Running head: OCCUPATIONAL STRESS AMONG AIRCRAFT

MAINTENANCE PERSONNEL IN HONG KONG

Occupational Stress, Personality, and Coping Strategies among Aircraft Maintenance Personnel in Hong Kong

Ng Yuk Lin

City University of Hong Kong

In fulfillment of the requirements for SS4708

Dr. Lai, Chuk Ling Julian

28 April 2007

Abstract

The effects of occupational stress on job satisfaction, physical health, and work injuries were examined among 138 Chinese aircraft maintenance personnel. Results indicated that occupational stress predicts higher work injuries, poorer physical health, and lower job satisfaction. Direct and moderator effects of optimism, neuroticism, and coping strategies on the stressor-strain relationship were also examined in the current study. Neuroticism was found to be a reliable predictor of poor physical health, while at the same time a moderator which intensifies the effects of occupational stress on work injuries. Furthermore, support coping and control coping were found to moderate the aversive effects of work-related stress on physical health and work injuries respectively. The contributions and limitations of the findings were discussed, with special attention drawn to the possible combined effects of Big Five traits in affecting the occupational stressor-strain relationship, and the implications of coping strategies for occupational health psychology.

Occupational Stress, Personality, Coping Strategies among Aircraft Maintenance Personnel in Hong Kong

Occupational stress is a growing global concern, which has increased dramatically during the past decades. The deleterious effects of occupational stress are not only one of the most leading concerns for both individuals and organizations, but also one of the most costly occupational health issues (Cooper, Luikkonen & Cartwright, 1996; Cotton & Fisher, 1995). According to Ryland and Greenfeld (1991), occupational stress adversely affects performance in the work place due to factors such as absenteeism, lower productivity, employees' turnover, and industrial accidents. A nationwide study of occupational stress conducted by Northwestern National Life (as cited in Spielberger & Reheiser, 1995) clearly reflected the effects of occupational stress on absenteeism and employees turnover, about 17% participants indicated missing one or more days of work per year due to high stress levels, and 14 % reported that stress had caused them to quit or change jobs in the previous two years. It has been estimated that work-related stress cost US business and organizations in excess of 150 billion dollars per year and the cost is continuously increasing (Wright & Smye, 1996).

The deleterious consequences for the employees and their employing organizations are manifold, which can cause serious health and mental illness for the employees and substantial loss of resources for the organizations. Numerous studies have linked

occupational stress to physical and psychological illnesses, such as cancer, gastrointestinal disorders, musculoskeletal and cardiovascular disorders, and anxiety and depression (Grimshaw, 1999). Recent figures given by the Health and Safety Executive (2001) in UK suggest that stress-related medical problems are responsible for the loss of 6.5 million working days each year, which in turn cost organizations in UK around £370 million (about $518 million US dollars) (Sutherland & Cooper, 2002). More shocking, Elkin & Rosch (1990) estimates the US business and industry loses to be about 550 million working days annually because of absenteeism, and 54% of these cases are stress-related. It should be noted that stress-related medical claims also account for more than 14% of all insurance compensation claims (Pelletier & Lutz, 1991). In addition, counterproductive behaviors due to work-related stress or job dissatisfaction such as doing inferior work purposely, stealing from employers, and damaging property, equipment and products on purpose are the hidden cost and potential loss of resources loss for the organization (Ryland, Greenfeld, 1991).

It is noted that negative implications of work-related stress is particularly prevalent for countries which are undergoing tremendous economic reforms and social changes (Siu, 2003). Hong Kong has been undergoing economic difficulties since the Asian financial crisis of 1997, many business enterprises, private organizations, and even the Hong Kong government coped by broadening sources of income while at time same time

reducing expenditure. This has lead to changes in salary policy and resource re-allocation. Employees in Hong Kong perceived a great amount of pressure due to job insecurity, which in turn led to a lot of occupational stress related problems. According to a survey, more than 90% responding professionals indicated that they had experienced different stress-related problems in the previous month, these problems were mainly due to the excessive heavy workload (Sing Tao Daily, 21 November 2006). Occupational stress and extended working hours of workers also aggravate family problems in Hong Kong (Sing Tao Daily, 30 December 2006).

Overview of Aircraft Maintenance Professionals in Hong Kong

Safety is the first priority of concern in the aviation industry. For many years, death rates of airplane accidents are well below those for the other traffic accidents (Sing Tao Daily, 24 March 2007). However if, airplane accidents happen, the detrimental consequences are much more fatal. Maurina et al. (1995) pointed out that human errors contribute causally to most transport accidents.

Improper or poor aviation maintenance has been identified by the Federal Aviation Administration as one of the major causes of airline accidents (Fogarty, 2004). Obviously, aircraft maintenance is a critical component to ensure the safety of the passengers and to maintain the proper function of aircraft overall system (Hobbs & Williamson, 2003).

According to Marx and Graeber (1994), approximately 12% of major aircraft accidents have been attributed to maintenance deficiencies, which also contributed to the deaths of 1481 aircraft passengers all over the world in the years between 1982 and 1991 (Russell, 1994).

Although there is now an increase of worldwide recognition that maintenance deficiencies pose a fatal threat to aircraft safety, the study of human error involved in aircraft accidents has until recently been largely confined to the enormous stress of pilots, aircrew, or air traffic controllers, which directly or indirectly affects job performance and causes airline accidents. Study on the direct effects of occupational stress on the aircraft maintenance professionals is very limited. International Civil Aviation Organization (1995) indicated that the working environment for the aircraft maintenance professionals contains many potential error-producing conditions, for example, they work under time pressures, shift work and environmental extremes.

