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# Autonomous Motivation and Information Security Policy Compliance: Role of Job Satisfaction, Responsibility, and Deterrence

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## ABSTRACT

Many existing studies focus on the effect of external influence mechanisms (e.g., deterrence) impacting information security policy compliance (ISPC). This study explores the formation of ISPC from an autonomous motivation perspective, based on social exchange theory and self-determination theory. Data were gathered by conducting a survey of 261 employees, with hierarchical regression analysis being used to test the hypotheses. The results indicated the following: First, job satisfaction and personal responsibility positively impact ISPC. Second, job satisfaction perceived by employees is positively linked to personal responsibility, where deterrence severity has a negative moderating effect on this relationship. Finally, personal responsibility mediates the relationship between job satisfaction and ISPC. This study suggests that organizational support should focus on promoting perceived self-determination of employees and that deterrence should be maintained at a moderate level to adapt to the organization's security strategy and information security environment.

## KEYWORDS

Social exchange theory, Self-determination theory, Intrinsic motivation, Extrinsic motivation, Internalization, Positive psychology, Organizational behavior, Empower, Persistent

## INTRODUCTION

The behavior of insiders is regarded as an important source of information security emergencies (Willison & Warkentin, 2013). The International Business Machines Corporation (IBM) X-Force Threat Intelligence Index (2018) found that most information security incidents result from misconfigurations, phishing victimization, use of weak passwords, unsecured personal devices, and storage of authentication credentials in open repositories (International Business Machines Corporation, 2018). The Ernst & Young Global Information Security Survey 2017–18 reported that 77% of the respondents were worried about poor user awareness and behaviors that might expose them to risk via a mobile device (Ernst & Young, 2017).

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Information security policy is considered to be “employees’ roles and responsibilities in complying with standards for using the information and technology resources of their organizations” (Han et al., 2017, p. 53). It is formulated by an organization to restrict the information security behavior of insiders. Whether the policies are effective in alleviating information security problems depends on the information security policy compliance (ISPC) of employees. Deterrence theory (D’arcy et al., 2009; Siponen & Vance, 2010), the theory of planned behavior (Hong & Furnell, 2019; Sommestad et al., 2017); protection motivation theory (Thompson et al., 2017; Tsai et al., 2016; Warkentin et al., 2016;), neutralization theory (Siponen & Vance, 2010), the health belief model (Ng et al., 2009), and the theory of reasoned action (Bulgurcu et al., 2010), etc., have been used to explain the formation mechanism of employees’ ISPC (Moody et al., 2018).

However, many existing studies are based on exploring the effect of fear appeals that impact ISPC (Orazi et al., 2019). Studies that consider positive factors as predictors of ISPC are limited, except those using efficacy, which are included in theories such as the theory of planned behavior and protection motivation theory. Positive psychology was considered to promote positive organizational behaviors and better job performance (Baron & Bronfen, 1994; Organ & Ryan, 1995; Williams & Shiaw, 1999). It is an important complement to the research of information security (Burns et al., 2017), such that D’Arcy and Lowry (2019) found that positive affection can impact the decision-making process of compliance behavior. Burns et al. (2017) found that psychological capital (hope, optimism, resilience, and self-efficacy) can promote protective motivation for information security. Job satisfaction is one such type of positive psychology.

This study aims to explore the formation of ISPC based on social exchange theory (SET), according to which the positive experience of job satisfaction is an inducement of reciprocate behavior (e.g. ISPC in this study), and personal responsibility may mediate the influence of job satisfaction on ISPC. Moreover, although a large number of studies regard deterrence as an important predictor of information security behaviors, from the perspective of SET, deterrence implies a lack of trust in employees, and the employees will respond by breaking their social exchange contract (Barkema, 1995; Frey, 1992). Therefore, this study also discussed the boundary conditions for social exchange in the context of information security, namely, the moderating effect of deterrence severity.

