Ethical leadership and employee information security policy (ISP) violation: exploring dual-mediation paths

Botong Xue and Feng Xu
Mississippi State University, Mississippi State, Mississippi, USA
Xin Luo
The University of New Mexico, Albuquerque, New Mexico, USA, and
Merrill Warkentin
Mississippi State University, Mississippi State, Mississippi, USA

Abstract

Purpose – A growing number of studies have investigated the effect of ethical leadership on behavioral outcome of employees. However, considering the important role of ethics in IS security, the security literature lacks a theoretical and empirical investigation of the relationship between ethical leadership and employees’ security behavior, such as information security policy (ISP) violation. Drawing on social learning and social exchange theories, this paper empirically tests the impact of ethical leadership on employees’ ISP violation intention through both information security climate (i.e. from a moral manager’s perspective) and affective commitment (i.e. from a moral person’s perspective).

Design/methodology/approach – The research was developed based on social learning theory and social exchange theory. To measure the variables in the model, the authors used and adapted measurement items from previous studies. The authors conducted a scenario-based survey with 339 valid responses to test and validate the research model.

Findings – Results indicated that information security climate fully mediates the relationship between ethical leadership and ISP violation intention. The authors also found that information security climate enhances the negative effect of affective commitment on ISP violation intention.

Originality/value – This research contributes to the literature of information security by introducing the role of ethical leadership and integrating two theories into our research model. This study also calls attention to how information security climate and affective commitment mediate the relationship between ethical leadership and employees’ ISP violation intention. The theory-driven study provides important pragmatic guidance for enhancing the understanding of the importance of ethical leadership in information systems security research.

Keywords Ethical leadership, ISP violation intention, Information security climate, Affective commitment, Insider threat

Paper type Research paper

Introduction

Mitigating security threats and safeguarding information security has become an important organizational strategic agenda. Among a variety of security threats, employees’ information security policy (ISP) violation has been deemed to be a major concern to organizations (Chen et al., 2021; Luo et al., 2020; Moody et al., 2018; Siponen and Vance, 2010). Academics and
practitioners have recognized the significant negative outcomes of employees’ ISP violation behavior. Employees’ security policy violations might result in significant financial losses caused by security breaches, privacy violations, legal liabilities and the like (Cheng et al., 2013; Chu et al., 2015). According to the Data Breach Investigations Report 2020, more than 32,000 information security incidents have occurred in over 81 countries, with 28% of them involving organizational insiders (Verizon, 2020). Worse yet, according to PWC (2018), insider incidents across industries cost an average of 8.76m US dollars.

To address concerns about insider threats, previous security research has identified a variety of antecedents to employees’ ISP compliance or violation behavior (Bulgurcu et al., 2010; D’Arcy et al., 2009; Johnston and Warkentin, 2010; Mutchler and Warkentin, 2020; Siponen and Vance, 2010; Warkentin and Willison, 2009; Lin and Luo, 2021; Li et al., 2021; Ho and Warkentin, 2017). Among these antecedents, ethics or moral-related factors, such as moral beliefs, ethical climate and employees’ personal ethics (Li et al., 2014; Siponen et al., 2012), have been considered significant in influencing employees’ security behaviors. Due to the critical role of organizational ethics or morality in affecting employees’ security behaviors, managers must exemplify ethics for employees to anchor the issue of information security in the organization (Feng et al., 2019). However, the aspect of managers’ ethics has received relatively scarce attention in IS security research.

To advance this line of research, this study aims to investigate the role of a specific leadership dimension – ethical leadership – in influencing employees’ ISP violation. Previous studies have empirically examined the impact of ethical leadership on a variety of employees’ behaviors, such as deviant behavior (Mo and Shi, 2017; Resick et al., 2013), employee misconduct (Mayer et al., 2010), unethical behavior (Moore et al., 2019; Schaubroeck et al., 2012), citizenship behavior (Newman et al., 2014) and ethical behavior (Huang and Paterson, 2017; Lu and Lin, 2014). The mediating factors influencing the underlying mechanism between ethical leadership and employees’ workplace behaviors have been identified, including trust (Mo and Shi, 2017; Newman et al., 2014), justice (Walumbwa et al., 2017) and ethical climate or ethical culture (Demirtas and Akdogan, 2015; Huang and Paterson, 2017; Lu and Lin, 2014; Schaubroeck et al., 2012). Taken together, we conjecture that ethical leadership can influence employees’ security behaviors by promoting appropriate and ethical conduct through personal actions and interpersonal relationships in the workplace.

Conceptualized as “the demonstration of normatively appropriate conduct through personal actions and interpersonal relationships, and the promotion of such conduct to followers through two-way communication, reinforcement, and decision-making” (Brown et al., 2005, p. 120), ethical leadership subsumes two dimensions to influence employees’ behaviors: a moral person and a moral manager. In essence, a moral person who is honest, trustworthy, caring and concerned for employees has been found to be more associated with employees’ positive work attitudes, such as satisfaction and commitment (Brown and Treviño, 2006; Neves and Story, 2015), whereas a moral manager who promotes principles through communications, rewards and punishments is more related to external regulations, such as controlled motivation (Bavik et al., 2018) and procedural justice (Newman et al., 2014).

