of team members could collectively maximize the effectiveness of each stage of the error process. Next, we discuss some examples of complementarities that are theorized to exist across different error processes to illustrate our argument.

For example, as noted, effective error prevention requires the establishment of individual anticipatory strategies, the development of error detection technology, and clear communication and planning for errors. As discussed, it is expected that different cultural dimensions will be related to preventive measures (or the lack thereof). We suggested that team members from cultures that are high on uncertainty avoidance, low on humane orientation, high on tightness, low on fatalism, and high on collectivism may excel at error prevention. These cultural values are all related to control and its establishment over the environment either to avoid uncertainty or to establish standards for conduct from close or generalized others. In contrast, cultures with high levels of humane orientation, low levels of uncertainty avoidance, high levels of looseness and fatalism, and high individualism are likely to avoid planning or taking preventive action because of a higher tolerance of errors due to a variety of reasons particular to these different cultures. Thus, teams comprised of people from these different cultures may provide a good balance that should result in strong, formal preventive measures that support and protect organization members and their relationships.

Error detection is another part of the error process that may benefit from collaboration between culturally heterogeneous team members. Team members from tight cultures are likely to focus on error detection given the focus on rules, avoidance of rule violation, and high potential for punishment in those cultures. On the other hand, team members from high humane orientation cultures are again less likely to focus on error detection because they care more about people than performance. Similarly, high-fatalism cultures may find it unnecessary to detect errors or to report errors. Moreover, in cases of high power distance, there may

be little error communication upward (to people with higher hierarchical positions), which may also decrease error detection. A team comprised of people from tight cultures and high humane orientation cultures, as an example, may compensate for each other such that they develop a focus on error detection that is simultaneously considerate of individuals. In contrast, a combination of people from high humane orientation and loose cultures would likely have a negative impact because there would be a general lack of attention to error detection. As with error prevention, cultural differences in groups can actually help to ensure attention to this aspect of the error process.

Finally, certain multicultural teams may be particularly adept at handling errors. For example, team members from high humane orientation and loose cultures are likely to be more accepting of errors and less likely to engage in defensive attributional processes. In contrast, team members from high UAI and tight cultures are less accepting of errors and more likely to engage in defensive attributional processes. Accordingly, these negative error-handling behaviors could be offset by team members from cultures high on humane orientation or looseness.

Across all error stages, one can deduce important complementarities that arise from cultural differences. For one example, based on the discussion, teams comprised of members from cultures that are on high humane orientation and tightness would have much complementary across all stages of the error process. On the one hand, people from tight cultures are likely to focus on establishing rules and engendering adherence to them, which can help focus the group on error prevention and detection. On the other hand, people from cultures with high humane orientation will temper this focus with an acceptance of the fallibility of people, which should especially attenuate the negative aspects of error handling in tight cultures.

To be sure, we have not presented an exhaustive list of possibilities; rather, we illustrated that cultural differences can create synergies across different stages of the error process. As an important caveat, however, we would add that although these compensatory combinations are theoretically possible, they would likely be accompanied with significant conflict, especially early in the team life cycle. As in other multicultural team contexts, the performance of culturally heterogeneous teams may be enhanced when leaders work to ensure effective communication (Ayoko, Hartel, & Callen, 2002) and help team members uncover hidden knowledge (Baba, Gluesing, Ratner, & Wagner, 2004).

## Theoretical and Practical Implications

To err is human; errors are universal. Yet, the error process, as we have argued in this chapter, can be highly influenced by cultural factors. Whether it is preventing errors, detecting them, or managing them, cultures can have different approaches to this human universal and therefore have different strengths and vulnerabilities for errors and their consequences.