## **THEORETICAL BACKGROUND**

### **Social Exchange Theory**

SET is an important theory for explaining positive organizational behavior (Cropanzano & Mitchell, 2005). It suggests that employees who are satisfied with the work conditions provided by organizations will feel a responsibility to reciprocate such that they will promote positive organizational behaviors (Eisenberger et al., 1990; Eisenberger et al., 1986; Erdogan & Enders, 2007; Gouldner, 1960; Gyekye, 2005; Lapierre & Hackett, 2007). Some previous literature has studied the exchange between organizations and employees on the topic of security based on SET, indicating that the more individuals are satisfied by organizational support, the greater the possibility that they will practice safety behaviors (DeJoy et al., 2010; Gyekye, 2005; Hofmann & Morgeson, 1999; Hofmann, Morgeson, et al., 2003; Huang et al., 2016; Mearns & Reader, 2008). In the area of information security, SET has also been used to explain the formation of information security behaviors (D’Arcy & Greene, 2014; Greene & D’Arcy, 2010; Sharma & Warkentin, 2019; Turel et al., 2020).

### **Self-Determination Theory**

As a general theory of motivation, the SDT proposes three types of behavioral motivations: intrinsic motivation, extrinsic motivation, and amotivation (Deci et al., 1991). Amotivation refers to a state in which an individual lacks motivation. Extrinsic motivation refers to drives that cause individuals to engage in an activity because of a distinct outcome. When individuals are intrinsically motivated,

they are driven by the interesting or enjoyable feelings that they expect as a result of engaging in the activity, which is fully autonomous. One important point of SDT is that individuals can experience autonomy, and even be extrinsically motivated if they have fully accepted external values or regulations, namely, undergone internalization (Gagné & Deci, 2005). The degree to which external regulation is internalized can be divided into four types based on the level of self-determination: external, introjected, identified, and integrated regulation. External regulation and introjected regulations are considered to be two types of controlled motivation because they are characterized by a lack of self-determination. Identified regulation and integrated regulation are considered to be different types of autonomous motivation because they are characterized by high levels of self-determination (Gagné & Deci, 2005; Ryan & Deci, 2000;).

SDT has also been used to explain the formation of information security behaviors (Herath & Rao, 2009; Menard et al., 2017; Padayachee, 2012; Siponen, 2000; Talib, 2015; Wall et al., 2013). Herath and Rao (2009) suggested that information security behavior can be encouraged by both extrinsic (the impact of penalties and social pressures) and intrinsic motivators (perceived value or contribution). Padayachee (2012) differentiated three types of behavioral motivations that underlie information security compliance based on SDT; she proposed that sanctions and monitoring belong to external regulation, while locus of control and response efficacy belong to integration. Talib (2015) considered sanctions, monitoring, rewards, and social pressures as extrinsic motivators of ISPC, while perceived competence, perceived effectiveness, and beliefs about organization are intrinsic motivators. Sikolia and Biros (2016) regarded most previous studies of ISPC as based on extrinsic motivators, including punishment, subjective norms, cost-benefit analysis, and perceived vulnerability.

## **Job Satisfaction**

Job satisfaction is a “pleasurable or positive emotional state resulting from the appraisal of one’s job and job experience” (Locke, 1976, p. 1304), which is the extent to which individuals like or dislike their jobs (Spector, 1997). At present, there are many theories and mature instruments related to job satisfaction. For example, Herzberg et al. (1959) proposed a two-factor theory of motivation, suggesting that only the intrinsic factors related to the content of the job itself can satisfy an individual, while the extrinsic factors related to the job environment only maintain individual dissatisfaction. Smith et al. (1969) regarded job satisfaction as having positive feelings about the work, supervisor, income, promotion, and coworkers. They developed the Job Descriptive Index using a 72-item inventory to measure the level of job satisfaction on five dimensions. The Minnesota Satisfaction Questionnaire (MSQ) (Weiss et al., 1967) is another popular instrument, which includes long and short forms. The MSQ score can be calculated as an overall satisfaction score or combined into subscales measuring intrinsic and extrinsic factors.

