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A Study of Employee Proactive Motivation and Proactive Security Behavior

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ABSTRACT

Proactive security behavior (PSB) is important in strengthening the information security posture of organizations. We draw upon the proactive motivation literature to identify the motivational factors that may underlie PSB. On that basis, we develop a preliminary research model comprising three hypotheses which pose that felt responsibility for constructive change (FRCC), role-breadth self-efficacy (RBSE), and positive affect (PA) positively influence PSB. We conduct a survey of US-based employees and test our model. Our results show that FRCC and RBSE are significant drivers of PSB, and that FRCC is more robust to any control effects. In future research steps, we plan to examine whether user participation in information security policy design and other related activities enhances FRCC. We plan to do so by conducting an experiment.

Keywords

Proactive security behavior, extra-role security behavior, proactive motivation theory, behavioral information security.

INTRODUCTION

Inadequate security behavior by employees can be harmful to organizations and the economy. Previous research has investigated the factors that motivate employees to comply with information security policies and the factors that prevent them from violating these policies (e.g., D'arcy & Herath, 2011; Menard et al., 2017). Employees' compliance with information security policies and taking the necessary protective measures are important for ensuring organizational information security. This behavior is known as in-role security behavior, which primarily comprises the security behaviors and actions formally required by organizational information security policies. However, recent research (Chen & Li, 2019; Davis et al., 2021; Nehme & Marler, 2023) considers the importance of extra-role security behavior, also referred to as proactive security behavior (PSB). This behavior refers to a set of voluntary actions by employees that serve organizational information security and go beyond what is required by their organizational policies. PSBs can take various forms. One form is stewardship, which may involve warning others about potential threats such as phishing emails. Another form is helping, which may for example involve showing others how to perform specific security actions. Reporting is yet another form of PSBs; this may for instance involve notifying someone in authority about a potentially harmful behavior. Finally, voice is also a PSB form, and it may entail suggesting new information security policies or bringing new information threats to management's attention.

Engaging in PSB would help organizations defend against both internal and external information threats and improve their security posture in the rapidly changing and dynamic cyber landscape. Employees' PSB is particularly important as emergent information threats hold complexities that may exceed the scope of current information security policies. By taking the extra step, employees can contribute to the overall information security of the organization and mitigate the risk of potential information threats. Motivated thus, we drew upon the proactive motivation literature to identify the motivational factors that may underlie PSB. On that basis, we developed a preliminary research model comprising three hypotheses and tested it with survey data we collected from US-based employees.

Our results show that feeling responsible for bringing about constructive change to the organization and believing in one's ability to perform different organizational roles and tasks within jobs drive employees to engage in PSBs. We discuss these results and our future directions for this research in the rest of this paper.

LITERATURE & THEORY

The information systems literature has recently acknowledged the importance and thereby turned attention to studying employees' PSB. Several studies have examined the factors that underlie PSB using different theories such as organizational citizenship theory (Lin et al., 2022), event system theory (Hu et al., 2021), stewardship theory (Ogbanufe et al., 2021), and social control theory (Hsu et al., 2015). Our study in this paper extends the literature by using the model of proactive motivation

(Parker et al., 2010; Parker & Wang, 2015), also known as Proactive Motivation Theory (ProaMT[1]), to explain employees' engagement in PSB.

ProaMT poses that three proactive motivational states, namely "can do," "reason to," and "energized to," motivate employees to engage in organizational proactive behaviors (Parker et al., 2010). "Can do" motivation is grounded in expectancy-based theories, which focus on the importance of self-efficacy and locus of control that are powerful in driving people toward accomplishing tasks and achieving goals. "Reason to" motivation is grounded in self-determination theory and other goal theories; it is the state that gives an individual a reason to take a proactive action. "Energized to" motivation is grounded in affect theories and underscores importance of emotion and affect in driving people toward a certain action. These three states are commonly reflected by the three following constructs, respectively: felt responsibility for constructive change (FRCC), role-breadth self-efficacy (RBSE), and positive affect (PA). FRCC refers to an individual's perception that they have a duty or obligation to make positive and meaningful changes in their organization (Morrison & Phelps, 1999). A person with high FRCC would have a high sense of personal responsibility and agency to continually and create a constructive and productive work environment (Fuller et al., 2006). RBSE refers to the extent to which employees believe they are capable of performing a wider range of tasks in their work that go beyond their prescribed duties (Parker et al., 2010). A person with high RBSE would have confidence in their ability to adapt and take on new responsibilities in their job beyond what is required. PA refers to the degree to which individuals experience positive moods and emotions such as joy, interest, and alertness. A person with high PA would be more likely to set proactive goals and initiate changes for better outcomes.

