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Ensuring Employees' IT Compliance: Carrot or Stick?

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With reward (carrot) and punishment (stick) widely applied by organizations to regulate mandatory IT usage, it is imperative to understand how these incentives influence employee compliance behavior. Drawing upon control theory and regulatory focus theory, this study investigates the relationships among regulatory focus, reward, punishment, and compliance behavior in mandatory IT settings. Survey data were collected from 186 employees in companies where enterprise resource planning (ERP) compliance was mandated. Analyses reveal that punishment expectancy is a strong determinant of compliance behavior, whereas the main effect of reward expectancy is not significant. Moreover, the relationship between reward expectancy and compliance behavior is moderated by promotion focus and the relationship between punishment expectancy and compliance behavior is moderated by prevention focus. This study provides an in-depth understanding of reward and punishment in mandatory IT settings and suggests that regulatory focus plays an important role in affecting employees' compliance with organizational controls.

Key words: organizational control; reward; punishment; regulatory focus; promotion focus; prevention focus; compliance
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Introduction

Contemporary organizations invest substantial resources in information technologies (IT) to improve performance and gain competitive advantages. The huge sunk costs of IT investments often force organizations to make IT use mandatory (Brown et al. 2002). Although a plethora of research in the information systems (IS) arena has been devoted to explaining IT use behavior, IT use intention or behavior is typically the focus (Burton-Jones and Gallivan 2007). We contend that, in mandatory settings, IT compliance rather than use is the most critical issue because if IT use is noncompliant, more IT use is not only unwanted but also could be detrimental (Xue et al. 2011).

To generate business value from IT, organizations often establish IT policies to specify appropriate IT use and compel employees to comply (Chae and Poole 2005, Galletta and Hufnagel 1992). IT compliance thus implies appropriate IT use in the given job context. Despite its longstanding importance since Zuboff's (1988) seminal work, IT compliance has not attracted broad attention from IS researchers. Recent research on IT compliance has largely been confined to the area of IS security and has concentrated on investigating employees' compliance with IT security policies (Bulgurcu et al. 2010, Herath and Rao 2009, Myyry et al. 2009). Little research has been conducted outside the security context to examine employees' compliance with regular system use. Although some researchers have started the quest to understand IT compliance in non-security settings (Xue et al. 2011), there are still many unanswered questions, and more research is needed to achieve a deeper understanding in this emerging area. This study is concerned with how organizational control influences employees' IT compliance.

Organizational control has been shown to be an appropriate lens through which employee compliance with mandatory IT policies can be investigated (Boss et al. 2009). We focus on two important elements of organizational control that have been widely applied by organizations to motivate desired employee behavior—reward and punishment (Podsakoff et al. 2006), also known as "carrot" and "stick" (Andreoni et al. 2003). The IS literature provides limited knowledge of reward and punishment. Although it has

been suggested that social influence of IT adoption is primarily based on significant others' power to reward compliance and punish noncompliance (Venkatesh et al. 2003), reward and punishment have not been explicitly studied in the IS acceptance/use literature. A few studies in the IS security arena have explicitly examined the effects of reward and/or punishment on employees' intention to comply with IT security policies, but they have also generated mixed findings (Bulgurcu et al. 2010, D'Arcy et al. 2009, Herath and Rao 2009, Pahnila et al. 2007). Outside the field of IS security, Xue et al. (2011) examined the effect of punishment on employees' intention to comply with enterprise resource planning (ERP) policies by taking an organizational justice perspective and find that perceived justice of punishment significantly improves compliance intention, but the reward element was not included in their study. In addition, psychology research has shown that individuals with different regulatory foci tend to exhibit different levels of sensitivity to the same stimulus (Higgins 1997, 1998). Although regulatory focus theory has attracted a great deal of attention from organization and management scholars (Johnson et al. 2010, Meyer et al. 2004, Neubert et al. 2008), it has not yet been exploited by IS scholars to understand the varying effects of reward and punishment across individuals.

Although previous research has shed light on the general effects of reward and punishment, we identified three gaps in the literature: (1) Although IT compliance behavior is the more important outcome, IT compliance intention is usually studied instead; (2) the effects of reward and punishment on IT compliance behavior have not been investigated in tandem in non-security settings; and (3) the different ways that employees respond to reward and punishment remains unknown. We attempt to bridge these gaps by drawing from both control theory (Eisenhardt 1985, Klein 1989) and regulatory focus theory (Higgins 1997, 1998). We propose that reward and punishment play important roles in affecting employees' IT compliance and that employees' regulatory focus influences their perception and sensitivity to organizational controls, rendering the same control mechanism to demonstrate differing effectiveness across employees. Thus, the objectives of this study are to delineate the effects of reward and punishment on IT compliance and examine the moderating role of regulatory focus.

This study makes three contributions to IS theory and practice. First, unlike prior research that mostly examines IT compliance intention, it directly studies IT compliance behavior as the dependent variable. Second, it explicitly includes the effects of both reward and punishment on employees' IT compliance in one research model and contrasts their effects. Third, it demonstrates that the effectiveness of reward and punishment is not invariant across employees. Rather, it is affected by employees' regulatory focus. This research is, to the best of our knowledge, the first attempt to investigate IT compliance by integrating organizational control and regulatory focus perspectives to provide a better understanding of the relationships between reward, punishment, and IT compliance.

This paper proceeds as follows. The next section reviews key concepts and presents theoretical development. Following that, the research model and hypotheses are discussed. The methodology of the survey study is then described, followed by a section reporting data analysis results. The paper concludes after a discussion of this study's limitations and implications for research and practice.

Theoretical Development

IT Compliance

We define IT compliance as the extent to which employees follow organizational IT policies to appropriately use the target IT in their job. IT policies are the rules, guidelines, standards, and procedures that restrict user choices in IT use by specifying desired and undesired use (Galletta and Hufnagel 1992). These policies are necessary because although employees' job performance is expected to improve as the result of using IT, many factors contribute to the nonuse or misuse of IT. For example, because IT can reduce users' power and autonomy and facilitate managers' monitoring of their behavior (Kohli and Kettinger 2004, Sia et al. 2002), users may perceive IT as a threat and thus resist using it (Beaudry and Pinsonneault 2005, Lapointe and Rivard 2005). IT can also create conflicts between the "best practices" embedded in a system and users' familiar job routines, thus interrupting existing business processes. Instead of adapting to the system, users may improvise new ways of using or working around it to accommodate their old work habits (Boudreau and Robey 2005, Niazkhani et al. 2011). From an organization's perspective, these types of nonuse and misuse, intended or unintended, can greatly undermine its potential to generate rents from IT investments. Hence, it becomes desirable to implement IT policies that regulate employees' IT use behavior as a way of maximizing the chance of business value creation.

IT compliance is a higher level concept encompassing both IT use and mandatory elements specifying how IT should be used (Xue et al. 2011). Use is a necessary but insufficient condition for compliance. Given the structure of compliance, the absence of either component could lead to noncompliance, which is manifested as nonuse and work-around

(absence of use) or misuse and inappropriate use (lack of obedience to mandatory elements). Moreover, IT compliance cannot be conceptualized as a simple dichotomy of use and nonuse; instead, the degree of IT compliance can vary continuously based on levels of use and obedience. Because of the complexity of IT compliance, the extant knowledge on how to motivate IT use may not be readily applied to motivate IT compliance. Hence, it is imperative to understand how IT compliance can be enforced in work settings.