## **Personal Responsibility**

Personal responsibility is concerned with individuals’ willingness to be accountable for their choices and behaviors as well as the personal and social outcomes they make (Linley & Maltby, 2009; Mergler & Shield, 2016). The definitions of personal responsibility vary across different studies (Mergler & Shield, 2016) and often are used in conjunction with other concepts to express similar meanings, such as normative commitment (Meyer & Allen, 1991), internal locus of control (Rotter, 1966), ownership (Hackman & Oldham, 1976), self-attribution (Dawson, 2019), and sense of obligation (Janmaimool & Khajohnmanee, 2020). Individuals feel that taking personal responsibility for the outcomes of their decisions will mean they are more likely to put in more effort to accomplish the task goals (Patah, 2009; Thomas & Velthouse, 1990). Organizational citizenship behaviors will be generated when these tasks are consistent with the organization’s goal (Han, 2010; Masterson & Stamper, 2003).

## Deterrence Severity

Deterrence severity is derived from general deterrence theory (GDT), which focuses on constraints and sanctions against deviant behaviors and the effect of those sanctions on deterring others from conducting a deviant act (Blumstein et al., 1978). The constraints are implemented in two ways: 1) The possibility of getting caught and being punished (deterrence certainty), and 2) severity of punishment (deterrence severity). GDT suggests that both deterrence certainty and deterrence severity can predict that individuals tend not to commit crimes (Blumstein et al., 1978). GDT is one of the most cited theories applied in the area of information security (Chen et al., 2018), and deterrence is considered a useful and important means by which to deter unwanted behaviors and promote desirable behaviors (Hong & Furnell, 2019).

## HYPOTHESES DEVELOPMENT

Social exchange theory has been considered a central theory for explaining the relationship between job satisfaction and positive organizational behaviors (Gyekye, 2005). For some time, a number of studies have found that job satisfaction has a strong positive effect on productive organizational behaviors (Lapierre & Hackett, 2007; Moorman, 1991; Ngunia et al., 2006; Organ & Ryan, 1995; Podsakoff et al., 2000; Williams & Anderson, 1991). Moreover, some studies have attempted to link job satisfaction with safety behaviors. For example, Probst and Brubaker (2001) found that satisfied employees exhibited a higher level of safety motivation than unsatisfied employees. Baring et al. (2003) found that job satisfaction had a negative impact on occupational injuries. Gyekye (2005) found that workers with higher levels of satisfaction had higher safe work behaviors and lower accident involvement rates. As a safety-related organizational behavior, Greene and D'Arcy (2010), Chang et al. (2012), and D'Arcy and Greene (2014) verified that employees with high job satisfaction tend to comply with information security policy. Therefore, this study hypothesizes the following:

H1: Job satisfaction has a positive impact on ISPC.

The positive effects of personal responsibility impact on positive behaviors have also been verified in some empirical studies, such as Poile (2017), who confirmed that felt responsibility has a positive impact on voluntary tasks completed. Dawson (2019) found that taking responsibility—self-attribution for risk creation—can promote willingness to engage in risk management behaviors. Bouman et al. (2020) found that personal responsibility had a positive impact on personal climate-mitigation behaviors and support for climate policy. Janmaimool and Khajohnmanee (2020) and Yue et al. (2020) both verified that personal responsibility could positively predict pro-environmental behavior. In the area of information security, personal responsibility is considered as the belief that an individual must take actions to achieve the goal of information security (LaRose et al., 2008). If individuals believe to a high extent that it is their responsibility to take control of security, this will increase the acceptable and proactive behaviors regarding information security (Anderson & Agarwal, 2010; D'Arcy & Greene, 2014; Workman et al. 2008), while a lack of understanding of responsibility will result in noncompliance and breaches (Hina & Dominic, 2018). For example, Workman et al. (2008) found that locus of control has a significant negative impact on subjective omissive behavior, indicating that individuals with a higher willingness to accept responsibility for information security will tend to practice information security measures. Tsai et al. (2016) found that personal responsibility has a positive impact on online safety behavioral intentions. Therefore, this study hypothesizes the following:

H2: Personal responsibility has a positive impact on ISPC.