According to Ryland and Greenfeld (1991), occupational stress adversely affects performance in the work place, workers' job satisfaction, and their physical and psychological health, as well as increases the risk of industrial accidents and injuries. Nevertheless, there is little research focusing on the relationships between occupational stress on aircraft maintenance professionals and the work-related outcomes, such as job satisfaction, work injuries and physical health; studies on the moderating role of

optimism, emotional stability and coping strategies in the stressors-outcome relationships are even rarer. Therefore, the objectives of the present study are (1) to examine the relationships of occupational stress and aircraft maintenance professionals' job satisfaction, physical health and work injuries, (2) to examine the effects of coping strategies, emotional stability and optimism of these professionals on their job satisfaction, physical health, and work injuries, (3) to examine the moderating effects of the moderators (coping strategies, emotional stability and optimism) on the stress-outcomes relationship.

Literature Review

Person-environment fit theory

According to the Person-Environment Fit theory, stress and strain in the workplace is caused by the interaction of a worker with his or her work environment. The model was developed by French (1972) and his colleagues, who suggested that occupational stress occurs if an individual lack the abilities, skills, or resources which are needed to satisfy the demands of her or his work and organizational climate (French & Caplan, 1972; French, Caplan, & Harrison, 1982). And this stress in turn produces stress-related physiological and mental-health problems, as well as behavioral disorders (French et al., 1982). If job demands and pressures in the workplace exceed the skills and abilities of an individual, or if the employee's goals and values conflict with these work demands, [2] a misfit between the characteristics of an individual and his or her work-environment occurs. This misfit contributes to many occupational stressors such as conflicting role demands, work overload, and role ambiguity (Hart & Cooper, 2002).

The resulting occupational stress may also lead to adversely affects behavioral consequences, such as lower productivity, absenteeism, turnover, employee turnover, and stress-related medical problems. The larger discrepancies in the fit between the individual and the environment, the more severe the occupational stress will be and the higher the probability that the individual will experience negative consequences in his/ her job

performance.

Transactional process Model

According to the cognitive-relational theory which is based on the transactional theory developed by Lazarus et al. (1991), stress has been defined as a multivariate process, involving a transaction between an individual and his or her work environment. Lazarus (1991) pointed out that this approach can be used to explain the positive and negative reactions when people respond to the demands of their environment. His theoretical approach requires a detailed analysis of the specific stressors arising from a particular working environment, and the reactions of different workers to these stressors, at the same time taking into account the workers' coping skills and past experiences.

According to the approach, people's emotional reaction to their environmental stressors is mediated through appraisal. There are three types of appraisal. Primary appraisal occurs when people constantly monitor the conditions in their environment to determine whether these conditions have immediate impact on their well-being. And if it is the case, secondary appraisal occurs if people cognitively thinking the allocation of resources for coping with the stressors. Reappraisal occurs when people evaluate their effectiveness in coping with a particular stressor, and incorporate new information from these experiences.

For example, when source of stress in the workplace (stressors) are cognitively appraised by an individual as threatening, or when the demands of a job exceed the individual's to handle them effectively, frustration and strain are experienced and negative emotions such as anxiety and anger will be evoked. It is noted that environmental conditions can be appraised in both positive and negative dimension, such as being potentially harmful, beneficial, threatening, or challenging, people will then interpret the conditions as having impact on their well-being, and this initiates the coping processes (Folkman & Lazarus, 1988).

Coping processes, taking the coping strategies and coping resources into account, refer to the efforts, whether cognition or action, involved in dealing with the environmental stressors or the emotional stressors by using problem-focused coping strategies for the former, for instance logically analyzing and making plans for the problem, and emotion-focused coping strategies for the latter, for instance engaging in denial and reducing anxiety by alcohol. The focus is on how people actually act, effectively or ineffectively, to deal with the stressors. Therefore, people sometimes engage in coping strategies that worsen the matters.

Dynamic Equilibrium Theory

Dynamic Equilibrium theory proposed by Hart and Wearing (1993) deals with the

concern of the role of personality plays in the stress process. According to this theory, stress is not conceptualized as a demand, a response or process, but as a state of disequilibrium exists when it affects the individual's normal level of psychological well-being. Stress results from a diversity of variables including personality characteristics, coping processes, positive and negative work experience. Since people respond with both positive and negative affect to the same working environment, the balance between positive factors (such as problem-focused coping and extraversion) and negative factors (such as emotion-focused coping and neuroticism) is very important in determining psychological well-being.

Hart and Wearing (1995) also emphasized on the separate operations between psychological distress and morale, that both of them contribute to the quality of an individual's work life. That means, positive work experiences affect morale while negative work experiences affect psychological distress. For example, heavy workload and job demands are negative, and correlate to psychological distress, while promotion opportunities and increase in salary are positive, and correlate with morale (Hart & Wearing, 1993).

These popular conceptions of occupational stress mentioned above have both merit and limitations, and appear to be complementary and overlapping rather than contradictory. And, these conceptions provide a meaningful conceptual framework for a

deeper understanding of stress in the workplace.