Organizational Control

Given that organizations and employees typically have different self-interests and incongruent goals, organizations must control employee behavior to reduce opportunism and ensure cooperation (Eisenhardt 1989a, Jensen and Meckling 1976). Because of its importance, control has long been a central concept in the management literature (Eisenhardt 1989b, Green and Welsh 1988, Ouchi 1979) and has drawn much attention from IS researchers (Choudhury and Sabherwal 2003, Kirsch 2004, Kirsch et al. 2002, Sia and Neo 1997). Organizational control is based on two underlying strategies: formal and informal control (e.g., Kirsch et al. 2002, Ouchi 1979). Formal control is defined as a cybernetic process of monitoring and evaluating behavior- or outcome-based performance and regulating behavior toward predefined standards, whereas informal control (such as clan control) relies on social strategies to minimize goal divergence among organizational members and influence behavior toward predefined standards (Eisenhardt 1985). Formal control uses codified rules and policies and has an explicit sanction component that intends to regulate behavior by rewarding or punishing, whereas informal control does not have such elements. When IT compliance is mandated, it suggests that formal controls have been implemented to deter noncompliance. Without formal controls, IT compliance cannot be truly mandatory. Although both formal and informal controls can possibly improve IT compliance, we focus on formal controls in this study because of their direct connection with mandatoriness (Boss et al. 2009). We use "organizational controls" hereafter to refer to formal controls unless otherwise stated.

Formal controls essentially work as a feedback loop consisting of the behavior standard, measurement of behavior (sensor), the comparison of the behavior to the standard, feedback information about the discrepancy, and actions to reduce the discrepancy (effector) (Hofstede 1978, Klein 1989). This feedback loop can explain both behavior and outcome control, depending on what is being monitored and evaluated (behavior or outcome). In the context of IT compliance, an organization's goal is to fully assimilate the focal IT into its business processes (Liang et al. 2007). The organization monitors employee IT use behavior, detects adherences to and departures from the prescribed IT policies, and administers rewards and punishments to motivate adherences and reduce departures, giving rise to a typical feedback loop of behavior control.

Prior research concerning formal controls largely focuses on the sensor side of the feedback loop, examining control types and their antecedents (Choudhury and Sabherwal 2003; Kirsch 1996, 1997; Kirsch et al. 2002; Sia and Neo 1997) with little attention paid to the effector side. Except in a few studies (e.g., Boss et al. 2009, Kirsch 2004), the effector remains implicit and control has been viewed merely as a process of measurement and evaluation (Eisenhardt 1985). Eisenhardt (1985) contended that capturing the reward linkage (effector) of control arrangements represents reality in a more precise way because the feedback loop of control is incomplete and hardly effective without the effector.

The effector of a formal control aligns individuals' behavior with organizational goals by providing appropriate incentives (Kirsch et al. 2002). Control theory does not explain how incentives are implemented. Some researchers have realized this deficiency and studied reward as an incentive (Boss et al. 2009). Incentives are implemented by administering not only rewards but also punishments. The hedonic principle (Higgins 1997) posits that people are motivated to approach pleasure derived from positive outcomes (reward) and avoid pain derived from negative outcomes (punishment). Leadership research (Bass 1985, Burns 1978) has also suggested that subordinates are motivated by receiving rewards for progress toward or reaching goals and suffering penalties for failure to achieve the agreed-upon performance. By equitably applying rewards and punishments, managers signal employees' need to modify or change their behavior. The use of reward and punishment is widely diffused and considered central to the leadership roles in most organizations (Podsakoff et al. 2006).

Regulatory Focus

Regulatory focus theory (Higgins 1997, 1998) delineates the operation of the classic hedonic principle, which posits that people are motivated to approach pleasure and avoid pain. The hedonic principle has been the fundamental assumption in motivational research for centuries (Higgins 2006) and has been applied by IS scholars to explain IT threat avoidance behavior (Liang and Xue 2009, 2010). It is also the foundation for control theory. Control theorists assume that it is feasible to regulate behavior using formal controls because organizations can manipulate incentives to ensure that pleasure is approached and

pain is avoided if their employees follow the prescribed behavior. Without the support of this principle, it would be irrational to impose formal controls on people. Therefore, regulatory focus and control theories are inherently connected because both are concerned with why and how individuals regulate their behavior.

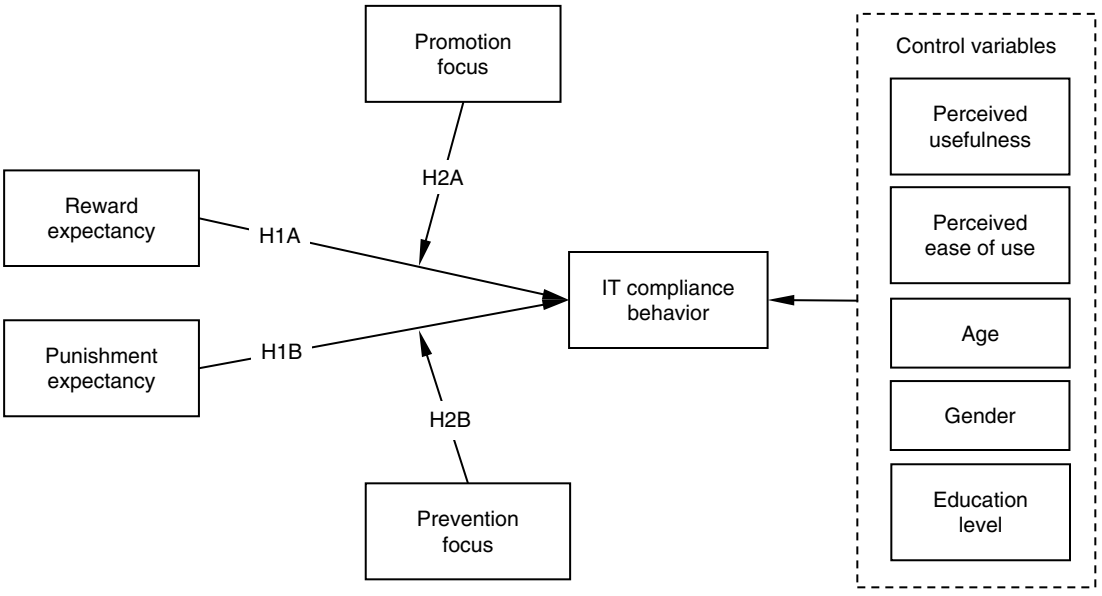
Extending the hedonic principle, regulatory focus theory explains that motivated behavior serves two fundamentally different survival needs: nurturance and security (Higgins 1997, 1998). This gives rise to two different regulatory foci: promotion and prevention. Promotion focus is driven by the need for growth and development, whereas prevention focus is driven by the need for safety (Johnson et al. 2010). Promotion-focused individuals try to become the "ideal self" by fulfilling accomplishments, hopes, and aspirations. They also tend to notice positive outcomes such as success, gain, and reward. In contrast, prevention-focused individuals try to become the "ought self" by assuming duties, responsibilities, and obligations. They tend to notice and recall negative outcomes such as failure, loss, and punishment (Higgins 1998). Previous research shows that regulatory focus influences individuals' perceptions, attitudes, emotions, engagement, and behavior (Higgins 2001, 2006).

