



# 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

to their inner state, as experienced through job satisfaction, even though environmental conditions—such as the compensation system—are the same.

However, for ASSs with low self-determination, the level of job satisfaction may have only a small impact on organizational attitudes or behaviors because their self-awareness is low. Harris et al.'s (2007) finding, which is particularly relevant to our prediction, reveals the interaction effect between abusive supervision and meaning of work, which is a component of psychological empowerment with self-determination. In Harris et al.'s study, individuals with high meaning of work showed significantly lower performance than those with low meaning of work when they were under abusive supervision. This result suggests that, unlike the traditional finding—that meaning of work has a positive effect on work outcomes—it also has the potential to have a negative impact on work outcomes, depending on the situation. As SDWM is also classified as “intrinsic task motivation reflecting a sense of self-control” (Seibert et al., 2011), the moderating effect of SWDM can be similar to that of meaning of work.

Altogether, we posit that SDWM is both a moderator of the relationship between job satisfaction and TI and an antecedent of TI. Support for these hypotheses and Hypothesis 1—that job satisfaction mediates the relationship between job stress and TI—would yield a pattern of moderated mediation, as shown in Fig. 1.

**Hypothesis 2.** Self-determined work motivation will be negatively related to TI.

**Hypothesis 3a.** SDWM will moderate the relationship between job satisfaction and TI. Specifically, this relationship will be weaker for individuals with low levels of SDWM than for individuals with high levels of SDWM.

**Hypothesis 3b.** SDWM will moderate the strength of the mediated relationship between job stress and TI via job satisfaction, such that the mediated relationship will be weaker for individuals with low levels of SDWM than for individuals with high levels of SDWM.

## 2. Method

### 2.1. Participants and procedure

Data were gathered from 492 airport security screeners from two airports located in Korea. Due to missing data, only 442 participants were included in our analyses. Of these participants, 175 (39.6%) were male and 267 (60.4%) female. The mean age of the participants was 28 years ( $SD = 4.75$ ), with a range of 18 years to 50 years. Average tenure with the company was 47.93 months ( $SD = 39.14$ ), with a range of 1 month to 182 months. Three hundred forty-six (78.3%) worked at Incheon International Airport,

which is the largest and busiest international airport in South Korea, and 86 (21.7%) at Gimpo International Airport, which serves mostly domestic destinations and offers limited international flights to Japan, Taiwan, and China.

### 2.2. Measures

#### 2.2.1. Occupational stress scale for Korean employees

Occupational stress was measured using the Korean Occupational Stress Scale (KOSS), which contains 43 items developed by Chang et al. (2005). The KOSS, which was sponsored by Korea's Occupational Safety and Health Agency, was developed to investigate specific occupational stressors nationwide. This measure contains eight subscales: physical environment (three items; e.g., “I have to work for a long time in an uncomfortable posture”); job demand (eight items; e.g., “My job has become increasingly demanding”); insufficient job control (five items; e.g., “My work requires a high level of skill or knowledge”); interpersonal conflict (four items; e.g., “I have someone who understands my difficulties at work”); job insecurity (six items; e.g., “My future is uncertain because the current situation of my company is unstable”); organizational system (seven items; e.g., “The organizational policy of my company is fair and reasonable”); lack of reward (six items; e.g., “My salary is not appropriate to my effort and work performance”); and occupational climate (four items; e.g., “Having a business dinner after work makes me uncomfortable”). Items were rated on a 4-point Likert scale ranging from 1 (*strongly disagree*) to 4 (*strongly agree*).

