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Prasanthi Yepuru

National Sun Yat-sen University, santhimis2017@gmail.com

Jack Shih Chieh Hsu

National Sun Yat-sen University, jackshsu@mis.nsysu.edu.tw

Yuzhu Li

University of Massachusetts Dartmouth, yuzhu.li@umassd.edu

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Dealing with Security Related Stress: Mindfulness on Countermeasures

Research-in-Progress

Prasanthi Yepuru

Institute of Information Management
National Sun Yat-sen University, Taiwan
santhimis2017@gmail.com

Jack Shih-Chieh Hsu

Institute of Information Management
National Sun Yat-sen University, Taiwan
jackshsu@mis.nsysu.edu.tw

Yuzhu (Julia) Li

Department of Decision and Information Sciences
University of Massachusetts Dartmouth, USA
yuzhu.li@umassd.edu

Abstract

Contemporary knowledge workers face information security-related stress and often struggle with responding to security threats. Employees deal with stress using different coping strategies. Some adopt avoidance coping mode to dissociate themselves with stress while some adopt approach coping mode to actively solve problems. We propose that being mindful on countermeasures of information security threats can ease stress and the negative impacts caused by stress. In addition, we also hypothesize the moderating effect of mindfulness on the relationships between security-related stress and two coping modes.

Keywords: Mindfulness on Countermeasures, Security related stress, Approach coping mode, Avoidance Coping mode

Introduction

According to the Richardson (2008) survey, the computer-security-related loss was consecutively increasing in 2002-2008 from \$288,618 from \$345,005. One major threat to companies' information security is individual carelessness (Loch, Carr, & Warkentin, 1992). Due to the pressure from the stakeholders, the U.S. state government took some security changes and implemented the changes to the regulations and standards (Chen, Ramamurthy, & Wen, 2012). Organizations also create and implement information security policies (ISP) to assure information. Information can be better secured when employees comply with these policies. However, employees may find the compliance of these policies stressful when doing so means increasing workload, complexity, and uncertainty. In addition, employees tend to deliberately violate information security policy (D'Arcy et al., 2014).

Stress has been discussed intensively in the psychology literature and is one of the most abiding topics (Rodell, & Judge, 2009). Psychology literature points out that individuals may cope stress in avoidance and approach modes (Roth and Cohen, 1986). These two modes represent the state of toward or away from stress. Individuals act on the external or internal source of stress with approach mode and try to reduce the emotional distress associated with a stressful encounter with avoidance mode (Boekaerts, 1993). Since these two modes are not mutually exclusive, following studies include both in one model and argue that the level of stress is positively associated with avoidance mode and negatively associated with approach mode. It is noticeable that, avoidance coping mode toward information security in an organization context is less preferred because it simply allows individuals to be dissociated with the

stress or threat but not actively face it and solve the problem. Since stress may drive individuals to the avoidance mode and deviate from the approach mode, reducing stress or ease its unwanted impacts are therefore crucial.

Information security awareness, an individual's knowledge of particular security threats and the potential countermeasures against those threats, has been shown to be one critical factor in information security area (e.g., Siponen 2000; Bulgurcu et al., 2010). For example, from deterrents perspective, individuals are more likely to comply with information security when they are aware of security policy, consequences of violating security policies, and their own responsibility (D'Arcy et al., 2009). Based on protection motivation theory, individuals possess higher self-efficacy and response efficacy when they are aware of coping approach (Hanus and Wu, 2016). However, in addition, to be aware of the threat and countermeasures, recent studies highlight the importance of mindfulness (e.g. Wirth et al., 2017). Mindfulness is a flexible cognitive state of an individual which is caused in pulling novel varieties from a number of issues in the environment (Langer 1989). Individuals being in a state of mindful are therefore in an aware state of being. In addition to being aware of the threats passively, mindfulness highlights the importance of actively seeking novelty, knowing the change of environment, produce new knowledge, and take a different perspective (Langer 1989).

In summary, the objective of the study is to examine how mindfulness can diminish the impact of stress and lead workers to select distinctive coping modes. We argue that mindful individuals tend to be more approach-oriented and less avoidance oriented because (1) they are less stressful, and (2) even they are stressful, being mindful on threat coping can ease the unwanted consequences.