Regulatory focus has recently been found to contribute to an in-depth understanding of motivated behavior in work settings and has gained increasing popularity in the organizational psychology and management literature (Higgins 2001, Kark and Van Dijk 2007). Researchers have realized that regulatory focus has important moderating effects in the process of developing work motivation and commitment (Johnson et al. 2010, Meyer et al. 2004). However, most of this research remains at the conceptual level and little empirical evidence exists. The exact role that regulatory focus plays in work settings remains unclear. Regulatory focus theory has rarely been applied by IS researchers, although it has tremendous theoretical appeal as a lens to understanding individuals' IT behavior. Employees' IT compliance is a typical motivated behavior in work settings. We integrate control theory and regulatory focus theory to empirically examine how regulatory focus interacts with reward and punishment to influence IT compliance.

Research Model and Hypotheses

Figure 1 depicts our research model. Based on control theory and regulatory focus theory, we hypothesize that reward expectancy improves IT compliance and promotion focus strengthens the relationship between reward expectancy and IT compliance. Similarly, punishment expectancy improves IT compliance and prevention focus strengthens the relationship between punishment expectancy and IT compliance. Given that the well-established technology acceptance literature consistently confirms the importance of perceived usefulness (PU) and perceived ease of use (EOU) in influencing IT use behavior (Venkatesh et al. 2003), we include these two constructs as control variables. In addition, we control for the effects of demographic variables such as age, gender, and education level. Venkatesh et al. (2003) noted that age and gender could moderate the effects of PU and EOU. To keep the model's conciseness, we do not consider these moderations.

Figure 1 **Research Model**



Reward refers to supervisors' application of positive consequences to subordinates. Employees' behavior can be motivated by a variety of rewards including pay, raises, promotions, alleviation of boredom, and a sense of accomplishment (Guzzo 1979). According to the law of effect (Thorndike 1911), an individual tends to repeat past actions that lead to positive outcomes. Scholars have argued that individuals learn the contingent relationships between behavior and its consequences and that these contingencies guide future behavior so that contingently rewarded behavior will be repeated (Komaki 2003, Skinner 1953). The enabling effect of rewards is also supported by organization research (Steers et al. 2004). Work behavior is believed to be purposeful and goal-directed, with employees rationally assessing different behaviors and choosing that which generates the greatest value (Vroom 1964).

We define reward expectancy as the expectation that IT compliance will be rewarded. The extant literature has suggested that reward expectancy modifies employee behavior in two ways. First, as dyadic events between the supervisor and subordinate, rewards directly encourage the rewarded subordinate's future desired behavior (Skinner 1953). Second, rewards are social phenomena that influence not only the rewarded individuals but also other organizational members who are observers (Trevino 1992). Bandura (1971) explains that individuals learn vicariously from others what behavior is rewarded. They remember the reinforced behavioral model learned from their social environment and use the imaginary incentives to guide their own behavior. Regardless of how individuals learn about rewarding consequences, the key driver of behavioral change is the expectancy that a given reward will follow a given behavior. In the context of IT compliance, if a user expects to be rewarded for her IT compliance, she is likely to adhere to the IT policy. For example, Bulgurcu et al. (2010) reveal that rewards are an antecedent of security policy compliance intentions.

Hypothesis 1A (H1A). *Reward expectancy positively affects IT compliance behavior.*

Punishment is defined as supervisors' application of negative consequences to or the withdrawal of positive consequences from subordinates (Trevino 1992). Examples of the application of negative consequences include verbal reprimands, fines, suspensions, and terminations. Examples of the withdrawal of positive consequences include removal of privileges, withholding pay raises, and delaying promotions. Individuals remember negative consequences associated with past behavior and adjust their future behavior to avoid them (Komaki 2003, Skinner 1953). Punishment has received little attention from organization and management researchers, although it is extensively practiced by managers as a way to control subordinate behavior (Arvey and Ivancevich 1980). The conventional view is that punishment leads to undesirable emotional, attitudinal, and behavioral side effects. Yet Arvey and Ivancevich (1980) found that these criticisms lack empirical support. In contrast, empirical studies have suggested that punishment can effectively control employee behavior and increase performance in organizational settings. (Arvey et al. 1984, O'Reilly III and Puffer 1989, Podsakoff et al. 2006).

We define punishment expectancy as the expectation that noncompliant IT use will be punished. Similar to reward expectancy, punishment expectancy modifies employee behavior in two ways. First, as dyadic events between supervisors and subordinates, punishments directly deter the punished subordinates' future misconduct (Skinner 1953). Second, punishments influence not only the individual being punished but also other organizational members (Trevino 1992). Through observation and vicarious learning (Bandura 1971), individuals can learn from others what behavior incurs penalties and adjust their own behavior accordingly. In addition, criminology research (Zimring and Hawkins 1973) has suggested that observers learn from a punishment event by developing a perception of risk regarding the misconduct causing the punishment and alter their future behavior accordingly. Hence, Trevino (1992) suggests that punishing one individual deters the prohibited behavior in observers and failure to punish one individual increases the prohibited behavior in observers.

In the IT compliance context, if a user expects punishment for her noncompliance, she is likely to adhere to the IT policy. For example, Xue et al. (2011) show that perceived justice of punishment is positively associated with ERP compliance intention. Herath and Rao (2009) and Bulgurcu et al. (2010) find that sanctions improve security policy compliance intentions. Although these studies deal with compliance intention, it can be inferred that punishment also influences compliance behavior.

Hypothesis 1B (H1B). *Punishment expectancy positively affects IT compliance behavior.*

According to regulatory focus theory, as people move toward their desired goals they demonstrate different strategic inclinations (Higgins 1997, 1998). People with a promotion focus are inclined to make progress by approaching matches with desired goals because a promotion focus involves sensitivity to positive outcomes, whereas people with a prevention focus are inclined to be prudent, precautionary, and

avoid mismatches with desired goals because a prevention focus involves sensitivity to negative outcomes. People with a promotion focus are eager to attain advancements and gains, whereas people with a prevention focus are vigilant to assure safety and non-loss (Higgins 2001).

Regulatory focus theory (Higgins 1997, 1998) predicts that the motivational significance of different incentives is affected by regulatory focus. An incentive can be framed as a gain versus non-gain situation (positive incentive) that induces a promotion framing. In a gain versus non-gain situation, attention is directed toward gain options that are considered positive outcomes and people are motivated to approach pleasure by pursuing matches with these positive outcomes. This framing is compatible with the strategic inclination induced by a promotion focus. Consequently, promotion-framed incentives will be perceived as more important by an individual with a promotion focus. Previous experimental studies (Shah et al. 1998) confirm these predictions, indicating that it is essential to recognize that regulatory focus leads to different goal attainment strategies.

Higgins (2000) uses regulatory fit to explain why people exhibit variant degrees of motivation resulting from the same incentive. A regulatory fit is experienced when individuals' means to pursuing goals fit their regulatory focus. When promotion-focused individuals attempt to attain goals by eagerly approaching matches to their desired end states, they experience a regulatory fit. Regulatory fit has been found to increase the intensity of the value experience of a goal, such that an attractive goal will become more attractive (Cesario et al. 2004, Higgins 2006).