Grounded in the social learning theory and the social exchange theory, this paper is an early attempt to explore the influence of ethical leadership on employees’ ISP violation intention through two mediation mechanisms. Our study makes several theoretical and practical contributions. First, this paper contributes to ethical leadership and IS security research. We conducted an empirical study to investigate the influence of ethical leadership on employees’ ISP violation intention. Although ethics-related factors have been studied, this research is one of the first studies to gauge the influence of ethical leadership on employees’ ISP-related behavior. Second, embracing the theoretical lenses of the social learning theory and the social exchange theory, this study identifies information security climate and
organizational affective commitment as two critical mediators that influence the relationship
between ethical leadership and employees’ ISP violation intention. Investigating the role of
ethical leadership in the context of information security provides important insights into how
to effectively manage employees’ information security behaviors and significantly improves
organizational information security performance.

Theoretical framework and hypothesis development
ISP violation and ethical leadership
Employee engagement in ISP violation, as a specific organizational deviant behavior, has
been identified as one of the major issues leading to security incidents. Previous studies have
identified a variety of individual and organizational factors that influence employees’ ISP
violation or compliance behavior, such as fear appeals and sanction (Herath and Rao, 2009;
Johnston et al., 2015; Li et al., 2014; Wall and Warkentin, 2019), neutralization (Siponen and
Vance, 2010; Trinkle et al., 2021), security-related stress (D’Arcy et al., 2014), moral beliefs
(Siponen et al., 2012), personal ethics (Li et al., 2014), top management and leadership (Hu et al., 2012; Guhr et al., 2019; Feng et al., 2019), and organizational justice (Willison et al., 2018; Xu et al., 2019; Ormond et al., 2019). Among these factors, explaining the influence of
management leadership on employees’ security behavior has become an important focus in IS
security research.

Previous research has identified the paramount role of ethics in affecting employees’
security behaviors. For example, Li et al. (2014) found that personal ethics significantly
improve user’s Internet usage policy compliance intention. Vance et al. (2020) suggested that
moral beliefs negatively influence employees’ ISP violation. Given the significance of ethics in
IS security, managers should be able to promote ethics to individual employees to increase
employees’ ISP compliance behavior. However, as an essential component of ethical leaders,
ethical leadership has not been well investigated in IS security research.

The role of ethical leadership in influencing employees’ behaviors has been investigated in
previous leadership or organizational behavior research (Bavik et al., 2018; Gerpott et al.,
2019; Kacmar et al., 2011; Lu and Lin, 2014; Mo and Shi, 2017; Neubert et al., 2009; van Gils
et al., 2015; Wang and Sung, 2016; Zhu et al., 2004). For example, Mo and Shi (2017) found a
negative effect of ethical leadership on employees’ deviant behavior, and Resick et al. (2013)
studied the effects of ethical leadership on deviant behavior and organizational citizenship
behavior (OCB). Other research has sought to enhance the understanding of ethical
leadership through a focus on specific behaviors. For example, Bavik et al. (2018) examined
how ethical leadership influences employees’ knowledge sharing behavior. The authors
found that the relationship is mediated by moral identity and control motivation. Cheng et al.
(2019) investigated the mediation effect of perception of organizational politics on the
relationship between ethical leadership and Internet whistleblowing.

Although previous research has identified a variety of behavioral outcomes associated
with ethical leadership, the relationship between ethical leadership and information
security behavior has not been thoroughly investigated. Based on the social learning
theory and the social exchange theory, we seek to identify the mechanisms of how
ethical leadership influences employees’ ISP violation intention through two separate
paths. The research model and hypothesized relationships among constructs are shown in
Figure 1.

There are two important pillars consisting of the role of ethical leadership, including
conceptualizing an ethical leader as a moral person and a moral manager (Treviño et al., 2000).
A moral person is a leader who can be trusted and who will make decisions in a fair and
balanced way, while a moral manager is a leader who frequently conveys ethics to employees
through two-way communication and disciplines unethical behaviors (Treviño et al., 2000).
In the following section, we presented the development of hypotheses based on the previous literature and discuss the roles of a moral person and moral manager separately.

**A moral manager: the mediating role of information security climate**

A leader has been identified as a person who is influential and trustworthy among the organization and an effective role model for employees. As a moral manager, an ethical leader could perform a reward and punishment action aligned with his/her moral principles to regulate and influence employees’ behaviors (Brown et al., 2005). Social learning theory suggested that individuals will be influenced by the role models and learn which behaviors are appropriate and acceptable (Bandura, 1977). In the organization, employees will perform and behave by observing behaviors from the role model and learn from people who are influential and creditworthy. Social learning theory also suggests that employees can learn by direct or vicarious experience with the consequences of their actions (Manz and Sims Jr, 1981). Employees might experience their own punishment or witness their coworkers’ actions being punished for violating organizational policy (Bandura, 1977). The corresponding rewards or punishments in the organization can form a shared work climate that highlights the appropriate and acceptable behaviors in the organization and then influence employees’ workplace behaviors.