Theoretical background

The purpose of this study is to understand whether mindfulness can ease stress and the unwanted effects of stress on avoidance and approach behavior. In this section, we first introduce security-related stress, information security coping modes, and then the mindfulness concept. We then build the hypotheses for the effects of mindfulness.

Security Related Stressor

Employees face a lot of security-related stress in their work environment with regards to a lot of work, ambiguity, and ramification. For example, high workload makes employees too busy to think about policies and policies are inconvenient to follow (Cisco, 2011). Some researchers suggested that security requirements can backfire and lead to security diminishing behavior due to high demands (e.g., time, effort, frustration) that those requirements impose on employees (Posey et al., 2011; Siponen, 2000; Stanton, 2006). D'Arcy et al (2014) extended the technostress concept to the domain of IS security and explained three conditions—overload, complexity, and uncertainty—in which security requirements can create stress on employees. This form of employees' stress, termed security-related stress (SRS), is a contributor to ISP violations.

For *complexity*, employees require a lot of time and endeavor to learn, perceive, and enforce IS security requirements because the frequent changing demands in work environment alter information security and inflate employee work requirements (Albrechtsen and Hovden 2009). This leads to stress for the employees to deal with it. It also leads to a misunderstanding of information security (D'Arcy et al. 2014). Accordingly, complexity is one of the dimensions of the security-related stress. *Overload* is determined as one of the crucial security-related stress (Li and Shani 1991, Lee et al. 2016). For instance, when employees need to care about a vast number of passwords, they should be varied and acquiesce with organization's security policy and emails encryption and decryption before reading or sending accordingly. Password protection is very difficult in the organization because of a lot of passwords to remember so employees save their passwords by using sticky notes (Albrechtsen 2007). Employees are compelled to work very quickly to accomplish their actual works in time. Work quality decreases additionally when they have to work for long hours. For *uncertainty*, fast-developing technology becomes a stressor to information system employees (Weiss 1983). These technology

changes lead to new requirements in the security policies and raise employees' workload because employees need frequently update their security knowledge (D'Arcy et al. 2014).

In addition to the above three stressors, Lee et al. (2016) added privacy invasion as one type of stressor. Knowing that complying with security policy allows the organization to monitor their behavior may introduce stress to the employees. Recently, Ament and Haag (2016) extended past studies and classified the stressors to work environment related (including complexity, overload, uncertainty), personal environment related (including job insecurity, the degree of freedom, and privacy invasion), and social environment (including conflict and news). Furthermore, they also showed that those stressors might generate both positive and negative impacts on compliance intention.

Mindfulness on Countermeasures

Mindfulness refers to a state of alertness and lively awareness (Langer 1989). Past studies confirm that mindfulness plays a key role in making optimal decisions and achieving high goals in various contexts including high-reliability organizations, clinical research, education, and marketing etc. (Langer 1989, Weick, Sutcliffe, & Obstfeld, 1999). Recently, mindfulness has been examined in IS contexts such as technology adoption (Sun et al., 2016), post-implementation IS adaptation (Aanestad and Jensen, 2016), agile software development (Vidgen and Wang 2009), and IS security (Jensen et al 2017). Mindfulness has four dimensions including active information seeking and processing, constant creation of new categories, awareness of local details, and openness to multiple perspectives (Langer 1989). People with mindfulness tend to actively collect and interpret information and expand action repository.

People with mindfulness on security countermeasures tend to inquire various coping strategies for information security threats. For example, developers are interested in utilizing tools and implementing layers of controls to reduce the negative impact of security threats. Employees with high engagement are likely to collect current coping methods with detailed operations and identify new coping methods and changes and stay opening minded for new coping methods.

Coping (Avoidance and Approach)

Coping refers to people's capacity to oversee stressful perceptions and to manage the offensive events from which those perceptions start (Averill and Rosenn 1972). Employees utilize particular and planned strategies as coping strategies to respond (Anshel et al. 2010). These strategies are constructed based on individual resources such as personal strength, self-control, knowledge, and social relations, etc. People may choose the approach or avoidance modes facing a stressful situation or event. Facing a threat, the approach coping mode including collecting information, acquiring knowledge, getting expert help, etc. focuses on individual thoughts and practices that can reduce the stress or deal with the threat. On the other hand, the avoidance mode gets an employee disengaged with the stressful situation or discounting the impact of the threat. Approach and avoidance coping modes are treated as dispositional traits by some studies (Anshel et al. 2010). This study argues that approach and avoidance coping modes are the results of people's processing of information processing, knowledge, and decision making. Specifically, we propose that mindfulness on security countermeasures can reduce security-related stress, leading to approach and avoidance coping modes. At the same time, mindfulness on countermeasures plays a moderating role in the relationship between security-related stress and the approach and avoidance coping modes. Figure 1 shows the proposed research model.