To test the KOSS's factor structure, we conducted a confirmatory factor analysis (CFA) and compared a single-factor model with an eight-factor model. Goodness of fit for the CFA was evaluated using the comparative fit index (CFI); non-normed fit index (NNFI; also known as the Tucker-Lewis Index, or TLI); and adjusted goodness of fit index (AGFI). The single-factor model provided good fit with the data ( $\chi^2(18) = 74.03$ ,  $p < 0.001$ , CFI = 0.94, NNFI = 0.91, AGFI = 0.91); but the eight-factor model did not provide acceptable fit ( $\chi^2(178) = 435.91$ ,  $p < 0.001$ , CFI = 0.90, NNFI = 0.87, AGFI = 0.88). Furthermore, the difference in chi-square statistics between the two models was significant ( $\Delta\chi^2(160) = 361.88$ ,  $p < 0.001$ ), and the CFI difference for the two models exceeded 0.01 ( $\Delta\text{CFI} = 0.04$ ). These results indicate that the single-factor model produced a significantly better fit than the eight-factor model. Thus, the whole scale as a single dimension was used for model analysis. In this study, Cronbach's alpha was found to be 0.88 for the whole scale.

#### 2.2.2. Job satisfaction

Job satisfaction was measured using a five-item scale used by Bacharach et al. (1991). Four items were drawn from the Job Satisfaction scale developed by Gross et al. (1958), and an additional item was taken from the Attitude toward Job Scale developed by

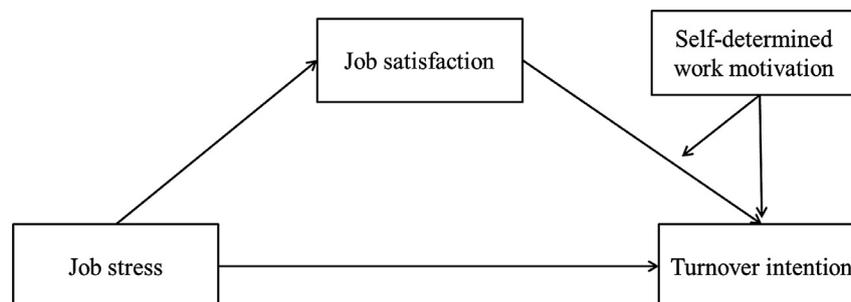


Fig. 1. Proposed model for job stress, job satisfaction, SDWM, and TI.

Vroom (1959). Results of the CFA with the five items showed that the single-factor model fit the data well ( $\chi^2(4) = 5.03, p > 0.05, CFI = 1.00, NNFI = 1.00, AGFI = 0.98$ ). Sample items include “I am satisfied with my present job when I compare it to jobs in other organizations” and “I am satisfied with my present job in light of my career expectations.” Each item was rated using a 4-point Likert scale ranging from 1 (*Not at all*) to 4 (*Very much*). Cronbach’s alpha for the scale was 0.89.

2.2.3. Turnover intention (TI)

TI was measured using a four-item scale developed by Becker (1992). Two items were drawn from the Michigan Organizational Assessment Questionnaire (Cammann et al., 1979): “It is likely that I will actively look for a new job in the next year” and “I often think about quitting.” Two additional items were taken from the Organizational Commitment Questionnaire (Porter et al., 1974): “It would take very little change in my present circumstances to cause me to leave this organization” and “There’s not too much to be gained by sticking with the organization indefinitely.” Results of a single-factor structure composed of the four items provided good fit with the data ( $\chi^2(2) = 3.60, p > 0.05, CFI = 1.00, NNFI = 0.99, AGFI = 0.98$ ). Each item was rated based on a 7-point Likert scale ranging from 1 (*Not at all*) to 7 (*Very much*). Cronbach’s alpha for the scale was 0.82.

2.2.4. Self-determined work motivation (SDWM)

Work motivation was measured using 16 items from the Situational Motivation Scale (SIMS; Guay et al., 2000). The SIMS assesses an individual’s self-determined motivation for work and contains four subscales: intrinsic motivation (four items; e.g., “Because I think that work is interesting”); identified regulation (four items; e.g., “Because I am doing work for my own good”); external regulation (four items; e.g., “Because I am supposed to do work”); and amotivation (four items; e.g., “I do work but I am not sure if it is worth it”). Items on the SIMS were rated on a 5-point Likert scale ranging from 1 (*Not at all*) to 5 (*Very much*).