According to SET, satisfied experiences resulting from perceived organizational support create employees' feeling of obligations and make them feel they have to act reciprocally toward the organization by engaging in behaviors that support organizational goals (Biswas & Bhatnagar, 2013; Eisenberger et al., 1986; Eisenberger et al., 1990; Gyekye, 2005;). Lew (2009) found that individuals satisfied by the organization's support will also develop a felt obligation to act reciprocally to the organization. D'Arcy and Greene (2014) believed that employees who report satisfaction with their jobs are likely to comply with organizational policies and procedures because they are highly engaged in terms of their organizational responsibilities. In other words, the reciprocated behaviors resulted from employees' willingness to fulfill job responsibilities after they experienced a positive emotional state due to perceived organizational support (Settoon et al., 1996). Moreover, SDT suggests that autonomous motivation can be enhanced by the satisfaction of basic psychological needs (Gagné & Deci, 2009; Greguras & Diefendorff, 2005). In keeping with previous studies, especially the classification of information security compliance behavior motivators by Padayachee (2012), This study proposed that personal responsibility is an autonomous motivator, which is characterized by a high level of self-determination. Job satisfaction encourages the internalization process, which generates personal responsibility and motivates ISPC. Therefore, this study hypothesizes the following:

H3: Job satisfaction has a positive impact on personal responsibility.

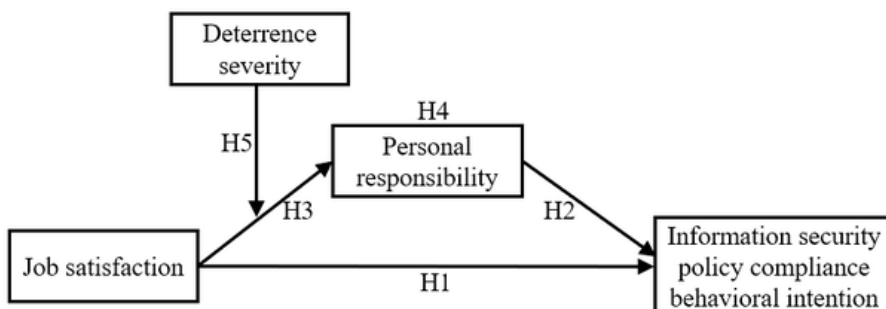
H4: Personal responsibility mediates the relationship between job satisfaction and ISPC.

Deterrence has been verified to have a direct negative impact on abuse or misuse of information security behaviors (D'Arcy et al., 2009; Straub, 1990;) and positive effects on ISPC (Foth, 2016; Herath & Rao, 2009). However, a limited number of studies have paid attention to the role of deterrence from the perspective that information security behaviors are internally motivated. In fact, excessive external rewards and controls (e.g., deterrence) will block the internalization process and reduce individuals' desire to perform positive organizational behavior autonomically (Deci et al., 1999). Deterrence from an organization breaks an individual's social exchange contract and lowers individuals' autonomous motivation when external regulations reduce their self-determination (Barkema, 1995; Frey, 1992). In this way, their locus of control will be shifted from internal to external, and personal responsibility will decrease. Therefore, this study hypothesizes the following:

H5: Deterrence severity moderates the relationship between job satisfaction and personal responsibility. Specifically, when deterrence severity is high, the positive relationship between job satisfaction and personal responsibility decreases.

Based on the above hypotheses, the research model is presented in Figure 1.

Figure 1. Research model



## METHODS

### Study Participants

As part of a larger study on information security behavior (Hong & Furnell, 2019), this study conducted a survey based on questionnaires. Five hundred paper-based questionnaires were sent to 100 companies in the IT industry, finance, manufacture, logistics, real estate, hospitality, and media. A total of 261 employee surveys were returned (52.2% response rate with 44% from women). To improve the reliability of the measurement and structure validity as well as to motivate respondents' participation, this study used a hypothetical scenario approach that provided respondents with a detailed vignette describing an information security-related behavior or behavioral decision-making. Six hypothetical scenarios were adapted from previous studies that comprised reading "confidential" documents, installing and using unauthorized software, unlocking a PC, using insecure public wireless networks for business purposes, allowing children to play with one's laptop, and using unauthorized portable devices for storing and carrying organizational data. The respondents were then required to read one scenario before answering the questions. Detailed sample characteristics on gender, hierarchy, profession, and industry, as well as a description of the procedure can be found in (Hong & Furnell, 2019).