Sources of Occupational Stress among Aircraft Maintenance Professionals

There are a number of stressors encountered by the aircraft maintenance, such as shift work, long working hours, work overload with time pressure, and high job demands, low decision latitude as well as noisy working environment.

Shift work

Aircraft maintenance is usually 24-hour operating in the airline industry. Many aviation organizations require their aircraft maintenance professionals to work under a compressed work week, including extended day shifts as well as extended night shifts (Feyer, Herbison, & Purnell, 2002).

Costa at el. (2000) have pointed out that workers who work atypical hours regularly, such as shift work, experience more adverse effects on both physical and psychological well-being than typical day workers. It is because their work schedule greatly disrupts their biological functioning such as producing circadian desynchronization (disruption of the ‘body clock’), by working and sleeping at non-standard times. Their work schedule disrupts their social functioning, such as family and social life, as well.

Shift work, especially night work, provokes circadian disharmony, one almost

immediate result is fatigue (Luna, French, & Mitcha, 1997). In the short term, the negative effects are quite obvious (e.g. increased fatigue, sleepiness). According to a study conducted by the Civil Aviation Safety Authority (CASA) (2000) on the aircraft maintenance professionals, about 29% of the respondents indicated that they were often very tired after a long shift "that they could not perform their tasks properly". In the long term, shift work probably leads to more serious medical conditions such as gastrointestinal and cardiovascular disorders (Costa et al., 2000). It may also impose on the workers psychological impairment such as anxiety, nervousness, and depression (Barton et al., 1993). Furthermore, shift work disturbs the biological functioning which in turn leads to serious errors and injuries among the workers, especially on the night shift (Costa, 1996).

Long working hours

CASA (2000) also shows alarming figures that over 88 % of the respondents of the aircraft maintenance professionals work over 12 hours a day, and 15.4% of respondents indicated that they work 14 hours a day.

Sparkes and her colleagues (1997) pointed out that there is a significant positive correlation between poor physical and psychological health and hours of work. Unsurprisingly, employees who work long hours are under very high levels of pressure,

this is usually associated with increase fatigue, which in turn lowers performance of workers. Excessive levels of fatigue caused byprolonged periods of work is a typical stressor encountered by aircraft maintenance professionals.

Work overload with time pressure

The pace of work may perceive as potential stressor. Jones *et al.* (1995) defined overload as the 'number or intensity of demands that may be made of employees'. It should be noted that time is a very crucial element in defining whether the work demands are considered as reasonable or unreasonable according to a particular time frame. In the situation of aircraft maintenance personnel, if their job cannot be done on time, airlines face the problem of flight delays and cancellations which adversely affect the airlines' images and impose financial burdens onto the airline organizations.

Work overload with time pressure is one of the most common stressors in the filed of non-stop 24-hour operation and can reasonably be expected to affect psychological and physiological well being, as well as attribute to behavioral symptoms.

High job demands and Low decision latitude

Aircraft maintenance professionals are having a high level of job demands, especially before and after rush seasons like Christmas, Easter holiday, because airlines must ensure that their aircrafts are in good standard of functioning before and after every

flight, since the number of flights increases and the usage is very high during the busy season, therefore, the job demands of aircraft maintenance personnel are further increased.

According to a study conducted by Bureau of Air Safety Investigation (1997), aircraft maintenance organizations tended to be strongly hierarchical, with strict order of status from the lowest status of apprentices, to the highest status of management personnel. This suggests a high power distance within the hierarchical structure. For those who are in the lower level of the hierarchy, have no authority in decision, and were likely to be asked to perform dirty tasks (Bureau of Air Safety Investigation, 1997). In other words, the lower the level of the hierarchy, the lower the level of decision latitude in Karasek's Demand-Control Model, in which employees have high job demands and low decision latitude are considered to be under the highest level of stress

Noisy working environment

Usually, aircraft maintenance employees work beside airplanes taking off or landing. The loud noises originate from their working environment imposing noise-related noxious stimuli to the aircraft maintenance employees.

Landy (1992) stated that noise is seen as a potential precursor of psychological problems because it often limits the individual's ability to focus attention and perform

accurately or quickly. Pressure, anxiety, depression, and fatigue are the negative psychological responses to noise, whereas lower job satisfaction, decrease organizational commitment, and reduce job involvement are the behavioral responses to noise stimuli (Baron 1989).

Stress-related Outcomes

Physical Health

Over the past years, there has been a substantial interest in the potential linkages between psychological stress and physical disease, especially in the occupational health context. Exposure to stressors produces psychological and emotional reactions that act as potential contributors to many health-related medical problems, such as digestion illness, respiratory infections and cardiovascular illnesses (Schat, Kelloway, & Desmarais, 2005). There is also evidence suggesting that exposure to stressors will suppress immune functioning, which in turn increase the susceptibility to infectious diseases (Cohen, 1996).

There is evidence suggesting that work patterns, such as shift work, contribute to the development of gastrointestinal illnesses, such as ulcer disease (Vener, Szabo and Moore, 1989). Employees who have to work in shift patterns, especially night shift, usually have the problems of irregular meals, skipping meals and complementing with snacks, which

are related to gastrointestinal disorders. As mentioned before, aircraft maintenance professionals who are required to work in shift patterns are at the greater risk of developing gastrointestinal disorders.