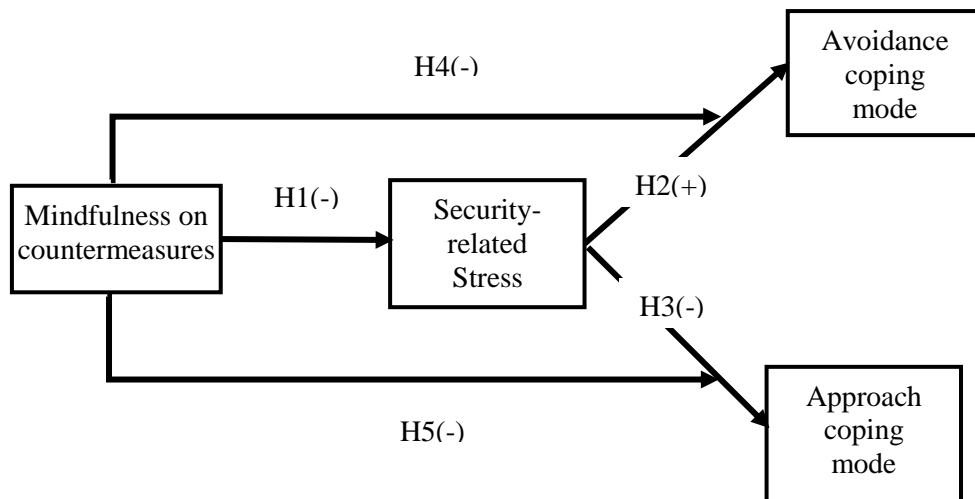


Figure 1. Research Model

Hypotheses Development

Mindfulness is a type of willful awareness, consciousness, or being vigilant in the current moment (Germer, 2005). Mindfulness may increase or decrease stress simultaneously. Mindful employees may be more stressful if they are aware of the severe threats in advance. However, mindful employees can be less stressful if they are aware of the techniques to deal with threats. In this study, we focus on mindfulness on countermeasures - security coping techniques. We argue that mindful individuals are more aware of new countermeasures, the pros, and cons of each countermeasure, and most appropriate countermeasure to be adopted based on the conditions of their organization. By knowing the ways to deal with potential threats and knowing how the countermeasure works, it is less likely for individuals to be stressful. Furthermore, individuals who are mindful also have other positive attributes that allow them to adaptively respond to stress. Lastly, empirical studies in psychology also suggest that mindfulness and stress are negatively related to each other at the within-person level. For instance, Weinstein, Brown, and Ryan (2009) found that day-to-day mindfulness is negatively related to day-to-day stress and trait mindfulness is negatively related to state-level perceptions of stress. Therefore, we hypothesize the following.

H1: Mindfulness on countermeasures is negatively related to security-related stress.

Stressful situations are those appraised as harmful, threatening, or challenging. Individuals may take problem-focused coping mode or emotional focused coping mode to ease stress (Folkman and Lazarus, 1984). Emotional focused/problem focused and avoidance/approach coping are similar (Lazarus, 1966). D'Arcy et al. (2014) argued that security-related stress is positively associated with moral disengagement which, in turn, leads to ISP violations. Based on coping theory, security-related stress is managed by cognitive and behavioral processes through primary and secondary appraisals (Pearsall et al. 2009). In primary appraisal stage, people evaluate whether a precise situation is friendly or harmful (stressful). In the secondary appraisal stage, people evaluate their management over the stressful position. Stress is alleviated through the combination of primary and secondary appraisal (Pearsall et al. 2009). Approach coping mode involves direct efforts to manage or alter the stressful situation. In work situation, these achievements can add ignored obstacles that delay work process or appeal actions to boost one's knowledge and skills. When stress is low, the likelihood for individuals to take approach coping mode is high since threats or problems are relatively easy to deal with. However, as the level of stress grows, the likelihood for individuals to take approach coping mode is reduced because of the difficulty of dealing with those problems or threats increases. Therefore, a negative relationship between stress and approach coping mode is expected.