To test the factor structure of the SIMS, we compared a single-factor model with a four-factor model using CFA. Both the single-factor model ( $\chi^2(2) = 32.85, p < 0.001, CFI = 0.96, NNFI = 0.87, AGFI = 0.82$ ) and the four-factor model ( $\chi^2(98) = 429.53, p < 0.001, CFI = 0.90, NNFI = 0.88, AGFI = 0.85$ ) provided marginally acceptable fit with the data, with CFI exceeding the criterion of

0.90, and NNFI and AGFI approaching 0.90. However, the difference in chi-square statistics between the two models was significant ( $\Delta\chi^2(96) = 396.68, p < 0.001$ ), and CFI difference for the two models exceeded 0.01 ( $\Delta CFI = 0.06$ ). Based on the results of difference tests and the principle of parsimony (Bentler and Mooijaart, 1989), we concluded that the single-factor model fit better than the four-factor model.

We computed a single SDWM score using summation of weighted subscales, in line with previous studies that used the self-determination index (e.g. Grolnick and Ryan, 1987, 1989; Richer et al., 2002). Each subscale was assigned different weights depending on the self-determined continuum (Grolnick and Ryan, 1987, 1989). For example, intrinsic motivation and identified regulation items were assigned weights of 2 and 1, respectively, because they are forms of self-determined motivation. External regulation and amotivation were assigned weights of -2 and -1, respectively, because they are considered less self-determined forms of motivation. Thus, four subscales were computed using the following formula:  $\{[2 \times (\text{intrinsic motivation}) + \text{identified regulation}] - [\text{external regulation} + 2 \times (\text{amotivation})]\}$  (see Vallerand, 1997). In this study, Cronbach’s alpha for the whole scale was found to be 0.70.

2.3. Data analysis

We analyzed data using SPSS Statistics 21. First, to identify whether data were normally distributed, we obtained skewness and kurtosis values. We also conducted Pearson’s correlation analysis to test the overall relationship among study variables. Next, we used the INDIRECT macro (Preacher and Hayes, 2008) to assess the mediating effect of job satisfaction on the relationship between job stress and TI. Finally, we performed moderated mediation analysis using the PROCESS macro suggested by Preacher et al. (2007) to estimate the conditional indirect effects of job stress on TI through job satisfaction as a function of SDWM.

3. Results

3.1. Descriptive statistics

Descriptive statistics and correlations for all variables are displayed in Table 1. We examined the absolute values of skewness

Table 1  
Means, standard deviations, and intercorrelations of variables.

Variable	M	SD	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1. Gender	1.59	0.48	-													
2. Tenure	47.93	39.14	-0.20***	-												
3. Job stress	2.77	0.30	-0.01	0.24***	-											
4. PE	2.84	0.50	0.14**	0.14**	0.59***	-										
5. JD	2.89	0.45	0.03	0.30***	0.70***	0.56***	-									
6. IJC	2.96	0.38	0.02	-0.10 <sup>†</sup>	0.57***	0.19***	0.20***	-								
7. IC	2.14	0.43	-0.02	0.00	0.43***	0.13*	0.06	0.27***	-							
8. JI	2.59	0.41	-0.19***	0.40***	0.52***	0.23***	0.33***	0.12*	0.11*	-						
9. OS	2.92	0.48	-0.04	0.21***	0.82***	0.36***	0.45***	0.48***	0.30***	0.33***	-					
10. LR	2.95	0.48	0.03	-0.00	0.73***	0.34***	0.32***	0.50***	0.33***	0.19*	0.60***	-				
11. OC	2.57	0.55	0.06	0.14**	0.68***	0.32***	0.40***	0.30***	0.33***	0.27***	0.50***	0.42***	-			
12. JS	2.40	0.76	-0.06	-0.01	-0.59***	-0.33**	-0.29**	-0.41**	-0.22**	-0.20**	-0.53***	-0.62***	-0.39***	-		
13. TI	5.20	1.28	0.04	-0.07	0.50***	0.24**	0.23**	0.32**	0.27**	0.06	0.47***	0.60***	0.34***	-0.57***	-	
14. SDWM	-1.40	2.97	0.00	0.05	-0.47***	-0.20**	-0.17**	-0.37***	-0.26**	-0.11*	-0.38***	-0.61***	-0.29***	0.61***	-0.56***	-

Note. N = 442.