Job Satisfaction

In the industrial or organizational psychological literature, it has been widely discussed that work-related stress not only has substantial impact on the workers' psychological and physical health, but also important consequences on workers' attitude towards their jobs, such as job satisfaction (Fisher & Gitelson 1983). There are many definitions of job satisfaction in the literature, the most comprehensive and widely recognized one views job satisfaction as a pleasurable, positive emotional responses and attitudes an individual has towards his or her job. These responses are brought about by a comparison of actual outcomes with desired, expected, wanted or needed outcomes (Oshagbemi, 1999).

Substantial empirical research supports that job satisfaction is related to positive attitudes and behaviors, e.g. extra work effort and innovativeness, however, stress tends to reduce positive attitudes and this reduction in the positive way have undesirable consequences at the organizational level.

Work injuries

Literatures on the relationship of occupational stress with work accidents or injuries, are in vast amount in the industrial or organization context. Johnston (1995) found out that there is statistically significant association between occupational injury and work-related stress. Trimpop et al. (2000) even consider occupational accidents or injuries as an under researched outcome of work-related stress.

Concerning the work characteristics of aircraft maintenance personnel are highly complex and usually needed to handle the sophisticated aircraft systems. These aircraft systems can be considered as a great potential contributor for danger and injury to maintenance personnel. If these potential dangerous work conditions accompany with the great job-related strain, the consequences of these combination are very serious. Glasscock at el. (2006) pointed out that high levels of stress are associated with an elevated risk of work injuries.

Hobbs and Williamson (1995) conducted a safety study on aircraft maintenance in Australia for the Australian Transport Safety Bureau (ATSB), they found that approximately 22% of participants had been involved in workplace injuries during the previous year. Campbell (2002) indicated that cuts, bruises, sprained backs and legs are among the most common injuries to maintenance personnel.

Other than pilots, air crews and air traffic controllers, aircraft maintenance personnel

also play a very critical role in ensuring the safety of the aircraft and passengers. Despite the importance of the role on aircraft maintenance, there is little research on these professionals and study on them in the occupational context is even rarer and limited. Based on the findings reviewed earlier, this study is in designed to figure out the relationship between occupational stress and its adaptational outcomes, including physical health, job satisfaction, and work injuries, among the aircraft maintenance personnel.

Direct and Moderating Effects of Coping Strategies

Coping has been considered as a very crucial element in the stress literature, because individuals who are under psychological strain can use various coping strategies to buffer, master, minimize, reduce or tolerate the effects of the stressors. Lazarus and Folkman (1984) defined coping processes as efforts, whether cognition or action, that people use to cope with the environmental stressors. According to the transactional theory, individuals use three types of appraisal (namely primary appraisal, secondary appraisal and reappraisal) to evaluate the environment, and to mediate the effects of environmental stressors. Two fundamental types of coping behaviors were proposed by Lazarus and Folkman (1984), the first one is problem-focused coping, which is an attempt to alter the environmental stressors directly (such as analyzing the problem logically and planning

the solutions and executing the plans that will directly address and remove the problems). The second one is emotion-focused coping, which is to manage and alleviates negative emotions induced by stressors (such as seeking social support, talking with family members and friends).

In western societies, many studies provide evidence demonstrating that effective use of coping strategies can have beneficial role on both the employers and the employees, for instance improving work satisfaction while reducing work place related tension, decreasing the rate of absenteeism and turnover (Nelson & Sutton, 1990). A study showed that employees who usually use problem-focused coping have better psychological and physical health (Semmer, 1996).

It has been found that problem-focused coping is a predictor that has direct effects on job satisfaction, psychological and physical well being in blue-collar workers (Siu, 2001), and managers (Siu et al, 2002). A study conducted by Siu et al (2002) also showed a moderating effect of support coping on the relationship between stressors and physical well being. Based on the previous research findings, direct and moderating effect of coping strategies on stressors, stressors-outcomes relationship will be examined in this study.

Direct and Moderating Effects of Neuroticism

In the occupational stress literature, individual characteristics have become one of the important factors determining whether a particular job environment is perceived as stressful or not. According to the Dynamic Equilibrium theory, individuals exposed to the same environmental conditions may exhibit remarkably different psychological, physical, and behavioral reactions due to different personality characteristics (Kahn & Byosiere, 1992). Personality can be described in terms of five basic factors according to the Big Five, these factors are Extraversionm Neuroticism, Conscientiousness, Agreeableness, Openness (McCrae & Costa, 1984; John, 1990). In stress literature, the most frequently mentioned among the Big Five is Emotional Stability or Neuroticism. Neuroticism stands for the general tendency to experience negative, distressing emotions such as fear, depression, and frustration (Costa & McCrae, 1980). Fearfulness, irritability, low self-esteem, social anxiety, poor inhibition of impulses, and helplessness are the major traits subsumed within this dimension (Bakker et al., 2006). However, it should be noted cautiously that people who are low in neuroticism do not experience more positive emotion, although they are low in negative emotion.

Van Heck (1997) reported that neuroticism tends to be associated with strong emotional reactions to stressors, leading to physical illness consequently, and may pose a higher risk in developing psycholopathology (Widiger & Trull, 1992). It is reported that emotional instability is not only negatively correlated to physical health, but also well

being [emo1] (Hayes & Joseph, 2003). Since neuroticism is positively related to stressor exposure (Bolger & Zuckerman, 1995) and tend to exacerbate the environmental stressor via negative cognitive appraisal (Hemenover, 2001), so it lowers the individuals' psychological and physical well-being. Because neuroticism tends associated with negative appraisals of environmental stressors, those who are high in neuroticism are likely to experience a higher level of work stress, which in turn brings about a decrement in job satisfaction (Judge et al., 1999).