The three constructs of FRCC, RBSE, and PA have been substantially considered in the management literature to explain different proactive behaviors in different organizational contexts, such as sharing negative information (e.g., Marler et al., 2021) and voice behavior (e.g., Fuller et al., 2006). We expect that ProacMT holds in the information security context. As illustrated in Figure 1, we hypothesize that FRCC, RBSE, and PA are positively related to PSB. To avoid redundancy and to be brief, we state our hypotheses in short form.

Hypotheses (H1-H3). (H1) FRCC, (H2) RBSE, and (H3) PA positively influence PSB.

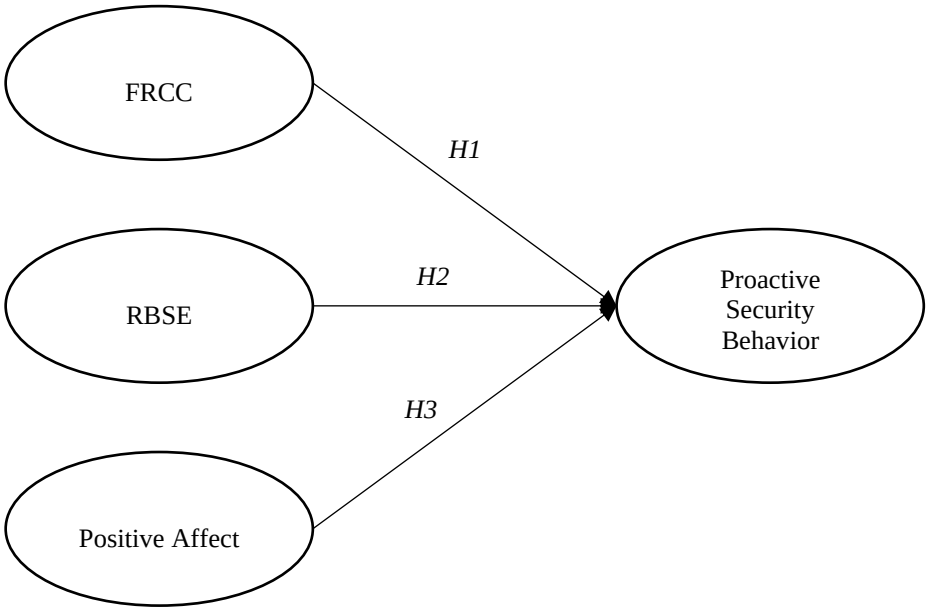

Figure 1. Research Model

[1] We use the acronym ProacMT not "PMT" to avoid confusion with Protection Motivation Theory (Rogers, 1975) which is substantially used in the information security literature (e.g., Nehme & George, 2022) and is commonly referred to as PMT.

Our research model also accounts for different control variables. We include the latent factor of "perceived risk," defined as employees' perceptions of the extent to which information threats put their organizations at risk. We also include employees' professional and organizational tenures. Other controls include security awareness, security training exposure, income, age, education, and gender.

METHOD

To test our hypotheses, we conducted an online survey of employees in the US on Prolific. We obtained 351 observations and after filtering out ones with failed attention checks retained 347 for our data analysis. In our sample, 64.27% of the respondents identified as male. The sample's median age, median income bracket, and median education were 35-44 years, $50k-$70k, and a 4-year college degree. 18.37% (33.14%) of the respondents reported to have been in their current profession (organization) for 1 to 3 years, while 32.38% (17.58%) have been in their current profession (organization) for 13 years or more.