Gender is coded as 1 = male and 2 = female.

No. 4 ~11 indicates subscales of job stress: PE = Physical Environment, JD = Job Demand, IJC = Insufficient Job Control, IC = Interpersonal Conflict, JI = Job Insecurity, OS = Organizational System, LR = Lack of Reward, and OC = Occupational Climate.

JS = Job Satisfaction; TI = Turnover Intention; SDWM = Self-Determined Work Motivation.

\* p < 0.01.  
\*\* p < 0.01.  
\*\*\* p < 0.001.

**Table 2**  
Regression results for simple mediation.

Variable	B	SE	t	p
Direct and total effects				
TI regressed on job stress	2.13	0.18	12.09	0.000
Job satisfaction regressed on job stress	−1.48	0.10	−15.17	0.000
TI regressed on job satisfaction	−0.71	0.08	−8.93	0.000
TI regressed on job stress, controlling for job satisfaction	1.08	0.20	5.41	0.000
	Boot	SE	Boot LLCI	Boot ULCI
Bootstrap results for indirect effect				
Effect	1.05	0.15	0.77	1.36

Note. Bootstrap sample size = 5000. LLCI = lower bound in 95% confidence interval; ULCI = upper bound in 95% confidence interval.

and kurtosis of each variable to test normality. For all variables, skewness values were less than 2 (ranging from −0.55 to 0.47) and kurtosis values were also less than 2 (ranging from −0.31 to 1.34), which satisfies the normality assumption. Correlation analysis reveals that job stress was significantly related to job satisfaction ( $r = -0.59, p < 0.001$ ), TI ( $r = 0.50, p < 0.001$ ), and SDWM ( $r = -0.47, p < 0.001$ ), and that job satisfaction was significantly related to TI ( $r = -0.57, p < 0.001$ ) and SDWM ( $r = 0.61, p < 0.001$ ). In addition, SDWM was negatively related to TI ( $r = -0.56, p < 0.001$ ).

### 3.2. Mediating effects

To test the mediating effect of job satisfaction, we conducted the INDIRECT procedure for SPSS (Preacher and Hayes, 2008). As can be seen in Table 2, job stress had a positive effect on TI ( $B = 2.13, \beta = 0.50, p < 0.001$ ) and a negative effect on job satisfaction ( $B = -1.48, \beta = -0.59, p < 0.001$ ), and job satisfaction had a negative effect on TI ( $B = -0.71, \beta = -0.42, p < 0.001$ ). When the mediator (job satisfaction) was included in the model, the effect of job stress on TI was reduced ( $B = 1.08, \beta = 0.25, p < 0.001$ ), and the reduction in this relationship was significant.

In addition, we used bootstrapping (Shrout and Bolger, 2002) to verify the significance of an indirect effect of job satisfaction on the relationship between job stress and TI. We calculated 95% confidence intervals (CI) of parameter estimates using 5000 data sam-

ples from the raw data samples ( $N = 442$ ). The conditional indirect effect of job stress on TI through job satisfaction was significant ( $B = 1.05, SE = 0.15, 95\% CI = [0.77, 1.36]$ ), as the 95% CI does not include zero (see Table 2). Thus, we confirmed that job satisfaction partially mediated the association between job stress and TI (supporting Hypothesis 1).

### 3.3. Moderated mediating effects

To test moderated mediation, we adopted Model 14 using the PROCESS approach (Preacher et al., 2007). Following the recommendations of Aiken and West (1991), the variables used as a component of the interaction term were mean-centered to minimize multicollinearity and facilitate interpretation of the interaction effect. Since previous studies report that gender and tenure influence TI (e.g., Arnold and Feldman, 1982; Cotton and Tuttle, 1986; Mobley et al., 1978), we added both gender and tenure as control variables in the model. Table 3 presents the moderating effect of SDWM on the relationship between job satisfaction and TI. As predicted in Hypothesis 2, SDWM was negatively related to TI ( $B = -0.13, \beta = -0.30, p < 0.001$ ). In addition, the interaction term between job satisfaction and SDWM on TI was significant ( $B = -0.04, \beta = -0.14, p = 0.015$ ). We interpreted this significant interaction by plotting simple slopes (see Fig. 2) at one standard deviation above and below the mean of the SDWM. The slope of the relationship between job satisfaction and TI was relatively