A study conducted by Deary et al. (1996) showed that neuroticism was the strongest predictor of burnout, because respondents who scored high on emotional instability neuroticism reported higher levels of occupational stress. There are two possible explanations for the relationship between neuroticism and burnout. First, a risk factor (i.e high level of sensibility in stress) may be associated with people who are high in neuroticism (Suls, 2001), so that they perceive their work environment as more threatening, and increases the risk of burnout (Tokar, Fischer, & Subich, 1998). In addition, they may also exacerbate the effects of job demands on burnout.

In sum, neuroticism may be associated with important consequences related to health and occupational contexts by influencing stressor exposure, cognitive appraisal, and also affecting susceptibility to stress-related illness and disease. In the present study, direct and moderating effects of neuroticism will be examined based on the findings

reviewed above.

Direct and Moderating Effects of Optimism

Scheier & Carver (1992, 1993) defined optimism as positive outcomes and the expectancies belief that good things rather than bad things will generally happen in one's life, and can be treated as a relatively enduring personality characteristic across times and context. Recently, it is found that optimism has become a better predictor than the personality constructs in the Five-Factor Model (i.e. conscientiousness, openness, emotional stability, agreeableness, and extraversion) of occupational stress and job performance (Chan, 2004).

Based on the previous stress literature in both Western and Chinese context, optimism as a personality characteristic may influence stress reactions by modifying the appraisal of stressors in a more positive light, and thus decrease the intensity of stress internalized by the individuals (Scheier & Carver, 1985). Optimism may also affect the stress responses by moderating the relationship between the stressors and outcomes. Optimism has been found to moderate the relationship between hassles in everyday life and health outcomes (e.g. symptoms of physical illness, feelings of exhaustion, burnout; Fry, 1995), hassles and physical symptoms (Lai, 1995), psychological health and coping strategies (resulting in fewer negative and more positive emotion; Lai, 1997, and use

more adaptive coping strategies in undergraduates; Lai & Wan, 1996), stress and both physical and psychological well-being (Sumi, 1997). Thus, individuals who reported higher optimism tended to report better well-being both physically and psychologically (such as better physical health, job performance and job satisfaction), regardless of their reported stress.

Because the direct and moderating effects of optimism have been demonstrated in various contexts, the current study is designed to examine the direct and moderating effects of optimism on the stressors and outcomes relationship based on the previous research findings. On the basis of the theories and findings reviewed in the above, the research questions of the current study are whether there are any

1. direct effects of occupational stress on the adaptational outcomes;
2. direct effects of coping strategies the adaptational outcomes;
3. direct effects of personality factors on the adaptational outcomes;
4. moderating effects of coping strategies and personality factors on the occupational stress-outcomes relationship.

Method

Participants and Procedures

A total of 138 aircraft maintenance personnel were recruited in Hong Kong. There were 130 males and 8 females, the mean age was 27 years old (S.D. = 5.6) and the mean working years in the company was 4.5 years (S.D. = 6.5). A self-administered survey was used in this study. The sample was recruited by snowball sampling method from January to February 2007. Totally 150 copies of questionnaire were sent out and 138 copies were returned, the response rate was 92%.

Instruments

Occupational stress- The Job Stress Survey (JSS) was designed by Spielberger (1986) to assess the perceived severity and frequency of work-related stressors which have impact on the psychological well-being of employees. The JSS consisted of 30 items describing general sources of occupational stress in a variety of work settings. Two 10-item major dimensions of occupational stress have been identified in the JSSS, which are Job pressure (JP) and Lack of Organizational Support (LS) (Spielberger & Vagg, 1999). In responding to the survey, participants were first asked to rate perceived severity of each item on a 9-point scale, ranging from 1 (the lowest stress level) to 9 (the highest stress level). After rating the perceived severity of each stressor event, respondents are

asked to report the number of days (i.e. the frequency) they have experienced each of the 30 JSS stressors during the past 6 months, on a 10-point scale with a score range from 0 to 9+.

JSS Severity and Frequency scores are computed by summing the ratings of the 30 items for each scale. Severity and Frequency scores for the subscales, Job pressures and Lack of Support are computed by summing the ratings of the 10-item comprising each scale, for example, items such as “fellow workers not doing their job”, “inadequate support by supervisor”, and “lack of recognition for good work” were under Lack of Support subscale while items such as “frequent interruptions”, “dealing with crisis situations”, and “excessive paper work” were under Job Pressure subscale. JSS Stress Index can be obtained by multiplying the severity and frequency rating for all the 30 items. Similarly, the Job Pressure Index and Lack of Support Index, can be obtained by multiplying the severity and frequency rating for each of the 10 items comprising the subscales. [JSS 1] According to Spielberger et al. (2000), the alpha coefficients for all three JSS Index scales (i.e. JSS Stress Index, the Job Pressure Index, and Lack of Support Index) were supported by acceptable reliability, which was .80 or higher. The alpha coefficients for the three JSS Severity and Frequency scales were all .82 or higher and .83 or higher, respectively.