In the IT compliance context, we argue that employees' regulatory focus will moderate the relationships between the incentive and employee compliance because employees tend to perceive the incentive as more motivational when they experience a regulatory fit. Reward frames a promotion situation in which the desired goal is to be rewarded. The means to attaining the goal is characterized by a strategy of approaching matches, which is compatible with the strategic inclination associated with promotion focus. Under this framing, promotion-focused employees tend to perceive rewards as more attractive because there is a fit between their regulatory focus and the strategic means through which the desired goal is attained. Therefore, as promotion focus increases, reward expectancy tends to be more motivating and to have a stronger impact on compliance behavior.

Hypothesis 2A (H2A). *Promotion focus positively moderates the relationship between reward expectancy and IT compliance behavior.*

An incentive can also be framed as a non-loss versus loss situation (negative incentive) that induces prevention framing. In this situation, attention is focused on the option of loss, considered a negative outcome, and people are motivated to evade pain by avoiding a match (or pursuing a mismatch) with this negative outcome. This framing is compatible with the strategic inclination induced by prevention focus. Hence, the prevention-framed incentives will be perceived as more important by people with a prevention focus. This prediction has also been confirmed in previous experiments (Shah et al. 1998).

Based on the notion of regulatory fit (Higgins 2000), when prevention-focused individuals attempt to attain goals by vigilantly avoiding matches to their undesired end states, they also experience a regulatory fit. Because regulatory fit increases the intensity of the value experience of a goal, repulsive goals will become more repulsive (Cesario et al. 2004, Higgins 2006). In the context of IT compliance, we argue that employees tend to perceive punishment as more repulsive when they experience a regulatory fit. Punishments frame prevention situations in which employees perceive avoiding punishment as the desired goal. The strategy for attaining this goal is to avoid a mismatch, which fits the strategic inclination of prevention focus. Because of the regulatory fit, prevention-focused employees feel a stronger urge to avert punishment. As a result, as prevention focus increases, punishment expectancy becomes more motivating and has a stronger impact on IT compliance behavior.

Hypothesis 2B (H2B). *Prevention focus positively moderates the relationship between punishment expectancy and IT compliance behavior.*

Method

Study Setting

We conducted a survey to test our research model with a group of 40 companies from China's iron and steel industry. These organizations were under a holding company that is one of China's top 100 companies. Following a hybrid management model, the holding company sets overall strategic goals and centrally manages key business processes including accounting and finance, whereas subsidiary companies take charge of their own operations. Major IT investment decisions are made in a top-down fashion. The holding company decided to adopt an ERP system from a domestic vendor in 2005. All of its subsidiary companies, including the 40 companies we studied, were required to implement the same ERP. The principal goal of the ERP implementation was to strengthen and streamline unified accounting and

finance management to support the group's further growth. The companies redesigned previous business processes to adapt to the ERP system and established policies to mandate appropriate ERP use. ERP implementations have always been challenging in China (Liang and Xue 2004, Liang et al. 2004, Xue et al. 2005). To ensure that the ERP system was appropriately assimilated and routinized, the managers in these companies used various rewards and punishments to motivate subordinates to comply with the policies. Thus, we deemed it appropriate to test our hypotheses in this context.

Specifically, we focused on the mandatory use of accounting modules of the ERP systems. After the ERP system was installed, all accounting tasks had to be completed using the ERP modules, and many previous accounting procedures were redesigned. Accountants needed to strictly comply with the mandatory ERP operation policy to perform their jobs because nonuse and misuse of the ERP modules might lead to serious accounting problems. Moreover, ERP compliance became an important indicator of the accountants' job performance because inappropriate ERP use suggested a lack of understanding of the new organizational accounting procedures and appropriate ERP use suggested competence in completing accounting tasks. This can be viewed as a form of sociomateriality (Orlikowski and Scott 2008) in which accounting tasks and ERP were inseparably fused together. Because of this fusion of work and technology, when the companies ensured ERP compliance they were essentially controlling accounting performance.

Both punishment and reward are relevant in this context. The use of punishment is intuitive because the companies try to deter employees from violating ERP policies. The use of reward is also understandable because ERP compliance indicates superior dedication or performance. First, the ERP-induced new accounting procedures require extra time and effort from employees, and long-lasting ERP compliance shows great dedication. Second, ERP use is an essential part of the accounting job, and long-lasting ERP compliance suggests good performance. Therefore, both punishment and reward were practiced to motivate employees to continue complying with ERP policies. To increase awareness of these policies, the holding company circulated official notices on a regular basis to announce the names of subsidiary companies that were rewarded and punished based on their ERP compliance. These official documents provided concrete evidence for the relevance of both reward and punishment.

In our study context, punishment and reward were administered hierarchically: unit supervisors were fined for the unit's poor ERP compliance and received bonuses for the unit's outstanding ERP compliance; unit supervisors then translated the punishments and rewards onto the individual employee level. The holding company's official bulletin showed that in 2009 two subsidiary companies were rewarded with about \$2,000 for their good performance in filing electronic accounting reports, and the top managers of six subsidiary companies were fined about \$400 for their poor performance in filing electronic accounting reports. Based on the bonuses or fines they received at the organization level, subsidiary companies rewarded or punished individual employees who contributed to good or poor ERP compliance. For example, if an accountant did not follow the standard procedures specified by the ERP policies when managing accounting matters such as accounts receivable and payable, funds, and contracts, the supervisor reprimanded or fined that accountant. In contrast, if an accountant exhibited a high level of compliance in obeying the ERP policies, that accountant was commended or rewarded with a monetary bonus. Given that the 40 companies were centrally controlled by the same holding company, their specific management styles showed a high level of homogeneity. Although their approaches to enforcing ERP compliance through reward and punishment may seem eccentric to Western scholars and practitioners, these companies were difficult to find and provide an ideal environment within which the effects of reward and punishment on IT compliance can be investigated.

Data Collection

With support from the companies' executives, we distributed questionnaires within their accounting departments. In mandatory organizational settings, employees' self-reports of their IT compliance behavior can hardly be free of biases (Podsakoff et al. 2003). Following Burton-Jones' recommendation (2009) of using multiple data sources to control for method biases, we designed two questionnaires to collect data from employees and IS managers. The employee questionnaire was used to measure accountants' reward expectancy, punishment expectancy, regulatory focus, and beliefs about the ERP system (PU and EOU). The IS manager questionnaire was used to request the IS manager in each company to assess the accountants' compliance with ERP policies. We requested the IS managers to fill out this questionnaire based on each accountant's actual ERP usage records in the system logs. Specifically, we asked the IS managers to query the system database and get the number of ERP violations for each accountant before rating compliance. Because the companies were unwilling to disclose confidential system log information, the IS manager questionnaire was the best alternative for evaluating

IT compliance behavior. We also conducted a post hoc test that confirmed that the IS managers could interpret the log data and provide corresponding questionnaire measures (see Appendix C, available at http://dx.doi.org/10.1287/isre.1120.0427). The purpose of the survey and this data handling procedure were explained in a note attached to the questionnaires, which stressed that the data would be kept strictly confidential and only used for research purposes. After matching the two questionnaires for each respondent, we deleted any personal information that might reveal the respondent's identity.

Given that our survey was conducted in China, we first developed the questionnaire in English and then translated it into Chinese. Following the back-translation method (Brislin 1980), a translator unaware of our research context was asked to translate the Chinese version back into English. The two English questionnaires were compared to confirm that no semantic discrepancies existed. The Chinese questionnaire was pretested by an expert panel comprising two university professors and one executive-level manger in a large Chinese firm to ensure the items' face validity. Minor wording changes were made to improve the clarity and readability of the items. A pilot test was then conducted on 50 accountants in a large Chinese organization to preliminarily evaluate the quality of the measures. The results suggested satisfactory reliability and validity.