### Measures

The measures used in this study originated from the mature classical scales with a 5-point Likert-type scale ranging from *strongly disagree* to *strongly agree*. ISPC was measured using three items adapted from Ifinedo's questionnaires (2012). Job satisfaction was measured using seven items that were adapted from the short version of the MSQ covering satisfaction with the work, supervisor, income, promotion, and coworkers. Personal responsibility was measured using two items that were adapted from Tsai's questionnaires (2016). Sanction severity was measured using three items that were adapted from Herath and Rao's (2009) questionnaires. In addition, as ISPC is also influenced by socio-demographic characteristics (Herath & Rao, 2009; Vance et al., 2012), this study used gender, age, education, industry, and scenario type as control variables.

## RESULTS

### Preliminary Analysis

Prior to the data analysis, this study conducted an internal consistency reliability analysis and confirmatory factor analysis (CFA) to examine the qualities of given scales and acquired samples. Cronbach's  $\alpha$  coefficient was used to test internal consistency, as it is the most common measure of reliability. The results showed that Cronbach's  $\alpha = 0.70$  for ISPC, 0.81 for job satisfaction, 0.80 for personal responsibility, and 0.74 for sanction severity, indicating a high internal consistency.

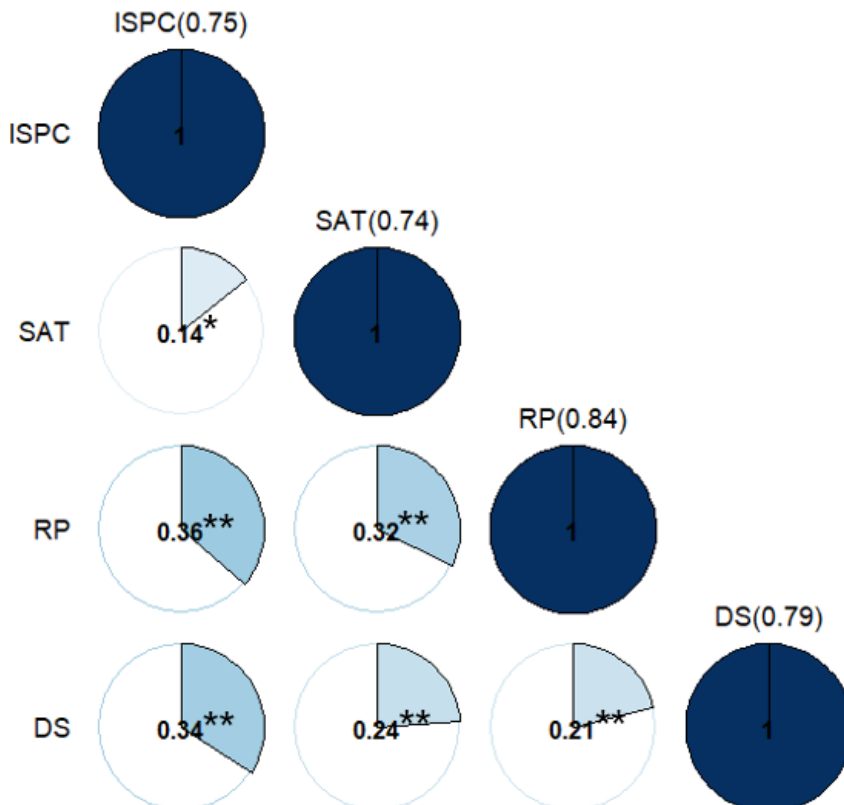
This study then conducted a CFA of variables including ISPC, job satisfaction, personal responsibility, and sanction severity, based on total samples. The results showed that the Kaiser–Meyer–Olkin value was  $0.760 > 0.7$ , and the Bartlett's Test of Sphericity was significant, indicating that the sample size was adequate, and the data could be subjected to factor analysis. As shown in Table 1, all loadings of these items were higher than 0.50, all the values of composite reliability (CR) were higher than 0.8, and all the values of average variance extracted (AVE) were higher than 0.5. Therefore, the validity convergence was good. As shown in Figure 2, the square root of AVE for each construct was higher than the correlations between it and all other constructs, indicating that the discriminant validity was good (Fomell & Larker, 1981).