Job satisfaction- Job satisfaction among the aircraft maintenance personnel was measured by a five-item scale developed by Kalleberg (1977), the scale consisted of 5 questions asking, on a 5-point Likert scale (1 = strongly disagree, 5 = strongly agree), about the participants' attachment to their jobs (e.g. "How satisfy are you with your job", "Would you recommend it to a friend?" and "Would you take the same job again if given a choice?"). These five-question scale gained an internal reliability in an acceptance level (i.e. $\alpha = .77$) as indicated by Kalleberg (1977). Since one question (for instance "Are you planning to change jobs?") was related to job dissatisfaction, it was coded reversely. The job satisfaction scores can be obtained by simply summing all the ratings and the higher the scores, the higher level of job satisfaction.

Physical health- Physical Health Questionnaire (PHQ) is a shortened and modified version of Spence et al's (1987) Health Scale. PHQ consisted of 14 items, used to assess somatic health during the past one month in four dimensions: quality of sleep (e.g. nightmares or disturbing dreams), headaches (e.g. when you experienced a lot of pressure), gastrointestinal illness (e.g. suffer from diarrhea or constipation), and respiratory infections (e.g. minor colds) (Schat, Kelloway, and Desmarais, 2005). The internal reliabilities of these subscales and the overall scale were supported by Schat and Kelloway (2000, 2003), showing an acceptable alpha coefficient of .80 or higher. To

complete the questionnaire, the participants were asked to rate the frequency of the somatic health-related questions of Item1 to Item11 using a 7-point frequency scale, ranging from 1 (not at all) to 7 (all the time). While for Item12 to Item 14, different frequency options are given to the respondents, for instance Item12 to 13 asked participants how many times (ranging from 0 times to 7+ times) they had experienced the illness, while for Item 14, how many days (ranging from 0 days to 7+ days) the illness had lasted. Since all the items indicated the presence of symptoms expect Item4 which indicated the absence of symptoms, ratings for Item 4 were reversely coded, so that higher ratings reflect more physical symptoms, while lower ratings reflect fewer physical symptoms and thus better somatic health.

Work injury- 8 items of work-related injuries (such as cuts or sprains) were used in the present study to measure the frequency of work injuries among the aircraft maintenance personnel. These items were selected from the Injuries scale of the Safety-Related Scales in a study conducted by Barling, Kelloway, and Loughlin (2002). The internal reliability was proved to be acceptable ($\alpha = .70$) in Wong and Lai's (2004) study. To respond to these items, participants were asked to rate on a 5-point Likert scale indicating the frequency of work related injuries, ranging from 1 (never) to 5 (frequently). The work injury scores were computed by summing all the ratings of all the eight items.

Higher scores mean higher frequency of work-related injury among the participants.

Optimism- Six-item Chinese Revised Life Orientation Test (C-RLOT), validated by Lai (2003) was adopted in this study measuring optimism among the aircraft maintenance personnel. The scale consisted of 3 positively phrased items (i.e. “In uncertain times, I always expect the best”, “Overall, I expect more good things to happen to me than bad”) and 3 negatively phrased items (i.e. “I hardly ever expect things to go my way”, “I rarely count on good things happening to me”). The internal consistency has been proved acceptable for which $\alpha = .69$ by Lai and Wong (1998). In responding to the scale, participants are asked to rate their agreeableness toward the six items on a 5-point scale, ranging from 0 (strongly disagree) to 4 (strongly agree). Ratings of the 3 negatively phrased items were coded reversely. Total scores of optimism can be obtained by simply summing all the ratings, higher scores yield higher level of optimism of the individuals.

Neuroticism- 12 items measuring neuroticism were adopted from Chinese version of the NEO Personality Inventory (NEO-PI) developed by Liu (1991). The internal reliability of the Chinese version of NEO-PI has gained acceptable alpha coefficient, i.e. $\alpha = .86$, in a study conducted by Wan, Luk, and Lai (2000). To respond to the 12 items, participants were asked to rate on a 5-point Likert scale, ranging from 0 (strongly

disagree) to 4 (strongly agree), indicating their agreeableness on the neuroticism related items. Since the scale consisted of 8 negatively phrased items (e.g. I sometimes feel helpless and hope others may help to solve my problems) and 4 positively phrased items (e.g. I seldom feel anxious and feared). Ratings of the 4 positively phrased items were coded reversely. Total scores of neuroticism are computed by summing all the ratings, the higher the scores means the higher the level of neuroticism of the respondents.

Coping strategies- 10-item Coping strategies, one of the four sections in the Occupational Stress Indicator-2 (OSI-2) were adopted in this study. The coping strategies consisted of 6 items measuring control coping (e.g. analyzing the problem logically and planning the solutions and executing the plans that will directly address and remove the problems) and 4 items measuring support coping (e.g. seeking social support, talking with family members and friends). The 10-item coping strategies of OSI-2 have been demonstrated to be useful in Western studies (Williams & Cooper, 1997). When applied to studies in Chinese societies, Lu et al. (2000) found acceptable reliability and validity of the OSI-2 coping strategies scale, supported by an alpha coefficient of .76. To complete the scale, participants are asked to rate the frequency of using the strategies of the ten items with 1 (never) to 6 (usually). Scores for control coping and support coping are computed by summing the rating for the 6 items comprising the control coping strategies

and the 4 items comprising the support coping strategies, respectively. The higher scores, the more frequent the use of a particular type of coping strategies.