In the formal data collection, 218 accountants were randomly selected from a population of 970 accountants in the 40 companies. A total of 186 paired questionnaires from accountants and IT managers were completed and returned, showing a response rate of 85.3%. Aged from 22 to 52 (mean = 34.7, SD = 5.9) and mostly female (72.2%),[1] the respondents had 11.1 years of computer experience on average (SD = 3.8) and 91.9% of them had received at least some college education. The respondents held different accounting positions, including chief accountant (15.8%), senior accountant (23.4%), staff accountant (56.5%), and cashier (4.3%). Their average work experience was 13.7 years (SD = 6.9). To evaluate nonresponse bias (Armstrong and Overton 1976), we compared early and late respondents based on demographic variables such as age, gender, education, computer experience, and work experience. Chi-square tests and *t*-tests indicated that the two groups were not significantly different, suggesting that the existence of nonresponse bias was unlikely.

[1] The holding company had 1,440 accountants, 917 of which were female. The overall female percentage was 63.7%. The high female percentage (72.2%) in our study sample is typical of this population.

Measures

Seven constructs were measured in this study. Appendix A shows the measurement items. Whenever possible, existing scales were utilized. When no existing scale was available for a given construct, items were adapted from the most closely related scale.

The items for reward expectancy and punishment expectancy were developed based on the Leader Reward and Punishment Questionnaire (LRPQ; Podsakoff et al. 1984). Four items were adapted from the contingent leader reward behavior section of the LRPQ to measure reward expectancy, which refer to employee beliefs about rewards, such as praise and positive feedback from the supervisor, resulting from compliant ERP use. Another four items were adapted from the contingent leader punishment behavior section of the LRPQ to measure punishment expectancy, which refers to employee beliefs about punishments such as disapproval, verbal reprimands, and discipline from the supervisor as the result of noncompliant ERP use. Promotion focus and prevention focus were measured by using the Regulatory Focus Questionnaire (RFQ) developed by Higgins et al. (2001). The RFQ assesses individuals' subjective histories of success or failure in promotion and prevention self-regulation. It contains 11 questions—6 for promotion focus and 5 for prevention focus. Following the Higgins et al. (2001) coding instruction, two single scores representing promotion focus and prevention focus were calculated and used in the data analysis. The items for IT compliance behavior were developed based on the scale of rule following behavior in work settings (Tyler and Blader 2005). Three items were used for IS managers to rate employees' compliance with or violation of ERP rules and policies.

The scales of perceived usefulness and perceived ease of use were tailored from Venkatesh's (2000) study and each contained four items. Age was measured as a ratio variable. Gender was dummy coded using 1 to represent male and 2 to represent female. Education level was coded in four levels: 1 = high school or lower, 2 = some college, 3 = bachelor's degree, and 4 = graduate degree.

Results

Partial least squares (PLS) was applied to test the research model. This choice was based on two considerations. First, PLS is less demanding on indicators' residual distribution than covariance-based structural equation modeling (CB-SEM) techniques (Fornell and Bookstein 1982, Wold 1985). To generate accurate estimates, most CB-SEM techniques require normally distributed data. After calculating the skewness statistics for our data, we found that the distribution of most indicators was significantly different from normal distribution. Therefore, we decided to use PLS

Table 1 Construct Reliability, AVE and Correlations

Constructs	*R*	AVE	1	2	3	4	5	6	7
1. Compliance	0.94	0.85	0.92						
2. Promotion focus	0.91	0.63	0.21	0.79					
3. Prevention focus	0.84	0.52	0.20	0.13	0.72				
4. Reward expectancy	0.98	0.92	0.10	0.19	−0.14	0.96			
5. Punishment expectancy	0.94	0.80	0.46	0.25	0.17	0.19	0.90		
6. Perceived usefulness	0.95	0.81	0.38	0.23	0.28	0.24	0.45	0.90	
7. Perceived ease of use	0.96	0.87	0.40	0.20	0.23	0.05	0.48	0.60	0.93

Note. R = composite reliability; square root values of AVE are in shaded diagonal cells.

to deal with the nonnormal distribution. Second, PLS is designed to maximize the prediction of dependent variables rather than the goodness of fit (Gefen et al. 2011). Because the theory we proposed (especially the moderating role of regulatory focus) has not been tested by IS scholars, the nature of this study is more exploratory than confirmatory. Accordingly, we focused on the predicted variance of IT compliance rather than the fit between model parameters and observed correlations. PLS is therefore suitable for our prediction-oriented analysis. Specifically, SmartPLS was used (Ringle et al. 2005).

Assessment of Measurements

Before testing hypotheses, we evaluated the validity and reliability of the construct measures. Following Gefen et al. (2000), the validity of the measures was tested using two procedures. First, as Table 1 shows, the square root of each construct's average variance extracted (AVE) is much greater than the construct's correlations with all of the other constructs, suggesting sufficient discriminant validity. Second, factor loadings and cross loadings were calculated for all of the constructs. As Table 2 shows, the loading of each item on its substantive construct is over 0.70 (except PRE3),[2] suggesting sufficient convergent validity. In addition, each item's factor loading is much higher than its cross-loadings on other constructs, confirming the sufficiency of discriminant validity (Hair et al. 1998). The reliability of the measurements was examined by computing composite reliability. As Table 1 shows, all reliability scores exceed Nunnally's (1978) recommended cutoff of 0.70.

The paired data collection is a strong remedy for reducing the threat of common method variance (CMV) (Podsakoff et al. 2003, Podsakoff and Organ 1986). In addition, Siemsen et al. (2010) demonstrated that moderation effects are unlikely artifacts of CMV. Thus, the significant moderation effects we found when testing the research model suggest that CMV is unlikely a concern for this study.

[2] Although the third item of prevention is below 0.70, we decided to retain it because the RFQ is a validated tool. Retaining all of the items can facilitate cross-study comparisons.