Table 1. Factor loading of items

Construct	Item	Loading	CR	AVE
ISPC	ISPC1	0.762	0.798	0.568
	ISPC2	0.744		
	ISPC3	0.754		
SAT	SAT1	0.773	0.853	0.542
	SAT2	0.788		
	SAT3	0.848		
	SAT4	0.524		
	SAT5	0.705		
PR	RP1	0.844	0.823	0.700
	RP2	0.828		
DS	DS1	0.583	0.830	0.627
	DS2	0.891		
	DS3	0.864		

Note. ISPC= information security policy compliance behavioral intention; SAT=job satisfaction; PR=personal responsibility; DS=deterrence severity."

Figure 2. Correlations between constructs (Note. Diagonal elements in parentheses are squared roots of AVE, \*  $p < 0.05$ , \*\*  $p < 0.01$ )





## Hypotheses Testing

As shown in Table 2, this study constructed regression models for the ISPC. The regression model was constructed using the control variables (Model 1). Next, job satisfaction was entered in Model 2; the result showed that job satisfaction had a positive effect on ISPC (Model 2,  $\beta = 0.185$ ,  $p < 0.05$ ). Thus, Hypothesis 1 was supported. Personal responsibility was then entered in Model 3, and the result indicated that personal responsibility had a positive effect on ISPC (Model 3,  $\beta = 0.340$ ,  $p < 0.01$ ). Hypothesis 2 was thus supported. After this, the regression model was constructed for personal responsibility (Table 3). As a result, job satisfaction had a positive effect on personal responsibility (Model 5,  $\beta = 0.369$ ,  $p < 0.01$ ). Hypothesis 3 was thus supported.

To test the mediating role of personal responsibility between job satisfaction and ISPC, this study followed the testing procedure provided by Zhao et al. (2010). This study utilized the PROCESS (Model 4) provided by Hayes (2013), and estimated 5000 bootstrap samples in which the independent variable was job satisfaction, the mediator was personal responsibility, and the dependent variable was ISPC. This study also included gender, age, education, industry, and scenario as covariates in the model. The results (Table 4) indicated that personal responsibility totally mediated the relationship between job satisfaction and ISPC (direct effect = 0.060; 95% confidence interval (-0.081, 0.201); since this interval includes 0 there is no evidence of a significant; indirect effect = 0.125; 95% confidence interval (0.067, 0.203); since the entire interval is larger than 0 imply about the significance of the effect). Therefore, Hypothesis 4 was supported.

To test the moderating effect of deterrence severity on the relationship between job satisfaction and personal responsibility, this study followed the procedure provided by Aiken and West (1991). this study first entered deterrence severity based on Model 5 to construct Model 6. Then, this study entered the interaction item (job satisfaction and deterrence severity) in Model 7. The results showed that the effect of the interaction item was significant (Model 7,  $\beta = -0.195$ ,  $p < 0.05$ ). Thus, Hypothesis 5 was supported. The interaction effects between job satisfaction and personal responsibility are shown in Figure 3(a), where this study divided participants into three groups based on perceived deterrence severity: Group I: High deterrence severity (+1 SD); Group II: Mean deterrence severity (Mean); Group III: Low deterrence severity (-1 SD). The interaction plot shows that deterrence severity played a role as a moderator in the relationship between job satisfaction and personal responsibility, which means that the more deterrence perceived by people, the less effective job satisfaction is to personal responsibility. Figure 2(b) shows the results of applying the Johnson-Neyman technique to evaluate the statistical significance of each group. The band represents the 95% confidence interval limits, and as long as the horizontal zeros are included in the band, the linear slope of job satisfaction is not statistically significant. According to Figure 3(b), the positive effect of job satisfaction on personal responsibility is significant when the value of deterrence severity is less than 4.44.