According to the social learning theory, pertaining research has suggested a positive relationship between ethical leadership and employees’ perception of ethical climate (Mayer et al., 2010) and ethical culture (Schaubroeck et al., 2012). In the information security context, information security climate is defined as “employees” perception of the current organizational state in terms of information security as evidenced through dealings with internal and external stakeholders” (Chan et al., 2005) (p. 25), where the more emphasis and attention related to information security in the organization is perceived by employees, the stronger information security climate will be. As the authorized party in the organization, the leader can perform the punishment and reward action toward the employee based on the established ISP to regulate the employees’ ISP compliance behavior (Lebek et al., 2014). By observing and witnessing the rewards and punishments of corresponding security behaviors, the collective effect of employees’ ethical perceptions creates a climate that emphasizes the importance of information security and shows what type of security behaviors are acceptable to the organization. Thus, we hypothesize that:

**H1.** Ethical leadership positively influences employees’ perception of information security climate.

In addition, previous research found that organizational climate and ethical culture play important mediating roles in the relationships between ethical leadership and employees’ behaviors (Demirtas and Akdogan, 2015). For example, Mayer et al. (2010) suggested that the
relationship between ethical leadership and employees’ misconduct behavior is mediated by ethical climate. Previous research suggested that ethical climate could provide cues about whether behaviors are acceptable or not in the organization and negatively influences employees’ unethical behaviors (Demirtas and Akdogan, 2015). In this research, we argue that information security climate also conveys information to employees about what behaviors are inappropriate and plays a mediating role.

Previous studies have investigated the effect of information security climate on employees’ information security behavior. For example, Chan et al. (2005) and Goo et al. (2014) found that information security climate positively influences employees’ policy compliance behavior. An ethical leader, as a moral manager, rewards appropriate security behaviors and disciplines the inappropriate security behaviors in the organization. The rewards and sanctions enforced ethical standards (Brown et al., 2005). Employees will learn how past violation behavior was disciplined and shape the shared understandings about ISP, that is, information security climate. When employees perceived a stronger information security climate, they are less likely to violate ISP. Previous research suggested that a leader in the organization will influence followers’ behavior by creating a climate that emphasizes the rule and policy (Wimbush et al., 1994). Thus, we hypothesize:

H2. Information security climate mediates the relationship between ethical leadership and employee ISP violation intention.

A moral person: the mediating role of affective commitment
From the perspective of a moral person, an ethical leader influences employees’ behaviors through reciprocity (Brown et al., 2005). A moral person is honest, integral, just and can be trusted (Brown et al., 2005), where employees perceive positive treatment from their leader. Ethical leaders who are responsible for coordinating work, evaluating employees’ performance and assigning resources are regarded as agents of the organization (Eisenberger, et al., 1986). Therefore, the exchanged benefits occur between employees and the organization. Previous studies have found a positive relationship between ethical leadership and employees’ positive organizational behaviors based on social exchange theory (Kacmar et al., 2011; Mo and Shi, 2017; Newman et al., 2014). According to social exchange theory, employees who received positive treatment from ethical leaders tend to respond with benefits of support or relationship investment (Aryee et al., 2002), and when employees are in a high-quality leader-member exchange relationship, they are more likely to be effective workers (Sparrowe and Liden, 1997). Previous research suggests that employees reciprocate positive treatment from ethical leaders by stimulating the emotional bond employees to develop with the organization, particularly affective commitment (Allen and Meyer, 1990).

Affective commitment is a type of organizational commitment that is emotional and affective in which the individual employee strongly identifies with the organization and wishes to be involved with and part of the organization. The influence of ethical leadership on affective commitment has been well-documented in previous research (Neubert et al., 2009). Previous research suggests that since the moral person focuses on caring for the people, openness to input, integrity and other aspects (Treviño et al., 2000), the employee will perceive more belongingness and affective commitment to the organization because their socioemotional demand has been satisfied (Neubert et al., 2009). Brown and Treviño (2006) also suggested a positive relationship between ethical leadership and follower work attitude and proposed that ethical leaders create follower’s organizational commitment. Following previous evidence, we hypothesize that:

H3. Ethical leadership positively influences employees’ affective commitment.
Furthermore, affective commitment has been considered as a mediating factor influencing the relationship between ethical leadership and employees’ behavior in previous research. For example, Neves and Story (2015) investigated the mediation effect of affective commitment between ethical leadership and employee deviance. Kim and Brymer (2011) found a mediation effect of affective organizational commitment between ethical leadership and employee turnover intention. Previous IS security research has investigated the role of affective commitment to the organization in influencing employees’ security behaviors. For example, Goo et al. (2014) investigated a positive relationship between affective commitment and employees’ ISP compliance intention. Posey et al. (2015) found that affective commitment has a positive impact on employees’ motivation to engage in protective security behavior. Thus, we propose that ethical leadership should influence employees’ ISP violation intention through an increase in affective commitment. We consider that employees who perceived positive treatment from ethical leaders will be more committed to the organization. Employees with a high affective commitment will reduce the ISP violation behavior as a result of reciprocity. Thus, we hypothesize:

**H4.** Affective commitment mediates the relationship between ethical leadership and ISP violation intention.

The interactive effect of information security climate and affective commitment

Although information security climate and affective commitment are treated as distinct pathways for explaining the role of ethical leadership, these two mediating factors might interact to influence individuals’ outcomes. For example, Li et al. (2016) investigated the moderating effect of organizational competitive climate on the relationship between affective commitment and job performance. Tepper et al. (2008) investigated the moderation effect of norms toward organization deviance on the influence of affective commitment on organization deviance.