Table 2 Factor Loadings and Cross-Loadings

	Mean	SD	COM	RWD	PUN	PU	EOU	PRO	PRE
COM1	4.41	0.75	**0.82**	0.08	0.26	0.23	0.32	0.14	0.19
COM2	6.58	0.72	**0.84**	−0.02	0.17	0.04	0.01	0.04	0.17
COM3	4.94	0.95	**0.80**	0.08	0.20	0.27	0.23	0.06	0.15
RWD1	3.87	1.51	0.04	**0.95**	0.06	0.08	−0.01	0.19	0.03
RWD2	3.87	1.53	0.06	**0.94**	0.09	0.10	0.01	0.23	−0.02
RWD3	3.90	1.57	−0.04	**0.96**	0.08	0.08	0.001	0.25	0.03
RWD4	3.85	1.54	0.07	**0.94**	0.10	0.10	0.03	0.24	0.04
PUN1	5.63	1.49	0.12	0.15	**0.82**	0.13	0.18	0.18	0.27
PUN2	5.48	1.35	0.16	0.004	**0.82**	0.18	0.26	0.03	0.20
PUN3	5.50	1.40	0.23	0.13	**0.89**	0.08	0.17	0.14	0.18
PUN4	5.61	1.29	0.17	0.06	**0.82**	0.24	0.18	0.09	0.17
PU1	5.29	1.20	0.24	0.18	0.13	**0.72**	0.24	0.22	0.09
PU2	5.48	1.25	0.16	0.08	0.14	**0.91**	0.24	0.16	0.07
PU3	5.47	1.32	0.10	0.06	0.19	**0.87**	0.25	0.12	0.10
PU4	5.71	1.07	0.07	0.13	0.21	**0.78**	0.39	0.15	0.16
EOU1	5.38	1.20	0.13	0.05	0.18	0.26	**0.88**	0.16	0.16
EOU2	5.45	1.20	0.12	0.03	0.23	0.27	**0.87**	0.15	0.20
EOU3	5.35	1.21	0.12	−0.03	0.21	0.26	**0.88**	0.12	0.20
EOU4	5.26	1.21	0.17	−0.03	0.22	0.27	**0.80**	0.15	0.22
PRO1	4.62	1.38	0.11	0.21	0.05	0.08	0.07	**0.83**	0.12
PRO2	4.71	1.41	0.04	0.13	0.06	0.08	0.07	**0.82**	0.18
PRO3	4.61	1.49	−0.03	0.16	0.03	0.07	0.03	**0.72**	0.28
PRO4	4.62	1.39	0.07	0.24	0.06	0.18	0.09	**0.85**	0.12
PRO5	4.74	1.30	0.11	0.18	0.13	0.23	0.22	**0.80**	0.07
PRO6	5.17	1.23	0.12	0.18	0.21	0.19	0.23	**0.75**	−0.14
PRE1	3.42	1.65	0.08	0.16	0.17	0.10	0.22	0.17	**0.70**
PRE2	3.59	1.68	0.07	0.08	0.12	0.15	0.09	0.20	**0.72**
PRE3	3.29	1.65	0.13	0.09	0.03	0.18	0.16	0.24	**0.64**
PRE4	3.59	1.41	0.20	0.05	0.24	0.14	0.14	0.08	**0.79**
PRE5	2.93	1.58	0.16	0.01	0.17	0.14	0.16	0.12	**0.75**

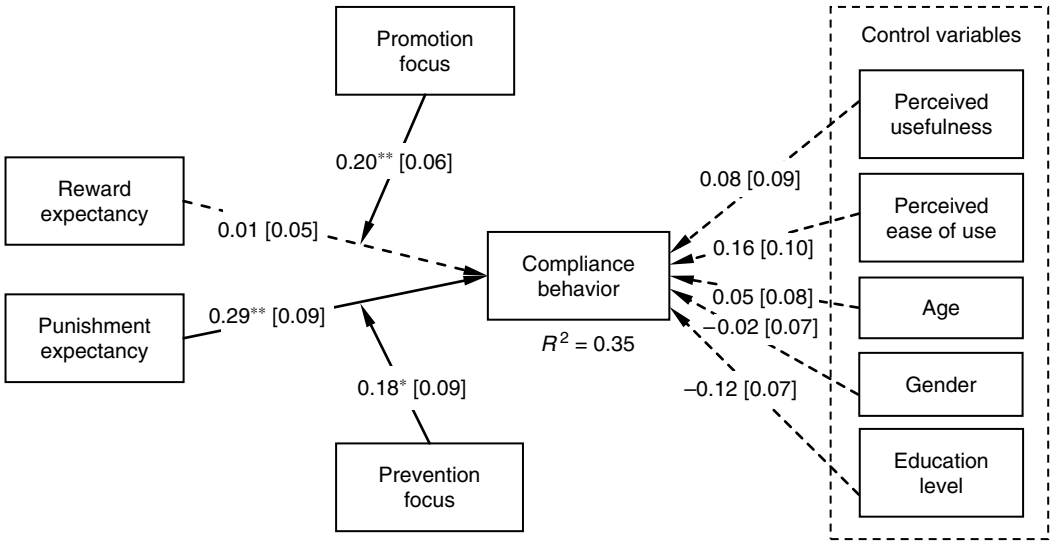
Notes. COM = compliance; RWD = reward expectancy; PUN = punishment expectancy; PU = perceived usefulness; EOU = perceived ease of use; PRO = promotion focus; PRE = prevention focus.

Hypothesis Testing[3]

Figure 2 shows the model testing results. About 35% of variance in compliance behavior is explained by the model. Whereas the path from reward expectancy to compliance behavior is not significant ($b = 0.01$, $p > 0.05$), the path from punishment expectancy to compliance behavior is ($b = 0.29$, $p < 0.01$). Therefore, we find support for H1B, but not for H1A.

[3] We also tested the model using AMOS 19. The results were similar to the PLS results. About 24% of variance in compliance behavior is explained. Punishment expectancy is significantly related to compliance behavior ($b = 0.33$, $p < 0.01$). The moderation effects of promotion focus ($b = 0.23$, $p < 0.01$) and prevention focus ($b = 0.19$, $p < 0.05$) are both significant. No other paths are statistically significant. However, the goodness of fit is borderline ($\chi^2 = 437.47$, df = 185, GFI = 0.81, CFI = 0.92, TLI = 0.91, RMSEA = 0.088).

Figure 2 PLS Results of Model Testing



Notes. For statistical purposes, promotion focus and prevention focus were linked to compliance behavior when testing the moderations. Standard errors are shown in square brackets. Solid lines represent significant paths and dashed lines represent insignificant paths.

$^{**}p < 0.01$, $^{*}p < 0.05$.

To evaluate the moderation effects proposed by H2A and H2B, a product-indicator approach was followed (Chin et al. 2003). A multiplicative term was created by cross-multiplying the items of promotion focus and reward expectancy and another was created by cross-multiplying the items of prevention focus and punishment expectancy. All of the items were standardized before multiplication to reduce multicollinearity (Aiken and West 1991). The PLS test results indicate that the moderation effects of promotion focus ($b = 0.20$, $p < 0.01$) and prevention focus ($b = 0.18$, $p < 0.05$) are both significant. To further validate the moderator role of promotion focus and prevention focus, the overall effect size (f^2) was calculated by comparing the R^2 value between the main and interaction effects (Chin et al. 2003).[4] The effect size is 0.08, which denotes a small to medium effect (Cohen 1988). Therefore, we find strong evidence to support H2A and H2B.

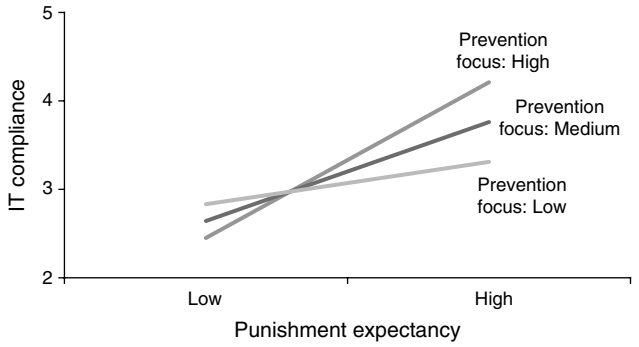
To illustrate the moderation effects, simple slopes are plotted following Cohen et al. (2003). Three regression lines of the independent variable on the dependent variable were plotted when the moderating variable was low (one standard deviation below mean), medium (mean) and high (one standard deviation above mean). As Figure 3 shows, reward expectancy has a positive influence on IT compliance when promotion focus is high ($b = 0.21$, $p < 0.01$) and medium ($b = 0.01$, $p > 0.05$) and a negative influence when promotion focus is low ($b = -0.19$, $p > 0.05$); the influence is only significant when promotion focus is high. As Figure 4 shows, the regression line between punishment expectancy and IT compliance becomes flatter as prevention focus decreases from high to low. The slope is significant when prevention focus is high ($b = 0.47$, $p < 0.01$) and medium ($b = 0.29$, $p < 0.01$) and becomes nonsignificant when prevention focus is low ($b = 0.11$, $p > 0.05$). Additionally, we tested the moderation effects between promotion focus and punishment expectancy ($b = 0.02$, $p > 0.05$) and between prevention focus and reward expectancy ($b = -0.06$, $p > 0.05$), and none of them was found to be significant. Appendix B shows the additional testing results.