On the other hand, avoidance coping mode mainly changes the way people think or impress about the stressful situation. It is not associated with problem-solving but only associated with the change of

emotional or cognitive states. When the level of stress is low, individuals may not adopt this coping mode since dealing with the problem is relatively easy. However, as the level of stress grows, individuals tend to believe that solving the problem is hard and, therefore, tend to deal with stress from an emotional or cognitive perspective, instead of from a behavioral perspective. This mode of coping indirectly reducing the stress in short term. We, therefore, propose the following.

H2: Security-related stress is positively related to avoidance coping mode.

H3: Security-related stress is negatively related to approach coping mode.

Mindfulness on Countermeasures as Moderator

Mindfulness is a more flexible emotional state for people to handle many situations (Sun et al. 2016; Langer 1989). Langer (1989) suggested that mindfulness is a state that individuals are more alert and aware. Mindful people take deliberate decisions (Sun et al. 2016). Mindfulness on threat and countermeasures allows individuals to better sense the threats and effectively coping them (Wirth et al. 2017). Mindfulness is negatively related to stress and anxiety (Cole et al. 2015). Previous literature shows that mindfulness is significantly related with job demands, job resources, and stress, and it moderates relationship of emotional demands on psychological stress (Grover et al. 2015).

Stress has a positive impact on avoidance coping mode. We suggest that individuals are more likely to be disassociated with unwanted emotion caused by information security threats. In this section, we further suggest that the positive impact of stress on avoidance coping mode is weaker when individuals are more mindful toward dealing with information security threat. Mindful individuals actively scan new threats and coping technologies, knowing the effect of each coping technology, and understanding the best context for utilizing each technology. In this situation, since they are familiar with the threat and the best way to deal with the threat, even though employees sense certain stress, the likelihood for them to adopt avoidance mode is less because they tend to adopt approach mode to confront those threats. On the other hand, individuals are not familiar with the threats and countermeasures when individuals are less mindful. In this situation, employees tend to adopt avoidance mode because they are not capable of dealing with threats. Therefore, a negative moderating effect is expected.

H4: Mindfulness on countermeasures will moderate the negative relationship between security-related stress and avoidance coping mode such that when mindfulness on countermeasures is high security-related stress will have a weaker relationship with avoidance coping mode.

Stress is expected to reduce the possibility for individuals to adopt approach coping mode to deal with information security threats. We argue that this expectation is especially true when individuals are mindful. As indicated above, mindful employees pay attention to new threats, new ways of coping those threats, and the best timing for each coping method to be utilized. Therefore, even though they are stressed because of encountering threats, employees tend to adopt approach mode to deal with information threats. In contrast, when they are less mindful, individuals are less likely to adopt approach coping mode to deal with the threat. This suggests that the negative impact of stress on approach coping mode is stronger when individuals are less mindful of countermeasures. Therefore, a negative moderating effect is expected.

H5: Mindfulness on countermeasures will moderate the negative relationship between security-related stress and approach coping mode such that when mindfulness on countermeasures is high security-related stress will have a weaker relationship with approach coping mode.

Research Method

We plan to use a survey approach to collect the data from employees who use the computers to support their daily work. The expected sample size is 300. All constructs will be measured with items obtained from past studies. For mindfulness, items used by Thatcher et al. (forthcoming) will be adapted to this study with certain modifications to suit the context of this study. For security-related stress, the measurement will be adopted from Ayyagari et al. (2011) and Lee et al. (2016). Approach and avoidance

coping modes will be measured with the items from Seiffge-Krenke and Shulman (1990). Structural equation modeling (SEM) approach will be adopted for measurement validation and structural analysis.

Conclusion

This study aims to examine how mindfulness can reduce the effect of stress and lead employees to choose different coping modes (approach or avoidance). Through showing the impacts of mindfulness on stress, this study will illustrate one possible approach for employees to ease the stress caused by information security. Through demonstrating the impact of mindfulness on easing the unwanted effects of stress, we will further affirm the importance of being mindful while countering information security threats.

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