## DISCUSSION

This study aimed to explore the formation mechanism of ISPC from the perspective of autonomous motivation. All the hypotheses were supported. The main findings of this study are as follows: (1) Job satisfaction has a positive impact on information security policy-compliance behavioral intention. (2) Personal responsibility has a positive effect on information security policy-compliance behavioral intention. (3) Job satisfaction can promote the formation of personal responsibility. (4) Personal responsibility mediates the relationship between job satisfaction and information security policy compliance behavioral intention. (5) Deterrence severity has a moderating effect on the relationship between job satisfaction and personal responsibility; specifically, when deterrence severity is high, the positive relationship between job satisfaction and personal responsibility decreases.

**Table 2. Results of regression on ISPC**

	Model 1		Model 2		Model 3	
	$\beta$	$p$	$\beta$	$p$	$\beta$	$p$
GE	0.148	0.093	0.169	0.053	0.140	0.092
AG	-0.052	0.386	-0.044	0.461	-0.024	0.667
EDU	0.089	0.109	0.103	0.063	0.084	0.109
IND	0.015	0.282	0.017	0.225	0.018	0.195
SCE	-0.047	0.115	-0.042	0.154	-0.034	0.223
SAT			0.185*	0.010	0.060	0.405
RP					0.340**	<0.001
R <sup>2</sup>	0.038		0.062		0.159	
F	1.991		2.816		6.838**	
$\Delta R^2$	0.038		0.025		0.097	
$\Delta F$	1.991		6.717		29.098**	

Note. GE=gender, 1=men, 2=women; AG=age; EDU=education; IND=industry; SEC=scenario

**Table 3. Results of Regression on PR**

	Model 4		Model 5		Model 6		Model 7	
	$\beta$	$p$	$\beta$	$p$	$\beta$	$p$	$\beta$	$p$
GE	0.043	0.618	0.086	0.295	0.068	0.406	0.064	0.432
AG	-0.074	0.213	-0.057	0.308	-0.067	0.231	-0.087	0.121
EDU	0.027	0.620	0.054	0.298	0.062	0.228	0.056	0.279
IND	-0.004	0.761	-0.001	0.959	-0.002	0.905	<0.001	0.987
SCE	-0.033	0.259	-0.023	0.405	-0.015	0.590	-0.013	0.647
SAT			0.369*	<0.001	0.331**	<0.001	1.047**	0.001
DS					0.118*	0.019	0.850**	0.006
SAT×DS							-0.195*	0.016
R <sup>2</sup>	0.015		0.119		0.138		0.158	
F	0.802		5.719**		5.780**		5.894**	
$\Delta R^2$	0.015		0.104		0.019		0.020	
$\Delta F$	0.802		29.852**		5.533*		5.911*	

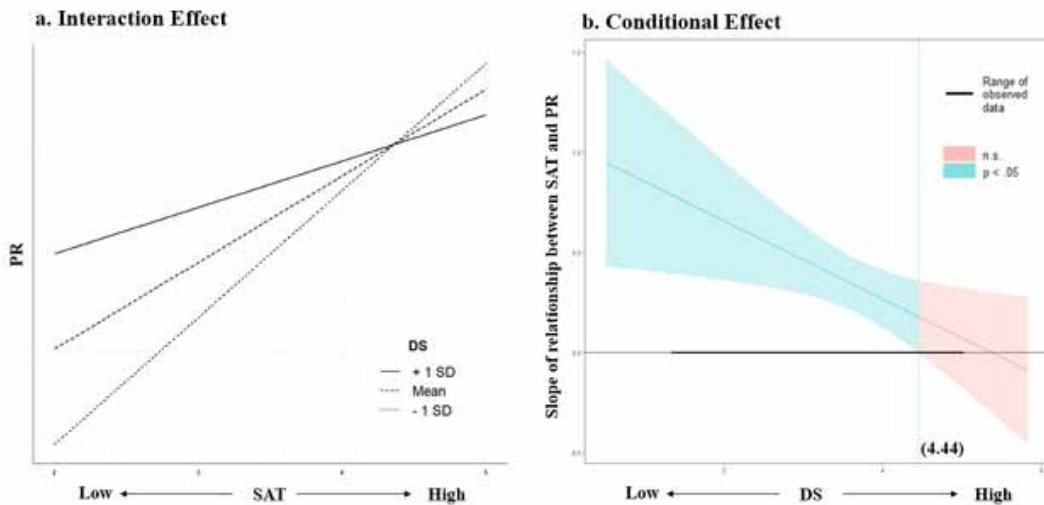
Note. SAT×DS= the interaction item of job satisfaction and deterrence severity.