Figure 3 Simple Slopes for the Moderation Effect of Promotion Focus

In the PLS model, we controlled for the effects of perceived usefulness and perceived ease of use. Neither perceived usefulness ($b = 0.08$, $p > 0.05$) nor perceived ease of use has a significant influence on compliance behavior ($b = 0.16$, $p > 0.05$). None of the demographic variables (age, gender, and education

[4] $f^2 = [R^2(\text{interaction model}) - R^2(\text{main effect model})]/[1 - R^2(\text{interaction model})]$.

Figure 4 Simple Slopes for the Moderation Effect of Prevention Focus



level) is found to have a significant effect on compliance behavior. In summary, our data analysis provides support for all of the hypotheses except H1A.

Discussion

This study focuses on IT compliance and examines its relationships with reward, punishment, and regulatory focus. Compliance has long been an important issue in the IS literature. A plethora of studies spawned by Zuboff's (1988) work have investigated the use of IT as a surveillance tool in work settings (e.g., Kohli and Kettinger 2004, Sia et al. 2002). Although compliance might not be the central construct explicitly measured in prior research, the phenomena of IT-related compliance has been alluded to quite often. We subscribe to the longstanding importance of compliance in the IS literature, and this study addresses IT compliance in an explicit and quantitative manner.

We find that punishment expectancy positively affects IT compliance. Moreover, the effects of punishment and reward expectancy on IT compliance are positively moderated by prevention and promotion focus, respectively. Overall, we find both "carrot" and "stick" to be effective controls for IT compliance, although "carrot" only motivates those with a high level of promotion focus.

In contrast to many of the previous studies, which find reward to have a much stronger effect on employee performance than punishment has (Podsakoff et al. 2006, Sims 1980), we show that punishment expectancy has a much stronger effect on compliance behavior than reward expectancy, which suggests that the effects of reward and punishment differ based on the types of behavior they intend to control. This finding is consistent with prior research (e.g., Liang et al. 2010, Venkatesh et al. 2003) that argued that social influence can affect IT behavior because of significant others' power to use reward and punishment and demonstrated that social influence is effective only in mandatory settings. This study further suggests that in mandatory settings punishment is a potent force behind social influence. A plausible explanation of this finding is that in the context of compliance, individuals' attention is focused on avoiding losses rather than achieving gains and therefore punishment expectancy has a stronger influence on compliance behavior than reward expectancy has. However, we are heedful not to jump to the conclusion that punishment is more effective than reward in mandatory IT settings because of the specific context of our study. The insignificant direct effect of reward expectancy might be due to the temporal demand of receiving rewards. To be rewarded, one must exhibit long-term compliance (e.g., three months); yet to be punished, one only needs to violate a policy once. The prolonged time required to receive rewards and the immediacy of punishment might partially explain why reward has no direct impact on compliance when punishment does. More research is needed to further clarify the effects of punishment versus reward.

A previous study has found that punishment expectancy is not significantly related to employees' IT compliance intentions (Xue et al. 2011). This seems to be (whereas in fact it is not) inconsistent with the findings of our study. This observation can be understood from several perspectives. First, the samples in the two studies have different demographic characteristics and were recruited from different organizations that often have unique organizational cultures. Compared with the Xue et al. (2011) sample, the respondents in our study are older and have more females, higher education levels, and more work experiences. The companies of Xue et al. (2011) are collective-owned, whereas the companies in our study are state-owned. These differences might have influenced respondents' perceptions and reactions to punishment. Second, Xue et al. (2011) measured compliance intention using respondents' self-reports, whereas we measured compliance behavior using IS managers' evaluations. Both the measurement items and data sources were different between the two studies, which might have contributed to the different findings. Third, intention and behavior are essentially two different constructs in both theoretical and empirical senses. Theoretically, they have been treated by major social behavioral theories as two distinct constructs (Ajzen 1991, Ajzen and Fishbein 1980, Fishbein and Ajzen 1975). Empirically, intention as a predictor of behavior has limitations (Venkatesh et al. 2008) and the intention-behavior gap has long been noticed (Sheeran 2002). Therefore, the relationship between punishment expectancy and compliance behavior in this study and the relationship between punishment expectancy and compliance intention in the Xue et al. study are different in nature, so it is not contradictory for them to have different statistical significance levels.

Limitations and Future Research

This study has a few limitations. First, it should be noted that rewards can include both the presence of gains (e.g., a bonus) and the absence of losses (e.g., alleviation of boredom). Likewise, punishments can include both the presence of losses (e.g., a fine) and the absence of gains (e.g., removal of privileges). Regulatory focus theory (Higgins 1997) suggests that promotion-focused individuals should be primarily sensitive to gains versus nongains and that prevention-focused individuals should be primarily sensitive to losses versus nonlosses, be they rewards or punishments. We find that promotion-focused individuals are more motivated by reward expectancies and prevention-focused individuals are more motivated by punishment expectancies. However, the reward expectancy items capture the construct of gain-related rewards more than nonloss-related rewards, and the punishment expectancy items captured the construct of loss-related punishments more than nongain-related punishments. This is because in the companies that we surveyed, nonloss-related rewards and nongain-related punishments were very rare. Therefore, our finding is consistent with research showing that promotion-focused individuals are more sensitive to gains and prevention-focused individuals are more sensitive to losses (Shah et al. 1998). However, the relationship between regulatory focus and reward/punishment expectancies may depend on whether rewards are about gains or nonlosses and whether punishments are about losses or nongains.[5] The asymmetric measures do not allow us to test whether promotion-focused individuals are more motivated by nonloss-related reward expectancies or prevention-focused individuals are more motivated by nongain-related punishment expectancies. Future research should take a more in-depth view of rewards and punishments and examine their specific relationships with regulatory foci. For example, the size of rewards and punishments can be examined to see whether it affects the moderating effect of regulatory foci.

Second, our research context is Chinese organizations. China is a country with a unique national culture, and our findings might be influenced by the respondents' cultural characteristics. For example, China is characteristic of high power distance and low individualism (Hofstede 2001). These cultural characteristics may have an unknown effect on IT compliance behavior. Previous research also finds that the Chinese culture is associated with more interdependent self-construal and that interdependence is positively associated with prevention focus (Lee et al. 2000, Zhang and Mittal 2007). This might plausibly explain why prevention focus significantly influences IT compliance in this study, whereas promotion focus does not. Therefore, researchers should be careful when generalizing our findings to other national contexts. Future research is needed to investigate how national cultures interact with punishment, reward, and regulatory focus to influence individual behavior.