Demographic factors- 8-items were used to obtain personal information about the respondents, including gender, age, marital status, educational level (primary, junior secondary, senior secondary, diploma/degree, post-graduate), working years in the current company, assumed working hours in the preceding week, actual working hours in the preceding week, and days of illness absence within 3 preceding months.

Statistical Analysis

Statistical Package for Social Sciences (SPSS, version 14.0) was used in this studying to analyze the distribution for the demographic variables (frequencies, means, standard deviations, and ranges), the distribution for the main variables (means, standard deviations, correlations and coefficient alphas), and a series of hierarchical regression analyses with job satisfaction, physical health, and work injury as dependent variables.

Results

Sample Characteristics

Table 1 displays the demographic characteristics of the sample in the current study. There were 138 respondents in total, 94.2% of them were males (N = 130) and 5.8% of them were females (N = 8), with a mean age of 26.59 years old (SD = 5.57). 81.2% of the respondents were single, 15.2% of them were married, and 0.7% and 2.9% of them were widowed and unspecified respectively. More than 84% of them attained senior secondary education. Concerning the working history in the current company, the mean working year was 4.48 years (SD = 6.53), ranging from 0.25 to 34 years. Mean of the assumed working hours in the preceding week was 48.1 hours (SD = 6.81), with a range from 40 to 70 working hours. While mean of the actual working hours in the preceding week was 50.82 (SD = 9.84), with a range of 35 to 75 hours. The mean day of absence within 3 months was 1.05 (SD = .93), ranging from 0 – 13 days.

Insert Table 1 about here

Table 2 displays the means, standard deviations, correlations among the main variables, as well as the internal consistencies of the scales included in the analyses. The reliabilities for all scales are acceptably high, with alphas coefficient ranging from .64 to .96, except for the job satisfaction scale.

As mentioned above, both the perceived severity and frequency of occurrence in the stressors are combined to determine the total stress level. It is found that the most severe stressors perceived by the aircraft personnel were inadequate salary (Mean = 7.02, SD = 1.76), and competition for advancement (Mean = 6.48, SD = 2.00), while the least severe stressor was periods of inactivity (Mean = 4.32, SD = 2.02). Furthermore, the most frequently occurred stressors were inadequate salary (Mean = 6.21, SD = 3.45), and noisy work area (Mean = 5.38, SD = 3.48), while the least frequently occurred stressor was excessive paper work (Mean = 2.40, SD = 3.02). In fact, inadequate salary and noisy work area were rated as the most stressful events as indicated by the total stress index.

Among the eight kinds of work injuries, the most frequently reported work injuries were cuts or lacerations (Mean = 2.91, SD = 1.20), bruises or contusions (Mean = 2.75, SD = 1.23), and strains and sprains (Mean = 2.45, SD = 1.08), while the least frequently reported work injuries were dislocated joint (Mean = 1.33, SD = .80), and fractured bone (Mean = 1.39, SD = .84).

Intercorrelations among Main Variables

Table 2 displays the results of a series of correlational analyses among the main variables examined in this study. Most of the correlation coefficients between the predictor and independent variables were in general low to moderate, with the largest between the relationship of total stress and work injury, r = .48. Table 2 also shows that the major predictor variable (i.e. total stress) was statistically correlated with all the dependent variables (i.e. job satisfaction, physical health and work injury) significantly. Specifically, total stress was positively correlated to poor physical health and work injury while negatively correlated to job satisfaction. In addition, neuroticism was positively correlated to poor physical health. It should be noted that the demographic variable, namely illness absence, was negatively correlated to the job satisfaction.

Insert Table 2 about here

Relationship between Occupational Stress and Outcomes

Three series of hierarchical multiple regression analyses were used to test the independent predictive power of the predictor variables on the three outcome measures

(job satisfaction, physical health, and work injury) while controlling effects of the demographic variables. It should be noted that all variables were centered before being used in the hierarchical multiple regression analyses.

With regard to the dependent measure of job satisfaction, demographic variables (i.e. illness absence and extra working hours) were entered in Step 1 of the regression equation as control variables, then in Step 2 total stress was entered as the main predictor. After that, optimism, neuroticism, support coping and control coping were entered as the moderator variables in Step 3. Finally, the four interaction terms (total stress * optimism; total stress * neuroticism; total stress * support coping; total stress * control coping) were entered.

Results summarized in Table 3 show that the demographic variables did not explain a significant portion of variance in predicting job satisfaction in Step 1. In Step 2, total stress reliably predicted job satisfaction ($\beta = -.35$, $p < .001$), which accounted for a significant 12% of the variance, $F = 6.66$, $p < .001$.

Similar procedures were applied to examine the effects of predictors on physical health. Demographic variables were entered in Step 1, the main predictor, moderators and interaction terms were entered one by one in the following steps. Results in Table 3 show that the demographic variables did not have significant predictive power on physical

health in Step 1. Total stress was considered to be a strong predictor of physical health ($\beta = .36$, $p < .001$), while accounted for a significant 12% of the variance ($F = 6.07$, $p < .001$) in Step 2. In addition, it was found that neuroticism reliably predicted physical health ($\beta = -.41$, $p < 0.01$) in Step 3, which explained a further 12% in variance ($F = 5.63$, $p < .001$).

Results in table 3 indicate that no demographic variables have predicting power on work injury. Rather, total stress was consistently found to be a predictor across three adaptational outcomes, included work injury ($\beta = .46$, $p < .001$), for which accounted for a significant 20% variance ($F = 7.68$, $p < .001$) in Step 2.