We argue that the information security climate moderates the effect of affective commitment on employees’ ISP violation behavior. When individuals perceive low affective commitment, they tend to engage in deviant behavior because they experience less emotional attachment and have no sense of belonging to the organization (Neves and Story, 2015). However, not all individuals who perceive low affective commitment will conduct deviant behavior. The effect of affective commitment on employees’ ISP violation intention might be determined by the information security climate.

Information security climate prescribes rules and standards for employees to judge the appropriateness of their security behaviors (Chan et al., 2005; Goo et al., 2014). Employees might learn from the information security climate about rewards or punishments for appropriate and acceptable or unacceptable behaviors in the organization. Individuals with low affective commitment might be likely to violate organizational ISP, but they might not violate it when they perceive a high organizational information security climate. Thus, we hypothesize that:

**H5.** Information security climate positively moderates the negative relationship between affective commitment and employees’ ISP violation intention.

**Methods**

**Sample and procedure**

Data were collected by using a cross-sectional survey developed on Qualtrics and distributed to members of Amazon Mechanical Turk (MTurk), and participants took approximately 8–10 min to complete. The participants were selected based on several criteria. First, participants had to be full-time employees and at least 18 years old. Second, the Human
Intelligence Tasks (HITs) approval rate for participants must be greater than 90%, and the number of HITs approved must be greater than 100. This ensured a high-quality sample pool. Rigorous scale development procedures were followed, and university ethics board approval was obtained. Participants who agreed with the informed consent continued to fill out the questionnaire. Each respondent received USD 1.00 for completing the questionnaire.

A total of 401 participants completed the survey. However, we discarded incomplete responses and excluded participants who did not pass the attention check question. This resulted in 339 responses, which were used for final data analysis. Among the respondents, the proportion of female employees was 46%. A total of 160 of the respondents were between 25 and 34 years old (47.9%) and 179 of them held a four-year university degree (52.8%). The average time they spent in their current organization was 5.99 years, and 184 of them held a position of supervisor, manager or executive in their organization (54.2%).

**Measures**

The measurement scales of ethical leadership, affective commitment, information security climate and ISP violation intention were adapted from previous studies, which were previously validated and empirically tested by the prior studies.

**Ethical leadership.** The items of ethical leadership which were adopted from Brown *et al.* (2005) have been empirically tested by numerous studies in the management field (Bavik *et al.*, 2018; Mo and Shi, 2017; Resick *et al.*, 2013). Respondents were asked to evaluate their perception of ethical leadership of their immediate supervisor. An example item was: “My leader (immediate supervisor) disciplines employees who violate ethical standards.” A five-point Likert scale (1 = “strongly agree” and 5 = “Strongly disagree”) was used. The Cronbach’s alpha was 0.90.

**Affective commitment.** The scale of affective commitment in Allen and Meyer (1990), which has been adopted by several IS security studies (Goo *et al.*, 2014; Sharma and Warkentin, 2019), was used. Respondents rated their perception of affective commitment to the organization using a 5-point Likert scale (1 = “strongly agree” and 5 = “Strongly disagree”). An example item was: “I enjoy discussing my organization with people outside it.” The Cronbach’s alpha was 0.893.

**Information security climate.** Based on the scale widely used in prior research (Chan *et al.*, 2005; Goo *et al.*, 2014; Johnston *et al.*, 2016), we adopted the following steps to adjust the items for the information security climate in this study. First, we developed an introduction to information security climate, using examples that enabled participants to imagine their organizational information security climate. These examples include “When thinking of the following items, please imagine: (for example) your organization’s top management is confident that the compliance of information security is important” or “your direct supervisor considers information security compliance as a key factor in assessing employees” overall performance.” Second, the respondents were asked to respond to five items, such as “My organization can protect its information assets well.” A five-point Likert scale (1 = “strongly agree” and 5 = “Strongly disagree”) was used. The Cronbach’s alpha was 0.865.