As we hope we have illustrated, the field of culture and errors is largely uncharted and has the potential to make wide theoretical and practical contributions. Given the paucity of theory and research in this area, many of our predictions are speculative and are in need of verification. As a first step, constructs and measures on errors are in need of large-scale cross-cultural validation to examine attitudes and beliefs about each stage of the error process and how they are influenced by culture. For example, the Error Orientation Questionnaire (EOQ; Rybowskiak, Garst, Frese, & Batinic, 1999), which includes scales for error competence, learning from errors, error risk taking, error strain, error anticipation, covering up errors, error communication, and thinking about errors, has received some cross-cultural validation in the Netherlands and Germany. Whether this construct and measurement is construct relevant, deficient, or contaminated in East Asian, South American, Middle Eastern, and African cultures, to name a few, remains to be tested. Other implicit measures of detection of errors and reactions to errors, such as those using reaction times or neuroscientific methods, could also shed light on cultural differences in error prevention and detection and reaction to errors. For example, the neural basis of human error processing has been linked to activity in the anterior cingulate cortex (Holroyd & Coles, 2002; see also Yeung, Botvinick, & Cohen, 2004), and cultural differences in error processing would presumably reflect such brain-related activity.

Whether studies involve surveys, experiments, implicit or explicit methods it is important that culture and error research also ultimately take a dynamic approach to look at how individual differences (e.g., gender, age) as well as contextual factors (the nature of the task, industry, region) interact with cultural factors to affect errors. For example, the predictions given in this chapter might be amplified in conditions of high time pressures or high cognitive load—factors that can cause individuals to rely on well-learned cultural schemas and norms (see Gelfand, Leslie, & Fehr, 2008). While we do not discuss these distinctions vis-à-vis societal culture and their potential interactions in this chapter, they are fertile ground for future research, as we point out in the general discussion that follows.

The previous discussion of culture and errors also has implications for the design of *error management training* in organizations. Error management training is a training procedure that allows and even encourages error

making in the training process to learn optimally from error experiences (Keith & Frese, 2005, 2008). There are a number of conceptual reasons why it seems worthwhile to integrate errors into training. Errors are informative feedback for knowledge and skill acquisition because they show what part of one's mental model is incorrect and needs to be modified. Also, errors prevent trainees from premature automatization of inappropriate action strategies because they interrupt the course of action and make trainees rethink their strategies. Finally, errors occur not only during training but also back at work, where there is less support than during training. Learning how to deal with errors effectively will therefore be a useful skill in itself. This issue is captured in the principle of transfer-appropriate processing, which postulates that those processes required on transfer tasks should be practiced in training (Ivancic & Hesketh, 2000).

Error management training has been shown to lead to higher performance than error-free training in several domains (training of computer skills, social skills, and other skills, such as firefighter skills) (Frese, Muelhausen, Wiegel, & Keith, 2010; Heimbeck, Frese, Sonnentag, & Keith, 2003; Joung, Hesketh, & Neal, 2006). Important aspects of this error management training are the so-called error management instructions (e.g., "The more errors you make, the more you learn! "I have made an error, great! Because now I can learn!") and the fact that the tasks are not graded in difficulty. Rather, those tasks that also appear in reality are given, and the participants of the error management training learn to deal with them by making errors, correcting them, and learning how to deal with difficult situations.

Error management training is effective for a variety of reasons. First, it decreases negative emotions associated with errors and their derivative consequences (Keith & Frese, 2005). Negative emotional reactions to errors may be mentally stressful, leading to secondary tasks of anxiety control, and thus leading to higher cognitive load and reduction of the ability to learn from an error and learning new skills (cf. Hockey, 1983). A second reason for the positive performance effects of error management training lies in the considered approach to the training material, resulting in higher metacognitive activity as a result of error management training (Keith & Frese, 2005).

While error management training might be universally effective, we argue that it will need to be tailored to particular cultural contexts. For example, different instructions may be needed in different cultures that specifically target the source of resistance that goes along with lack of prevention, detection, or management. For example, error management training that tries to help the trainee reduce negative emotions (e.g., "I made an error—great"; Frese et al., 1991), may not counter ineffective emotions in collectivistic cultures, where face and reputational concerns loom large when errors are committed. As such, different training instructions might be needed to help reduce this particular source of negative emotions.

Likewise, in tight cultures, in which punishment is often associated with deviating from normative expectations, such instructions may need to be supplemented with other interventions in the organizational environment to promote psychological safety surrounding errors. In effect, we would expect (cultural) attribute by treatment interactions for error management training. There are a number of studies that have found that error management training was not equally effective across different individuals (e.g., Treatment  $\times$  Attribute interactions). For example, Heimbeck et al. (2003) found that people high on prove and avoidance goal orientation performed particularly well in *error-avoidant* conditions, for which it is easier to stand out (particularly important for those on prove orientation) and easier to avoid any negative evaluations from others (particularly important for those high on avoidant orientation). Extending this to the culture level, we would expect that error management needs to be tailored to particular cultural contexts to be maximally effective.