**Table 4. Bootstrap analysis of significance test on mediating effect of personal responsibility**

Path	Effect	Boot SE	CI = 95%		Significance
			LLCI	ULCI	
Direct effect	0.060	0.072	-0.081	0.201	Not significant
Total indirect effect	0.125	0.034	0.067	0.203	Significant

Note. Boot SE bootstrap standard error, LLCI lower limit confidence interval, ULCI upper limit confidence interval.

Figure 3. The moderating effect of deterrence severity on the relationship between job satisfaction and personal responsibility. A) Interaction effect of job satisfaction and deterrence severity on personal responsibility; b) the conditional effect of job satisfaction and personal responsibility. The polygon shaded in blue indicates a 95% CI using the Johnson-Newman technique.



## Implications for Research

Many previous studies explained the formation of ISPC from the perspective of fear appeals, indicating that the ISPC results from the individual's avoidance of punishment and risk loss. This study considered that individuals' positive psychological factors can also promote ISPC. This study verified that the theories of organizational behavior, such as SET and SDT, can be used to explain the formation mechanism of ISPC in the context of China. Specifically, on the one hand, the positive information security behavioral intention can be generated due to the satisfaction with the work and organizational environment in which the relationship was verified by the text of direct effect. This result is consistent with SET. On the other hand, according to both SET and SDT, sustainable positive behavior is usually promoted by satisfaction through autonomous motivators, such as personal responsibility. Moreover, the formation of autonomous motivators will be blocked when individuals perceive excessive external rewards and controls, such as deterrence. In our study, the mediation effect of personal responsibility on the relationship between job satisfaction and ISPC as well as the moderation effect of deterrence severity on the relationship between job satisfaction and personal responsibility were verified. These results indicated that although deterrence is usually considered as an important influencing factor of ISPC, it does not play a positive role from the perspective of autonomous motivation. This study expanded the research boundary of the ISPC and provided a new perspective for its explanation. It also has the benefits of an interdisciplinary study combining the areas of information security behavior and organizational behavior.

## Practical Implications

The generation of autonomous motivation is helpful for a more sustainable ISPC. As personal responsibility totally mediates the relationship between job satisfaction and ISPC, job satisfaction can promote ISPC only when it can first increase personal responsibility. Therefore, one of the key points for increasing organizational support and, in turn, promoting employees' job satisfaction should be a focus on promoting the perceived self-determination of employees; moreover, (1) the job should be well designed to provide adequate freedom, independence, and discretion to schedule the work as well as to decide the procedures to carry it out (Hackman & Oldham, 1975); (2) employees should be

sufficiently empowered so that they can feel more autonomous; and (3) employees should be provided more opportunities to participate in the decision-making process of the organization. All of these can not only increase job satisfaction but can also promote personal responsibility. Moreover, deterrence will block the formation of personal responsibility acquired from job satisfaction. Information security management should not focus on external punishment. Deterrence gives employees a signal that their managers do not acknowledge their reciprocated behaviors. As a result, autonomous motivation is undermined by external sanctions (Frey, 1992), and sustainable ISPC will decrease. In other words, there is no restraint once the punishment is removed or it does not cover all of the information security scenarios, which has become very common recently as the information security environment is changing rapidly. Therefore, deterrence should be kept at a moderate level, which is adapted to the organization's security strategy and the specific information security environment.

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