**ISP violation intention.** In this research, we tested employees’ behavioral intention instead of actual behavior. This approach is chosen because the actual ISP violation is difficult to be observed by a researcher. Previous research suggests that there may be inconsistency between intention and behavior; however, a large number of studies have found a strong correlation between behavioral intention and actual behavior (Notani, 1998; Sutton, 1998). Therefore, the self-reported behavioral intention is used in this study. The scale for ISP violation intention was adapted from Johnston *et al.* (2016). Participants were randomly assigned to read one of the four scenarios that were borrowed from Johnston *et al.* (2016). Participants read the scenario and were asked to imagine the experience of the individual
whose situation was described in the scenario. Each vignette described a situation where a company employee, named Joe, wants to take company-owned sensitive customer data back home to continue his work, which will violate an organizational ISP. We asked participants to evaluate the likelihood that they would duplicate such behavior under a similar condition if they were the scenario character. This method, widely used in many security behavior studies, reduces social desirability bias, especially when measuring deviant behavioral intention. An example item was: “In this situation, I would do the same as Joe.” We also used a five-point Likert Scale (1 = “strongly agree” and 5 = “strongly disagree”). The Cronbach’s alpha was 0.925. The scenarios have been presented in the appendix section.

In addition, we also tested the response consistency of ISP violation intention across four scenarios. To test the difference, we conducted a one-way analysis of variance (one-way ANOVA) by using SPSS V25. The result showed that the responses were not significantly different among scenarios (p > 0.05), which indicated a response consistency across scenarios.

Control variables. We control for age, gender and employees’ position in this study. According to prior studies, age, gender and employees’ position have been found to be associated with employees’ security behaviors (D’Arcy et al., 2009; Lee et al., 2017; Guo et al., 2011). The results showed age and employees’ position significantly influence ISP violation intention, while gender has no significant effect.

Results
We used AMOS v.24 to test the measurement model and structural model. AMOS is used for covariance-based structural equation modeling, which can simultaneously test latent variables and path coefficients. As recommended by Gefen et al. (2000), we first used confirmatory factor analysis (CFA) to assess the measurement model. We used chi-square divided by degrees of freedom ($\chi^2/df$), the comparative fit index (CFI), the Tucker–Lewis index (TLI) and the root mean square error of approximation (RMSEA) to test the model fit. Then we tested the structural model and estimate the path coefficient using bootstrapping.

Test of the measurement model
The first step was to estimate the measurement model using AMOS. The measurement model fit data well ($\chi^2/df = 1.89$; CFI = 0.96; TLI = 0.95; RMSEA = 0.05). $\chi^2/df < 2$, CFI > 0.90, TLI > 0.90, and RMSEA <0.05 indicate a good model fit (Hu and Bentler, 1999). All factor loadings of items were statistically significant and between 0.66 and 0.92. We used composite reliability and Cronbach’s alpha to assess the reliability. Table 1 shows that the composite reliability was between 0.86 and 0.93, and Cronbach’s alpha was between 0.865 and 0.925, which indicates good reliability (Gliem and Gliem, 2003; Nunnally and Bernstein, 1994). Moreover, we assessed the convergent validity and discriminant validity. The validity was calculated based on the AVE and correlations among constructs. Table 2 showed that correlations among constructs were lower than the square root of AVE, which indicated a good discriminant validity (Fornell and Larcker, 1981). AVE values of all constructs are higher than 0.5, which indicate a good convergent validity in the measurement model.

We followed Podsakoff et al. (2003)’ prescriptions to mitigate the influence of common method bias (CMB). First, we have conducted expert panel reviews to decrease the ambiguity of items and increase the content validity. Second, survey respondents were guaranteed anonymity and were informed that there is no correct or incorrect answer for the survey questions. In addition, questions were randomized to avoid clustering by construct. Further, we performed the unmeasured latent common method to detect CMB. A latent common method variable was included in the model to test for the effect of CMB. We conducted a CFA
to compare the model with and without the latent method variable. The results showed that the difference of chi-square was less than 3.84 before and after the latent method variable was included in the measurement model, which indicates that CMB is not of great concern in this study.

Table 1. Confirmatory factor and reliability analysis

| Constructs | Standardized factor loading |
|------------|----------------------------|
| Affective commitment (Allen and Meyer, 1990) | C.R. = 0.86 |
| 1. I would be very happy to spend the rest of my career with this organization | 0.78 * |
| 2. I enjoy discussing my organization with people outside it | 0.70 |
| 3. I really feel as if this organization’s problems are my own | 0.70 |
| 4. I do not feel like “part of the family” at my organization | 0.70 |
| 5. I do not feel “emotionally attached” to this organization | 0.66 |
| 6. This organization has a great deal of personal meaning for me | 0.86 |
| 7. I do not feel a strong sense of belonging to my organization | 0.66 |

ISP violation intention (Johnston et al., 2016) | C.R. = 0.93 |
| 1. In this situation, I would do the same as Joe | 0.92 * |
| 2. If I were Joe, I would have also skipped the procedure | 0.86 |
| 3. I think I would do what Joe did if this happened to me | 0.92 |

Information security climate (adapted from Goo et al., 2014) | C.R. = 0.86 |
| 1. My organization can protect its information assets well | 0.72 * |
| 2. The information assets in our organization could be protected well | 0.66 |
| 3. Protecting information assets is a critical concern in my organization | 0.70 |
| 4. Information security is important to my organization | 0.80 |
| 5. Information security protection in my organization has been well-developed | 0.83 |