Third, our respondents are accountants. The accounting profession is unique and may also limit the generalizability of our findings. It is possible that the job design of accounting and the professional traits of accountants influence the perceptions and behavior of individual accountants. Future research should test the relationships among reward, punishment, regulatory focus, and compliance behavior using samples of other professionals.

Fourth, more than 72% of our respondents were female. Although we controlled for the effect of gender on compliance behavior, the disproportionately large percentage of females might have influenced relationships among other constructs. Thus, it might be difficult to equally generalize the findings of this study to males and females.

Finally, because of the cross-sectional nature of the survey study, we cannot claim any causal effects. The significant relationships we report here are correlational from a statistical standpoint, and they can only be interpreted as causal based on theoretical inferences. To demonstrate stronger evidence for causal effects, a more rigorous design, such as controlled experiments with longitudinal data collections, should be conducted. Another approach would be to follow the research stream anchored on Zuboff (1988) that carries out longitudinal case studies to illuminate the temporal sequence and causal order between reward, punishment, and IT compliance.

Implications for Research

This study contributes to the IS and organization research in several ways. First, it addresses IT compliance, rather than IT use, as the behavior of interest. Although IT use has been investigated by a large number of studies, IT compliance is a relatively new concept that has received little attention. To achieve compliance, employees need to not only use the system but also use it in accordance with policies and standards. Thus, IT use is a necessary but not a sufficient condition for IT compliance. In mandatory settings, IT compliance makes more sense than IT use. However, most prior research on IT compliance is in the area of IT security (except Xue et al. 2011), and little is known about non-security IT compliance. In this paper, we examine employee compliance with ERP policies, which creates a new opportunity to

[5] We thank one of the anonymous reviewers for raising this point.

enhance our understanding of individuals' IT behavior in mandatory settings.

Second, the study draws attention to how control mechanisms can be exploited to motivate people differently. The extant literature on control has focused on examining antecedents and the consequences of different control mechanisms (e.g., Eisenhardt 1985, Kirsch et al. 2002). Little attention has been paid to the stimuli used to achieve control. This is probably because control researchers assume the functional importance of reward and punishment but do not study them in an explicit way. By explicitly attending to stimuli, this study complements and possibly extends the extant control research. Because the effects of control mechanisms are largely based on individuals' reactions to reward and punishment, we suggest that regulatory focus can be used as a new theoretical lens through which the effects of control on individual behavior can be investigated.

Third, we examine two important motivational incentives—reward and punishment. Despite being widely practiced in organizations to achieve behavioral control (Podsakoff et al. 2006), punishment has rarely been mentioned in the IS literature except in matters of security. In this study, punishment and reward are investigated in tandem. Our findings demonstrate that employees perceive punishment as a highly important motivator, whereas reward motivates those who have a strong promotion focus. This suggests that both punishment and reward are important incentives and should be considered when studying IT compliance behavior. Our findings are consistent with Bulgurcu et al. (2010), who found both reward and punishment to be significant antecedents of an employee's intention to comply with IT security policies.

Fourth, this study contributes to the IS research by integrating the notion of regulatory focus. This is an important addition because it addresses the limitations of the hedonic principle (Higgins 1997). We find that regulatory focus influences and moderates the effect of employees' perceptions of incentives on IT compliance; promotion-focused individuals are more motivated by rewards and prevention-focused individuals are more motivated by punishments. The concept of regulatory focus has never been applied in IS research except in an exploratory study that only measured prevention focus (Ke et al. 2008). Our findings demonstrate the moderating roles of both prevention focus and promotion focus, which enhances our understanding of how individuals respond to extrinsic motivations in a mandatory IT context—a significant contribution to the IS research.

Finally, the study draws on and contributes back to regulatory focus theory. We apply regulatory focus theory in an organizational setting and test hypotheses using a sample of real employees. The majority of existing studies on regulatory focus theory are laboratory experiments involving samples of college students who may differ significantly from organizational employees. The applicability of this theory in organizational settings needs to be verified, and our findings indicate that regulatory focus theory can be extended into an IT compliance context in organizations. In addition, while management scholars have developed interesting motivation-related propositions based on regulatory focus (Johnson et al. 2010, Kark and Van Dijk 2007, Meyer et al. 2004), the exact relationships among regulatory focus, motivation, and behavior remain nebulous. For example, although Neubert et al. (2008) showed that regulatory focus has direct effects on employee behavior, Johnson et al. (2010) suggested that regulatory focus plays a moderator role in shaping employee motivation and commitment. Our research develops a concise research model to delineate the antecedent and moderator roles of regulatory focus that empirically tests the validity of the model, which lays a foundation for future research to extend the application of regulatory focus theory into the IS arena.

Implications for Practice

This study has implications for IT practices in organizations. First, we suggest that both reward and punishment can effectively control employees' IT compliance behavior because promotion-focused employees are more sensitive to rewards and prevention-focused employees are more sensitive to punishments. To ensure that everyone is effectively controlled, both incentives should be provided. Our suggestion is consistent with Andreoni et al. (2003), who found that rewards can motivate cooperation and punishments can reduce self-behavior. Second, punishments are found to have a stronger impact on compliance behavior than rewards. Rewards are only effective for those whose promotion focus is high. This seems to recommend that organizations should rely on punishment to improve IT compliance. However, this recommendation should be followed with great caution because the "stick" approach could lead to various emotional and behavioral side effects (Arvey and Ivancevich 1980). Their effects might also be influenced by organizational and national cultures. Considering these, organizations should make sure that their punishment policies are carefully designed and fairly implemented.

This study also has implications for control practice in general. Regulatory focus theory suggests that individuals' regulatory focus can be modified on a situational basis (Higgins 1998). Thus, a leader can adjust her subordinates' regulatory focus based on

specific situations to realize the most effective control. The objective of controls should be to achieve a fit between a task's desired outcomes and the employees' regulatory focus. For example, an innovative software development task's desired outcomes include progress, advancement, and success—requiring an eagerness to make progress and aspirations to achieve success. The leader of this task should use promotion-oriented control mechanisms to make her subordinates more promotion-focused. If the fit is created between the subordinates' momentary regulatory focus and the desired outcomes of the task, the task is more likely to be accomplished successfully. In contrast, the desired outcomes of open-heart surgery include safety and protection, which require caution to avoid medical errors and responsibility to protect the patient. The lead surgeon could activate prevention focus in the surgical team members to create a regulatory fit that is more likely to produce a successful surgery.

In addition, given that chronic regulatory focus is more similar to a personal trait that cannot be easily modified, organizations could use scales to measure employees' regulatory focus, then use the information as a basis to decide how to perform certain activities such as performance appraisal, mentoring, and training. Approaches that take regulatory focus into account can be tailored to fit individual employees and are likely to lead to more positive outcomes.

Conclusions

This study examines the impacts of reward and punishment on employee compliance with the appropriate use of ERP systems by integrating control theory and regulatory focus theory. Analyses of the data collected from 186 employees demonstrate that punishment expectancy has a strong influence on compliance behavior, controlling for perceived usefulness and ease of use. This influence is stronger for employees whose prevention focus is high. Reward expectancy has a significant effect on compliance behavior only for those who have a high level of promotion focus. The findings suggest that both "carrot" and "stick" can be effective control mechanisms for enforcing IT compliance in mandatory settings and the effectiveness of a control mechanism may vary across employees because of the moderation effect of regulatory focus.

Supplemental Material

Supplemental material to this paper is available at http://dx.doi.org/10.1287/isre.1120.0427.

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