**Table 3**  
Regression results for conditional indirect effect.

Predictor	B	SE	t	p
Job satisfaction				
Constant	4.29	0.29	14.97	0.000
Gender	−0.05	0.06	−0.81	0.420
Tenure	0.00	0.00	2.93	0.004
Job stress	−1.56	0.10	−16.04	0.000
TI				
Constant	2.48	0.63	3.94	0.000
Gender	−0.00	0.11	−0.01	0.990
Tenure	−0.00	0.00	−2.55	0.011
Job satisfaction	−0.41	0.09	−4.50	0.000
SDWM	−0.13	0.02	−5.95	0.000
Job satisfaction × SDWM	−0.04	0.02	−2.44	0.015
SDWM	Boot indirect effect		Boot SE	Boot ULCI
Conditional indirect effect at SDWM = M ± 1 SD				
−1 SD (−2.97)	0.45	0.17	0.14	0.78
M (0.00)	0.65	0.15	0.36	0.95
+1 SD (2.97)	0.85	0.18	0.49	1.18
Mediator	Index	Boot SE	Boot LLCI	Boot ULCI
Index of moderated mediation				
Job satisfaction	0.07	0.03	0.01	0.12

Note. Bootstrap sample size = 5000.

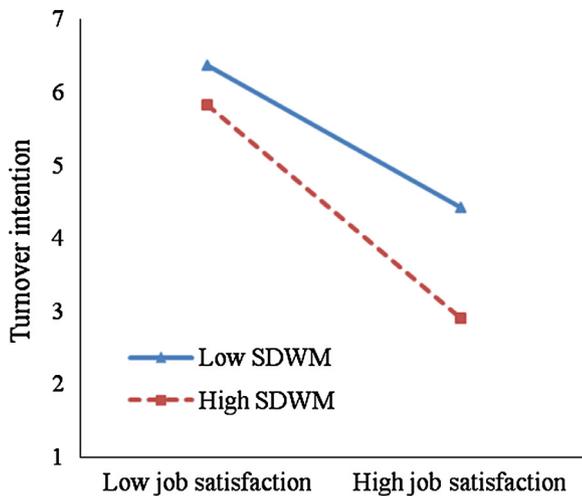


Fig. 2. Interaction of job satisfaction and SDWM on TI.

strong for employees with high levels of SDWM ( $t = -7.75$ ,  $p < 0.001$ ), whereas the slope was relatively weak for employees with low levels of SDWM ( $t = -4.99$ ,  $p < 0.001$ ). Thus, Hypothesis 3a was supported.

In addition, we examined the conditional indirect effect of job stress on TI through job satisfaction for three values of SDWM: one standard deviation below the mean, the mean, and one standard deviation above the mean. Normal-theory tests indicated that conditional indirect effects (based on moderator values at  $-1$  standard deviation, at the mean, and at  $+1$  standard deviation) were positive and significant. Bootstrap confidence intervals and index of moderated mediation corroborated these results (see Table 3). Hence, consistent with our expectations, SDWM moderates the indirect effect of job stress on TI through job satisfaction (supporting Hypothesis 3b). Specifically, the indirect and positive effect of job stress on TI through job satisfaction became stronger as the level of SDWM increased.

## 4. Discussion

High turnover among airport security screeners poses a threat to aviation safety, because it increases the proportion of novice screeners who lack expertise and heightens the probability of leakage of screening techniques. We focused on the influence of job stress as a variable that influences TI in ASSs, and hypothesized that job satisfaction would mediate the relationship between the two. We then examined whether ASSs' work motivation (i.e., SDWM) could directly influence TI and strengthen or weaken the indirect relationship between job stress and TI.