Ethical leadership (Brown et al., 2005) | C.R. = 0.92 |
| My leader (immediate supervisor) … | |
| 1. listens to what employees have to say | 0.80 * |
| 2. conducts his/her personal life in an ethical manner | 0.68 |
| 3. has the best interests of employees in mind | 0.86 |
| 4. makes fair and balanced decisions | 0.89 |
| 5. can be trusted | 0.86 |
| 6. discusses business ethics or values with employees | 0.69 |
| 7. defines success not just by results but also the way that they are obtained | 0.70 |
| 8. when making decisions, asks “what is the right thing to do?” | 0.74 |

Note(s): Model Fit Statistics ($\chi^2 = 450.96$, DF = 239, CFI = 0.959, TLI = 0.953, RMSEA = 0.05); *Items constrained for identification purpose; CR = Composite Reliability

Table 2. Correlations, means and average variance Extracted (AVE)

| Constructs | AVE | Mean | SD | Affective commitment | Ethical leadership | Information security climate (ISC) | ISP violation intention |
|------------|-----|------|----|-----------------------|-------------------|-----------------------------------|------------------------|
| Affective commitment | 0.525 | 2.623 | 1.031 | 0.725 | | | |
| Ethical leadership | 0.577 | 2.005 | 0.879 | 0.605 | 0.759 | | |
| Information security climate | 0.554 | 1.774 | 0.762 | 0.386 | 0.517 | 0.744 | |
| ISP violation intention | 0.806 | 3.936 | 1.171 | 0.134 | -0.203 | 0.302 | 0.898 |

Note(s): The square root of AVE is loaded on diagonal
Test of the structural model

With an adequate measurement model, we next used AMOS to test the structural model and hypotheses. Results show that the structural model fits the data well ($p < 0.001; \chi^2/\text{df} = 1.90; \text{CFI} = 0.96; \text{IFI} = 0.96; \text{RMSEA} = 0.05$). Figure 2 shows the result of our research model testing. Hypotheses 1 and 3 proposed positive relationships between ethical leadership and information security climate, and affective commitment. The results showed that ethical leadership was positively associated with information security climate ($b = 0.523, p < 0.001$) and was also positively associated with affective commitment ($b = 0.609, p < 0.001$). Thus, hypotheses 1 and 3 were supported. Table 3 shows the summary of hypotheses testing.

To test the mediation effects of information security climate and affective commitment, we conducted the mediation test by following Zhao et al. (2010), which assessed the indirect effect by examining the product of A path and B path while controlling the direct effect of C path. Consistent with hypothesis 2, the results showed that the indirect effect of ethical leadership on ISP violation intention through information security climate was significant ($B = -0.198, p < 0.05$) and the confidence interval is between $-0.320$ and $-0.107$. There was no remaining significant direct effect between ethical leadership and ISP violation intention ($B = -0.095, p > 0.05$). The result indicated that the relationship between the ethical leadership and ISP violation intention is fully mediated by the information security climate. Hypothesis 4 proposes the indirect effect of affective commitment. However, the results indicated that the indirect effect of ethical leadership on ISP violation intention through affective commitment

![Figure 2. Results of model testing](image-url)

Note(s): ***$p < 0.01$

| Hypotheses                                                                 | Supported? | Path coefficient | p-value |
|---------------------------------------------------------------------------|------------|------------------|---------|
| Hypothesis 1: Ethical leadership → information security climate            | Yes        | 0.523            | $p < 0.01$ |
| Hypothesis 2: Ethical leadership → information security climate → ISP violation intention | Yes        | $-0.198$         | $p < 0.01$ |
| Hypothesis 3: Ethical leadership → affective commitment                   | Yes        | 0.609            | $p < 0.01$ |
| Hypothesis 4: Ethical leadership → affective commitment → ISP violation intention | No         | 0.007            | $p > 0.05$ |
| Hypothesis 5: Information security climate * affective commitment → ISP violation intention | Yes        | 0.167            | $p < 0.01$ |
| Gender → ISP violation intention                                          | _          | $-0.029$         | $p > 0.05$ |
| Age → ISP violation intention                                             | _          | $-0.183$         | $p < 0.01$ |
| Position → ISP violation intention                                        | _          | 0.374            | $p < 0.01$ |

Table 3. Results of hypotheses testing
was insignificant \((B = 0.007, p > 0.05)\), and the confidence interval was between \(-0.110\) and \(0.126\).

Hypothesis 5 proposed the moderation effect of ISC on the influence of affective commitment on ISP violation. The results showed that the information security climate significantly and positively moderated the relationship between affective commitment and ISP violation intention \((B = 0.167, p < 0.05)\). The results in Figure 3 indicated that the negative influence of affective commitment on ISP violation intention was enhanced when the information security climate was at a high level. Hence, hypothesis 5 was supported.

Discussion
This research identifies the role of ethical leadership under information security context and estimated the effect of ethical leadership on employees’ ISP violation intention. We investigated the role of ethical leadership from two distinct perspectives. Based on social learning theory and social exchange theory, this research identified two different mediators: affective commitment and information security climate. We argue that, as a moral person, ethical leadership influences employees’ ISP violation intention through affective commitment. As a moral manager, ethical leadership influences employees’ ISP violation intention through information security climate.

