



A moderated mediation model of job stress, job satisfaction, and turnover intention for airport security screeners



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1. Introduction

Each day in 2014, roughly 100,000 airplanes were operated and approximately 51.3 million tons of freight transported by air around the world (International Air Transport Association, [IATA], 2015a). Statistics for 2014 reflected a 6% rise in the number of passengers, which rose by another 6.7% in 2015. As air traffic increases, aviation safety becomes even more vital (IATA, 2015b).

Generally, aviation accidents are classified as due to either technical factors or human factors (Skorupski and Uchroński, 2015), and research has shown that more than 70% of these accidents are due to human factors (Moriarty, 2015). Extensive research has targeted what influences humans' perceptions of and emotions about aviation safety, and most of these studies have focused on pilots and air traffic controllers. In modern society, however—in which terrorists are diversifying in their tools and methods—the role of airport security screeners, who are expected to detect threats from passengers and their baggage, is also critical to aviation safety. Of the accidents involving U.S. aircraft between 1990 and 2011, 15% were due to unlawful interference, including terrorism (Oster et al., 2013). This highlights the need for more research on aviation screening systems.

Security screening in aviation is defined as “the application of technical or other means which are intended to identify and/or detect weapons, explosives, or other dangerous devices, articles, or substances which may be used to commit an act of unlawful interference” (International Civil Aviation Organization: ICAO, 2011). The core work of airport security screeners (ASSs) is to detect threats such as explosives that might be concealed in freight using X-rays. To accurately discern such threats in luggage, ASSs must have knowledge-based expertise, including visual knowledge and cognitive processing, as well as the ability to discern image-based factors (Schwaninger et al., 2005).

These skills cannot be acquired through instruction alone. Rather, they can be gained only when expertise is developed through experience and training over a considerable period (Halbherr et al., 2013). Unfortunately, high turnover among ASSs is common in most countries (Coughlin et al., 2002). This implies

that there are few opportunities for advancement for skilled ASSs with years of experience, and, as a result, that there will be a higher proportion of novices who lack experience. Expertise has been proven to increase with experience (e.g., Dreyfus, 2004; Durso and Dattel, 2006; Fitts and Posner, 1967; Hoffman, 1996; Klein et al., 1993). For example, in a study on air traffic controllers (Seamster et al., 1993), controllers with at least 5 years of experience demonstrated superior workload management compared to their newer colleagues. A recent study by Skorupski and Uchroński (2015) also found that performance errors decrease as an ASS's experience increases. The authors investigated the relationship between experience and accuracy in detecting dangerous items, and found that both type A error (failing to identify a baggage image that contains a dangerous item) and type B error (incorrectly mistaking a non-prohibited item for a dangerous item) decline as an ASS gains experience. Although experienced ASSs do not always perform better, it seems clear that the technology to detect threats in three dimensions from a two-dimensional X-ray image requires considerable training and experience. Therefore, the increase in novices due to the high turnover of experienced ASSs could have harmful effects on aviation safety.

In particular, retired airport security screeners could devise methods for loading a threatening device or substance onto an airplane without being detected. Although the increasing numbers of former ASSs may pose a serious threat to aviation security, this scenario has been neglected by researchers.

In this study, we contribute to aviation safety by investigating the role of job-related variables and individual characteristics in turnover intention among ASSs. Specifically, we explore whether job stress increases turnover intention in ASSs and whether job satisfaction mediates the relationship between job stress and turnover intention. In addition, we examine the role of individual motivation as a moderator of this mediation model.

1.1. Job stress, job satisfaction, and turnover intention

Turnover intention (TI) is an employee's likelihood of leaving the organization to which he or she belongs. Increased TI is highly likely to develop into actual turnover (Steel and Ovalle, 1984). According to Mobley's Turnover Process model (1977) and Lee and Mitchell's unfolding model of voluntary turnover (1994), job stress and job satisfaction are important predisposing factors that

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can trigger TI. It has been confirmed that the higher job stress, the higher the TI in diverse occupational groups (e.g., Allisey et al., 2014; Bowling et al., 2015; Kazemi et al., 2015; Kim and Kao, 2014). Job stress is different from general stress, in that it occurs in work settings (Jou et al., 2013). As a result, research on job stress has emphasized work environments and distinct job characteristics that cause stress for employees rather than individual variables.

The Job Demand-Control (JD-C) model (Karasek, 1979) is a job stress model that emphasizes the importance of the external environment rather than individual variables. The model uses “psychological job demand” and “job latitude” as two characteristics that determine the extent of job stress (Karasek, 1979, 1998; Karasek and Theorell, 1990). In the context of the JD-C model, ASSs are expected to experience high levels of stress (Coughlin et al., 2002). This is because security screening involves high job demand with time pressure, in situations in which highly stressed passengers are waiting in line; threats are often difficult to accurately detect with X-rays; the work environment offers low job latitude; and ASSs are assigned to job shifts with little ability to change work order or methods. To evaluate ASS job stress more accurately, however, we need to fully comprehend diverse factors, such as the organization’s culture and interpersonal relationships, in addition to work-related aspects such as psychological job demands and job latitude. Indeed, numerous studies have examined work stressors such as interpersonal conflict (e.g., Keenan and Newton, 1985; Spector, 1987; Spector and Jex, 1998); organizational constraints (Peters and O’Connor, 1980; Villanova and Roman, 1993); rewards (Peter et al., 1998; Siegrist, 2002); workload (e.g., Buell and Breslow, 1960; Rau, 2003; Spector and Jex, 1998); and perceived control (Hackman and Oldham, 1980; Spector, 1986; Wagner, 1994). In this study, we aimed to examine how ASS job stress—which arises from various sources, including organizational factors—influences TI.