### 4.1. Summary of results and implications for research and practice

#### 4.1.1. Job stress, job satisfaction, and turnover intention

In line with previous studies (e.g., Chao et al., 2015; Emberland and Rundmo, 2010; Jou et al., 2013), our analysis demonstrates that the predictive power of job satisfaction for TI is significant and confirms Mobley's (1977) and Lee and Mitchell's (1994) models, which propose that job stress and job satisfaction are preceding variables of TI. We investigated the role of job satisfaction, which mediates the relationship between job stress and TI. As expected, the mediating effect of job satisfaction was significant, which supports Hypothesis 1.

These results make some theoretical contributions. Above all, this study increases the generalizability of the mediating model

for air traffic controllers, which investigates the relationship between job stress and TI through job satisfaction. Specifically, we (1) demonstrate that the mediating model described above applies to airport security screeners, and (2) verify the mediating model using a general job stress scale rather than a domain-specific job stress scale. Furthermore, given that job satisfaction is an affective reaction to work, our results offer additional support for the argument that affective reactions are a core mechanism that mediates between work events and work outcomes (Weiss and Cropanzano, 1996). Our finding that job stress affects employees' attitudes through emotional experiences such as job satisfaction supports the validity of our approach, which emphasizes the importance of emotion in the workplace.

Study results, while not surprising, have important practical implications for organizations that manage ASSs. Based on our findings, first, organizations can roughly surmise ASSs' TI by simply measuring job satisfaction and provide interventions or training programs to improve job satisfaction, which may reduce TI. Since job satisfaction, which is experienced through positive or negative emotions, is derived by comparing employees' work expectations to their actual situations (Hulin and Judge, 2003), adjusting ASSs' initial work expectations to match reality may also increase their job satisfaction. However, in our results, even after controlling for the mediator–job satisfaction–job stress still significantly influenced TI. This suggests that although job satisfaction can be increased through various interventions, TI may still be high without a reduction in job stress. Future research is warranted to clarify which workplace characteristics contribute to job stress for ASSs and which interventions are effective. In a related vein, Thomas et al. (2014) found that stress hormones can lower the accuracy of X-ray baggage screening. The question of whether job stress or job satisfaction actually influences the performance of ASSs, therefore, warrants further investigation.

#### 4.1.2. Motivation and turnover intention

As expected, our moderated mediation analysis revealed that the main effect of self-determined motivation on TI (Hypothesis 2) was significant. Specifically, TI was lower among individuals with high SDWM than those with low SDWM, which is consistent with previous studies (e.g., Bonenberger et al., 2014; Karatepe, 2015; Kim, 2015; Richer et al., 2002). This is easily understood, given that highly self-determined employees choose jobs based mainly on internal, self-determined motives such as interest, pleasure, meaning, a sense of mission, etc. In addition, Hypotheses 3a and 3b—for the moderating effect of SDWM—were also supported. As expected, compared to ASSs with low SDWM, for ASSs with high SDWM, as job satisfaction increases, TI steadily declines (Hypothesis 3a). This suggests that if psychological satisfaction is not obtained through their work, highly self-determined ASSs will change jobs to gain a sense of autonomy, competence, and relatedness in the workplace. In contrast, even if job satisfaction were increased, TI among ASSs with low SDWM would not be greatly reduced.

Our results make several important contributions to research on work motivation. We confirm, for the first time, that SDWM moderates the relationship between job satisfaction and TI; it is also intriguing to note that this relationship is stronger in the high-SDWM group. This suggests that SDWM does not always have a positive influence on organizational outcomes. As Deci and Ryan (1985) found, self-determined individuals are highly likely to make reference to their internal states, such as job satisfaction, when deciding whether to leave a job. Thus, if their subjective internal experiences are not satisfactory, high SDWM can have a detrimental effect on employees' outcomes, such as TI. In addition, we found that the magnitude of the mediating effect of job satisfaction is also greater for ASSs with high SDWM. This means that in the case of a

self-determined ASS, job stress is perceived as an emotional experience, as is job satisfaction, and this can reinforce thoughts of quitting. We could not unveil the reason why highly self-determined individuals experience job stress as an emotional state like job satisfaction. However, given the argument that people with intrinsic motivation invest more resources in their interactions with the environment (Harris et al., 2007), it is possible that they more actively process and integrate various job-related experiences, including job stress, which affects their overall emotions in relation to the job. To confirm this, further studies are needed to explore how people process their own experiences and form emotions and attitudes, depending on their SDWM level.