In particular, we found that ethical leadership has a positive influence on information security climate and affective commitment. In addition, the effect of ethical leadership on employees’ ISP violation intention was fully mediated by the information security climate. We also demonstrated the interactive effect of information security climate and affective commitment on ISP violation intention. That is, information security climate enhances the negative influence of affective commitment on ISP violation intention. These findings have engendered several important theoretical and practical implications.

Theoretical implications
Our findings provide contributions to ethical leadership and information security research in the following ways. First, our results supported the hypothesis that ethical leadership negatively influences employees’ ISP violation intention. Although previous research has demonstrated the effects of ethical leadership on employees’ deviant behavior (Demirtas and Akdogan, 2015; Kim and Brymer, 2011; Stouten et al., 2013), the influence of ethical leadership on employees’ information security behavior has not been thoroughly investigated. In this research, we contribute to a specific research context of information security, and we investigate how ethical leadership influences employees’ ISP violation intention. We believe this is also the first study to shed light on such relationships; hence, our research opens a new

![Figure 3. Moderation effect of information security climate on the relationship between affective commitment and ISP violation intention](image)
pathway for future research to investigate how different leadership styles can influence employees' ISP violation intention and illustrates how ethical leadership differs from other leadership styles in the context of information security.

Second, while previous studies have investigated the effects of ethical leadership on employees' workplace behavior (Lu and Lin, 2014; Mayer et al., 2010; Mo and Shi, 2017; Stouten et al., 2013; Toor and Ofori, 2009), there has been a dearth of research into the effects of ethical leadership from both moral person and moral manager perspectives. In the context of information security, we tested those two paths separately and found that ethical leadership influences employees' ISP violation intention through information security climate rather than affective commitment. As a moral manager, the ethical leader plays a critical role in generating organizational climate and norms to influence employees' security behaviors. Our results found that moral managers may be more important in the context of information security.

Finally, our findings highlight the importance of the interactive effects of information security climate and affective commitment. Although the moral manager and the moral person are regarded as distinct pathways for explaining the role of ethical leadership (Brown et al., 2005; Ruiz et al., 2011; Treviño et al., 2000), the interactive effects have not been investigated. We found that information security climate positively moderates the effect of affective commitment on employees' ISP violation intention. Employees who perceive a high level of information security climate pay more attention to the rules and norms governing organizational security requirements. In a high information security environment, employees with low affective commitment may not intend to violate ISP.

**Practical implications**
In practical terms, information security protection is a critical agenda item for organizations. Our findings provide recommendations for improving information security in organizations. We found that the organization should create high ethical standards for managers. Managers are important model examples to inspire subordinates to reduce unethical behaviors. A manager with higher ethical and moral standards can help employees learn how to behave morally in the organization and reduce deviant behaviors, including ISP violations. Therefore, it is important to raise leaders’ and top management’s ethical standards. For example, organizations should require managers to comply with the ISP and set a good example for employees. Also, managers are expected to provide feedback mechanisms for employees to express and share their security concerns or suggestions since it is important for ethical leaders to obtain employee feedback.

Second, our study indicates a critical role of information security climate in reducing organizational security-related deviant behaviors. Therefore, organizations could make greater efforts to improve their organizational information security climate. For example, the organization should encourage employees to participate in security training and education programs to improve employees' understanding of organizational information security protection. Furthermore, more resources could be investigated and allocated to information security climate-related areas to highlight the importance of information security in organizations, thereby raising employees' perceptions of information security climate and intention of ISP compliance.

Third, our findings indicate that information security climate (from the perspective of moral manager) does not significantly influence ISP violation intention but significantly moderates the effect of affective commitment (from the perspective of moral person) on employees' ISP violation intention. This result implies that simply improving employees' affective commitment may not be useful in influencing employees' security behaviors; instead, the organization should consider the interactive effects of factors from a moral
manager and a moral person. For example, top executives of the organization should
demonstrate themselves not only as moral administrators but also as moral people to
influence subordinates' information security behaviors. Using authorized power ethically
and properly in organizations will help leaders increase followers' organizational
commitment and other positive outcomes while decreasing employees' information
security violation behavioral intentions.

**Limitation and future research**
This research contributes to information security and ethical leadership literature; however,
it has several inevitable limitations. First, this research used a cross-sectional survey to
collect data. Although we found no evidence of common method bias, we cannot completely
mitigate it. A longitudinal study or a method with multiple stages is recommended for future
research.

Second, this research relied on self-reported intention rather than actual security behavior.
The use of self-reported intention may have the social desirability effect, especially for
violations of security policy. In addition, previous research has cautioned about the use of
intentions as a proxy for actual behavior (Alec Cram et al., 2019; Siponen and Vance, 2014;
Crossler et al., 2013; Warkentin et al., 2012). Future research could collect data on employees'
actual security behavior and estimate the effect of ethical leadership on actual security
behavior.

In light of findings that information security climate plays a complete mediating role in the
relationship between ethical leadership and ISP violation intention. Future researchers
should explore other important mediators, such as psychological capital. In addition, our
research found that affective commitment has no mediation effect. However, previous
research has identified the importance of affective commitment (Goo et al., 2014). The role of
affective commitment should be paid more attention in further study. In addition, other
factors, such as leadership member exchange, should be considered in future research.