Regarding our survey questionnaire, we adapted our measurement scales for all latent constructs from the relevant literature. All our construct scales had more than five items measured on a 1-7 "strongly disagree - strongly agree" Likert scale. Example items are (1) "I feel confident to present information to a group of colleagues at work." for the RBSE scale, (2) "I feel a personal sense of responsibility to bring about change at my work." for the FRCC scale, (3) "I feel enthusiastic toward my work." for PA, (4) "I have voluntarily helped others in my organization to learn about the work related to information security policies." for PSB, and (5) "Not following computer security rules in my organization poses a threat to my organization." for PR.

DATA ANALYSIS & RESULTS

To analyze our data, we used covariance-based structural equation modeling (CB-SEM) in Mplus. We first assessed our measurement model by conducting confirmatory factor analysis (CFA) and then estimated our structural model. Our CFA model had adequate fit with $\chi^2/df = 2.18$, RMSEA = 0.058, CFI = 0.958, TLI = 0.954, and SRMR = 0.047. All our constructs demonstrated adequate psychometric properties. Specifically, all constructs had composite reliability scores far above 0.7, thereby exhibiting reliability (Nunnally & Bernstein, 1994). Constructs' convergent validity was also established as all item loadings on their respective constructs were far above 0.707 ($p<0.00$) and all constructs' average variance extracted (AVE) values were above 0.5. Lastly, all constructs exhibited discriminant validity as each's square root AVE was higher than its inter-construct correlations, thereby meeting the Fornell-Larcker criterion (Fornell & Larcker, 1981; Nunnally & Bernstein, 1994).

We estimated our structural model with and without controls. Model fit indices for the one sans control variables were the following: $\chi^2/df = 2.55$, RMSEA = 0.067, CFI = 0.955, TLI = 0.949, and SRMR = 0.05. The results are illustrated in Table 1. As can be seen, the model without controls exhibited significant path effects for H1 (i.e., FRCC→PSB) with $\beta = 0.51$ ($p<0.001$) and H2 (i.e., RBSE → OSB) with $\beta = 0.14$ ($p < 0.05$). The path for H3 (i.e., PA → PSB) was not significant. In this model, the factors explained 36% variance in PSB. When the controls were accounted for, H2's path rendered less significant. This indicates that the effect of FRCC on PSB is more robust to control effects than that of RBSE. The only control variable that had a significant effect on PSB was gender (male) with $\beta = 0.20$ ($p<0.001$). All other control effects were not significant. The variance explained in PSB when controls were accounted for became 41%. Overall, the results indicate that H1 and H2 were supported, whereas H3 was not.

To investigate H3's path non-significance, we ran a model with only PA and PSB in a post-hoc analysis. The results showed that PA had a statistically significant effect on PSB with $\beta = 0.33$ ($p<0.001$) and $R^2 = 0.11$. This reveals that when the other explanatory factors (i.e., FRCC and RBSE) were added, PA lost its significance. This is due to the substantial shared covariance among the three exogenous factors, wherein FRCC's correlation (r) with RBSE was 0.66 and PA's r with each of RBSE and FRCC was 0.56.

	Model Without Controls	**Model With Controls**
Path	**Coefficient Estimate**	
H1. FRCC → PSB	0.51***	0.53***
H2. RBSE → PSB	0.14*	0.11^
H3. PA → PSB	-0.03 ns	-0.02 ns
	R^2	
PSB	0.36	0.41

Table 1. Model Results
(Note: ^ p <0.1; * p < 0.05; ** p <0.01; *** p < 0.001)

DISCUSSION AND MOVING FORWARD

Our results confirm the theoretical underpinnings of proactive motivation in different ways. First, our results align with the literature's view that the two motivational states of "can do" and "reason to" (vs. "energized to") are particularly important given their high explanatory power (Fuller et al., 2012; Parker et al., 2010). Second, our finding that FRCC has the most robust effect on PSB aligns with the theoretical views that out of the proactive motivational three states, "can do" is the most significant (Parker et al., 2010) as it provides individuals with a rationale for performing proactive actions prior to evaluating the feasibility of the task (Eccles, 2009; Eccles & Wigfield, 2002).

Moving forward, we plan to mainly focus on FRCC as the most important and robust driver of PSB. We plan to examine what drives FRCC. In particular, we plan to draw upon the theoretical proposition set forth by Nehme & Marler (2023) that users' participation in the development and design of information security policies and related activities drive FRCC which would further drive PSB. We plan to devise and conduct an experiment in this regard.

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