Previous studies have revealed that job stress is connected to job satisfaction (Liu and Ramsey, 2008; Von der Embse et al., 2016). Job satisfaction is one of the affective reactions that employees have to their work, and is determined by comparing actual job outcomes to the outcomes desired by the employee (Hulin and Judge, 2003; Porter and Lawler, 1968). Brief (1998) presents a job-satisfaction model in which both individuals’ positive emotions and their objective job situations influence job satisfaction. Given that job stress is related to work conditions, Brief’s model—which suggests that job situation is one source of job satisfaction—also suggests that job stress has an important effect on job satisfaction. In a longitudinal study of university employees (Pignata et al., 2014), employees who received a stress-reduction intervention had significantly higher job satisfaction levels than employees who did not, demonstrating that job stress is a factor that influences job satisfaction.

Job satisfaction is, in turn, associated negatively with personnel turnover (Porter and Steers, 1973; Russ and McNeilly, 1995; Valentine et al., 2010). Traditionally, research on turnover has considered job satisfaction as an important variable in understanding employees who voluntarily leave the organization (Wheeler et al., 2007). According to a meta-analysis, job satisfaction has been shown to have a correlation of -0.24 (Carsten and Spector, 1987) and -0.27 with actual turnover (Tett and Meyer, 1993). Taken together, we can easily postulate that job satisfaction mediates the relationship between job stress and TI. In their study of 20,000 adults, Emberland and Rundmo (2010) found that job insecurity—one of the elements of job stress—increases workplace risk behaviors and TI and, in addition, that job satisfaction mediates this relationship. Jou et al.’s (2013) study of air traffic controllers’ TI also revealed the role of job satisfaction as a mediator in the relationship between job stress and TI. However, Jou et al. did

not measure stress with a commonly used stress scale, but rather by using self-developed stress factors and items specific to air traffic controllers. They also considered the family factor, which is not typically included in definitions of job stress (for a review of job stress, see Sonnentag and Frese, 2003). Thus, we sought to increase the generalizability of Jou et al.’s model by using the commonly accepted job stress concept and applying it to ASSs rather than air traffic controllers.

Hypothesis 1. Job satisfaction will mediate the relationship between job stress and TI.

1.2. The role of self-determined work motivation

Prior research on turnover has focused on identifying the factors that affect turnover. Dysvik and Kuvaas (2010) found that the effect sizes for antecedents of turnover, such as job satisfaction and work stress, vary considerably depending on the situation and population, and suggest that an employee’s work motivation is an important additional factor in turnover. In the work field, the self-determination theory (Deci and Ryan, 1985, 2000; Ryan and Deci, 2000) has received a great deal of attention for its explanation of employees’ work motivation, and offers a good motivation framework for research on work (Gagné and Deci, 2005).

According to self-determination theory, human behaviors are regulated in accordance with self-determination levels that are affected by basic psychological desires for autonomy, competence, and relatedness. The theory holds that the more an activity is self-determined, the more intrinsic motivation is induced (Deci and Ryan, 2000; Ryan and Deci, 2002). As Deci and Ryan (1985) propose, self-determined motivation can be measured along a self-determination continuum that includes amotivation, extrinsic motivation, identified regulation, and intrinsic motivation (e.g., Grolnick and Ryan, 1987; Ryan and Connell, 1989; Richer et al., 2002; Vallerand and Bissonnette, 1992). Amotivation is a state of no motivation and is the least self-determined condition. Identified regulation refers to engaging in a certain behavior because an individual has made a “choice” and is less self-determined than intrinsic motivation.

Self-determination theory draws the inference that if the individual’s psychological desires are satiated through work, he or she will be likely to remain in the same job even if external work situations are difficult. In arguing that work turnover is closely associated with motivation, Richer et al. (2002) demonstrate that self-determined work motivation (SDWM) is associated with TI. In this way, SDWM has a direct influence on TI, and previous studies have empirically supported this relationship (e.g., Burakova et al., 2014; Sherman, 1989; Valero et al., 2015). Furthermore, not only does SDWM directly influence organizational outcomes, but studies have also found that it exerts influence as a moderating variable (e.g., Fernet et al., 2010; Parker et al., 2013; Trépanier et al., 2013; Zhou, 2015). Nevertheless, whether the effect of job satisfaction on TI varies depending on the employee’s SDWM has not been studied. We can postulate SDWM’s role as a moderator, however, through the characteristics of self-determination motivation.

Self-determined individuals who make decisions and act autonomously are assumed to have high self-awareness because they determine values and behaviors according to their “core self.” This, in turn, allows them to react sensitively to their inner state (Deci and Ryan, 1985). In other words, depending on their internal changes, individuals with high self-determination may have organizational behaviors and attitudes that differ from those of individuals with low self-determination. Therefore, we can expect that ASSs with high self-determination will vary in their TI according

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