Taken together, our results have three practical implications. First, to lower TI among ASSs, self-determined motivation, which is a relatively stable and less changeable individual characteristic, should be assessed when hiring ASSs. Second, even if a person has high SDWM, his or her TI may be still heightened if job satisfaction is absent. Therefore, organizations that employ ASSs must endeavor to elevate their job-satisfaction levels. A more fundamental approach for improving job satisfaction in the workplace is to consider person-job fit (P-J fit) or person-organization fit (P-O fit) when selecting ASSs. Wright and Pandey (2008), who point out that the results of studies of public-service motivation and job satisfaction or TI have been inconsistent, argue that P-O fit is important for job satisfaction among employees in public organizations. Further studies are needed to explore the effects of P-J fit or P-O fit on turnover among ASSs. Third, our results imply that if ASSs with high SDWM are unable to satisfy basic psychological desires for autonomy, competency, and relatedness in the workplace, they will be more likely to quit. Therefore, to decrease their TI, the organization must create a workplace that is as autonomous as possible and offer opportunities for employees to feel more competent. Although little can be done to change the actual work ASSs perform, organizational improvements—such as creating more opportunities for promotion, encouraging interactions between colleagues, or improving the organizational culture—will likely be beneficial.

#### 4.2. Limitations

This study has several limitations. First, all study variables were measured by self-reported questionnaire. This means that participants could consistently respond to questions in a certain direction, which could, in turn, inflate the observed results. In particular, we measured self-reported TI, not the actual rate of leaving a job. Although it is known that there is a high correlation between intention to quit a job and turnover behaviors (Steel and Ovalle, 1984), actual turnover behaviors can be influenced by many variables, such as alternative job opportunities and changes in the labor market (Steel, 1996), as well as the individual's willingness. Therefore, future studies are needed that include turnover behaviors as dependent variables. Second, our design is cross-sectional. This study revealed the relationships between job stress, job satisfaction, TI, and SDWM, but was unable to prove actual causal relationships. Additional studies that apply a longitudinal design will be required to more accurately determine whether job stress leads to turnover, and whether an ASS's SDWM level plays a moderating role in the turnover decision. Third, our participants were all Korean ASSs at airports in Korea. Our results demonstrate that TI was strongly correlated with job stress from organizational culture, which is more highly dependent on the country than on the work itself. These findings imply that our results might not be replicable in other countries with different cultures. Finally, it should be noted that the single-factor model of SDWM did not show acceptable fit for the data, with NNFI and AGFI not meeting the recommended criterion of 0.90 (Hu and Bentler, 1999). Based on the

criterion suggested by Hair et al. (2006), however, the model provided marginally acceptable fit with the data since these indices are greater than 0.80.

#### 5. Conclusions

Overall, this research makes three contributions to aviation safety. First, this is the first study to examine turnover issues among ASSs, who warrant more attention in research on aviation safety. Previous studies of ASSs have been inadequate in this regard, and most have focused on improving X-ray screening skills. In contrast, our findings highlight the need to manage ASSs at the organizational level in a manner that improves the accuracy of security screening and prevents leakage of screening skills. Second, our results demonstrate that the mediation model of job stress/job satisfaction/TI can be applied to ASSs; it has been confirmed, to a limited degree, in other occupations (e.g., Emberland and Rundmo, 2010; Jou et al., 2013). Lastly, this study expands aviation-safety research to include individual motivation. Specifically, our results support the importance of individual motivation in selecting and managing ASSs. Taken together, our findings suggest that job longevity among ASSs, which is critical to aviation safety, has a significant relationship with job stress, job satisfaction, and motivation.

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