Our research shows the moderating effect of information security climate on the influence
of affective commitment on employees' ISP violation intention. Future research could look
into the moderating effects of different psychological variables from the perspective of a
moral manager and a moral person such as moral identity and perceived interpersonal
justice. The interactive effects could play an important role in improving the understanding
of the role of ethical leadership.

This research investigates the role of ethical leadership in explaining employees' ISP
violation intention. Future research can explore the relationship between ethical leadership
and other types of security behaviors, especially extra-role security behavior, such as voice
and helping behavior. There has been no research into the impact of ethical leadership on
ethical security behaviors.

**Conclusion**
This study extended academic work on ethical leadership to the field of information security
and investigated the role of ethical leadership in influencing employees' ISP violation
intention through a dual-mediation effect. Data collected from 339 employees demonstrated
the influences of ethical leadership on employees' ISP violation intention by increasing
perception of information security climate and affective commitment. Moreover, this study
found the moderating effect of information security climate on the influence of affective
commitment on ISP violation intention. The findings provided a management guide for
organizational top management from both theoretical and practical lenses and highlighted
the importance of ethical leadership within the information security context.
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Appendix

Violation scenarios (adopted from Johnston et al., 2016)

Scenario 1: Joe has just collected sensitive customer data for his company, and he wants to take that data home to continue his work. He knows his company requires that he request a password to be issued and applied to all data before taking it out of the office on a USB drive so that it cannot be accessed by an unauthorized individual. Regardless, the password procedure takes several minutes, and he needs to leave now, so he skips the procedure. Joe believes his chances of being caught are low, but if caught, the punishment would be minimal.

Scenario 2: Joe has just collected sensitive customer data for his company, and he wants to take that data home to continue his work. He knows his company requires that he request a password to be issued
and applied to all data before taking it out of the office on a USB drive so that it cannot be accessed by an unauthorized individual. Regardless, the password procedure takes several minutes, and he needs to leave now, so he skips the procedure. Joe believes his chances of being caught are low, but if caught, the punishment would be severe.

Scenario 3: Joe has just collected sensitive customer data for his company, and he wants to take that data home to continue his work. He knows his company requires that he request a password to be issued and applied to all data before taking it out of the office on a USB drive so that it cannot be accessed by an unauthorized individual. Regardless, the password procedure takes several minutes, and he needs to leave now, so he skips the procedure. Joe believes his chances of being caught are high, but if caught, the punishment would be minimal.

Scenario 4: Joe has just collected sensitive customer data for his company, and he wants to take that data home to continue his work. He knows his company requires that he request a password to be issued and applied to all data before taking it out of the office on a USB drive so that it cannot be accessed by an unauthorized individual. Regardless, the password procedure takes several minutes, and he needs to leave now, so he skips the procedure. Joe believes his chances of being caught are high, but if caught, the punishment would be severe.

About the authors
Botong Xue is a Ph.D. Candidate of Business Information Systems in the College of Business at the Mississippi State University. He received his master’s degree in MS&ISA from the University of New Mexico. He has published research papers in The DATA BASE for Advances in Information Systems and Journal of Database Management, and several conference papers. His research focuses on areas including individual information security behavior, cross-cultural information system study, organizational culture, and organizational leadership.

Feng Xu is a Ph.D. Candidate of Business Information Systems in the College of Business at the Mississippi State University. He has been a visiting Ph.D. student at Anderson School of Management of the University of New Mexico. He received his Ph.D. degree in management science from Xi’an Jiaotong University, China. His research interests center around behavioral information security and information security investment. He has published research papers in Information & Management, Journal of Computer Information Systems, The DATA BASE for Advances in Information Systems, Information Systems Frontiers, Journal of Database Management, and Journal of Electronic Commerce Research.

Xin Luo is Endowed Regent’s Professor and Full Professor of MIS at the University of New Mexico. He received Ph.D. in MIS from Mississippi State University. He has published in leading IS journals, including Information Systems Research, Journal of the Association for Information Systems, European Journal of Information Systems, Information Systems Journal, Journal of Strategic Information Systems, Decision Sciences, Decision Support Systems, Information & Management, and IEEE Transactions on Engineering Management. He is an Associate Editor for Journal of the Association for Information Systems, Decision Sciences, Information & Management, Electronic Commerce Research, and Journal of Electronic Commerce Research. Xin Luo is the corresponding author and can be contacted at: xinluo@unm.edu

Merrill Warkentin is the James J. Rouse Endowed Professor of Information Systems in the College of Business and a William L. Giles Distinguished Professor at Mississippi State University. His research, primarily on the impacts of organizational, contextual, and dispositional influences on individual behaviors in the context of information security and privacy and in social media, has appeared in MIS Quarterly, Journal of MIS, Journal of the AIS, European Journal of Information Systems, Information Systems Journal, Decision Sciences, among others. He is the author or editor of seven books, and has authored or co-authored over 300 published manuscripts.

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