Likewise, although studies that have shown better performance as a result of error management training in comparison to error-free training, such training may be ineffective in cultures that already have high tolerance for errors. Put simply, error management training is geared toward reducing negative emotional processes, yet this may be less of a concern (and even counterproductive) in certain cultures. For example, in very loose, humane-oriented, fatalistic, and very low uncertainty avoidance cultures, there are less negative emotional effects of errors in general. In those cultures, people are not afraid of errors and do not experience any negative effects of errors; they are therefore not strained more in an error situation. Moreover, there may be less learning from errors in highly error-tolerant cultures given differences in metacognitive activities during error management training. That is, in very loose, humane-oriented, fatalistic, and very low uncertainty avoidance cultures, there may be less reason to increase metacognitive activities; people just accept errors as a natural part of their activities; therefore, there is little incentive to think again about the errors. Thus, high error tolerance not only may help people be relaxed in error situations but also they may be less motivated to learn in such situations because errors are so much seen as a natural part of one's activities. Thus, in these societies, error management training and error-free training may have similar effects, or in the extreme, error management training may make such individuals even more tolerant of errors and produce even less management of them.

At a more general level, this discussion is consistent with organizational learning, which is often based on negative events. Joung et al. (2006), for example, showed that most learning takes place from negative events and not from positive events. There is also evidence that it is more successful to have been in an error situation oneself than to hear about other people's errors (Ivancic & Hesketh, 2000). All of this may not appear in societies

that are highly error tolerant. In such societies, we would argue, error management training might even benefit from training people to have reactions that are more negative (without becoming too extreme) so that they are more attentive to and prepared to manage errors.

These notions not only are important for training per se but also may be important in the function of errors in the learning process at work. If we are right, there needs to be a certain degree of *error intolerance* to learn from errors; on the other hand, if error intolerance becomes *too high*, the strain effects are so high that there is little learning from errors. Thus, error management training must be designed in such a way to target error tolerance or intolerance in different cultures to accomplish this delicate balance between error tolerance and intolerance.

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### Concluding Remarks

In conclusion, in this chapter we set forth a research agenda on culture and error management processes. While errors are a universal, the specific ways in which people approach errors—in terms of prevention, detection, and management—was theorized to vary widely across the globe. Cultures, because of their differences in values, beliefs, norms, and orientations, bring particular strengths and vulnerabilities to the error process. Given their theoretical and practical importance, understanding cultural influences on errors is a critical frontier of this burgeoning literature.

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### Acknowledgment

This research is based on work supported by the U.S. Army Research Laboratory and the U.S. Army Research Office under grant number W911NF-08-1-0144.

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Routledge  
Taylor & Francis Group  
270 Madison Avenue  
New York, NY 10016

Routledge  
Taylor & Francis Group  
27 Church Road  
Hove, East Sussex BN3 2FA

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Routledge is an imprint of Taylor & Francis Group, an Informa business

Printed in the United States of America on acid-free paper  
10 9 8 7 6 5 4 3 2 1

International Standard Book Number: 978-0-8058-6291-1 (Hardback)

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**Library of Congress Cataloging-in-Publication Data**

Errors in organizations / edited by David A. Hofmann, Michael Frese.  
p. cm.

Summary: "This volume is dedicated to creating a single source that both  
summarizes what we know regarding errors in organizations and provide a  
focused effort toward identifying future directions for research. The goal is to  
provide a forum for researchers who have conducted a considerable amount of  
research in the error domain to discuss how to extend this research, and provide  
researchers who have not considered the implications of errors for their domain  
of organizational research an outlet to do so"-- Provided by publisher.

Includes bibliographical references and index.

ISBN 978-0-8058-6291-1 (alk. paper)

1. Organizational learning. 2. Organizational behavior. 3. Errors. 4.  
Errors--Research. I. Hofmann, David A. II. Frese, Michael, 1949- III. Title.

HD58.82.E77 2011  
302.3'5--dc22

2010049337

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