Moderating Effect in Stressor-Outcomes Relationship

To examine the moderating effects of optimism, neuroticism, support coping and control coping in the relationship of occupational stressors and outcomes, interaction terms were entered into the regression equation in Step 4. According to table 3, occupational stress was found to be a significant predictor of all the adaptational outcomes (i.e. job satisfaction, physical health, and work injury). Support coping interacted with occupational stress to determine physical health, in other words, support coping moderated total stress – physical health relationship ($\beta = -.30$, $p < .05$), which accounted for 8% variance ($F = 5.14$, $p < .001$) together with the other interaction terms

in Step 4. Table 3 also shows that ($\beta = .22$, $p < .05$) and control coping ($\beta = -.39$, $p < .05$) were found to be significant moderators for the relationship of total stress and work injury, which explained 14% variance together with the other three interaction terms ($F = 4.05$, $p < .001$) in Step 4.

Concerning the moderating effect of optimism, results in Table 3 suggest that optimism does not have any moderating effect on all stressor-outcomes relationships when its effect was being assessed together with that of the other three moderators, which could possibly be more relevant to the occupational context.

To sum up, data in Table 3 indicates that total stress was found to be a consistent predictor of the three outcomes variable, i.e. job satisfaction, physical health, and work injury. In addition, support coping was a moderator of the stressor and physical health relationship, while emotional stability and control coping were found to be moderators of the stressor and work injury relationship.

Insert Table 3 about here

According to Cohen et. al. (2003), a plot of regression of physical health on stress,

high stress (+1 SD above the mean) and low stress (-1 SD below the mean) at two levels of support coping can obtained by using the beta value and constant of the moderated regression equation which are both obtained in Step 4 (Please refer to Figure 1). Alike procedures are used to plot the moderating effect of neuroticism, and control coping on the relationship of occupational stress and work injury. (Please refer to Figure 2 and Figure 3 respectively).

The results of Figure 1 show that when under high occupational stress levels, people frequently used support coping reported fewer physical health problems than people who did not use support coping frequently. Therefore, support coping is proved to be a moderator on the stress-physical health relationship.

Insert Figure 1 about here

Figure 2 shows that in normal to high occupational stress levels, aircraft maintenance personnel scored highly on neuroticism reported much more work injuries than those scored low on neuroticism. When the occupational stress level escalated, people scored highly on neuroticism reported more work injuries Therefore, neuroticism

was a moderator of the relationship between occupational stress and work injury among the aircraft maintenance personnel.

Insert Figure 2 about here

The results of Figure 3 show that under high level of occupational stress, aircraft maintenance personnel who used control coping more frequently reported fewer work injuries than respondents who seldom used control coping. Therefore, control coping was a moderator of the relationship between occupational stress and work injury among workers who perceived very stressful in the workplace.

Insert Figure 3 about here

Discussion

Occupational Stress of Aircraft Maintenance Personnel

The main purpose of this study was to examine the effects of occupational stress on job satisfaction, physical health, and work injury among the aircraft maintenance personnel. Although there are substantial studies on stress in the occupational context, most of the studies targeted on police officers, fire fighters, doctors etc. Study on the aircraft maintenance personnel in the context of occupational stress is very rare and limited. Also, there is no previous study using Chinese aircraft maintenance personnel as participants in the occupational stress literature. The present study attempts to make some contributions to the existing preliminary findings of this particular occupation in the stress literature.

Results of the present study show that occupational stress of aircraft maintenance personnel was highly related to their work injury and poor physical health in a positive direction, while negatively related to job satisfaction. These findings corroborate findings from the previous Western studies discussed earlier (Johnston, 1995; Fisher & Gitelson 1983; Cohen, 1996). When considering the most severe stressors perceived by the aircraft maintenance personnel, results show that inadequate salary and noisy work area are the

two most severe stressful events perceived by the employees. Based on the effort-reward imbalance model proposed by Siegrist (1996), stress occurs when reciprocity is absent between the efforts the individuals put into their work and the rewards for their efforts. It is particular stressful if the employees have low actual reward (e.g. salary) or low potential for reward (e.g. raises, promotions).

Furthermore, working environment (whether is it comfortable or not) is very crucial for the employees in determining whether the working environment impose pressure on them. Some employees may find their working environments very comfortable, e.g. equipped with air-conditioning and sufficient working space, and these working environments are not perceived as potential stressors. However, working environments of the aircraft maintenance personnel are noisy (since they work besides airplanes taking off or landing), without air-conditioning in the hangar, and exposure to the extreme temperatures (very hot in the summer and very cold in the winter). Aircraft maintenance professionals working in these conditions no wonder perceived their working environments very stressful. Furthermore, noise often limits the employees' ability to focus attention on their job and make distractions, potential occupational accidents and work injury may happen as a result.

JSS mainly measures two domains, i.e. job pressure and lack of support. Within the domain of job pressure, it is found that insufficient personal time, meeting deadlines and

frequent interruptions are the most stressful events in the workplace. It is not surprising to note that aircraft maintenance personnel work with time pressure, if their job cannot be done on time, flight delays or cancellations will be very possibly occurred as a result. Consequently, they face a lot of responsibilities because flight delays and cancellations not only affect the passengers, but also the airline organization. In order to prevent flight delays or cancellations, they need to give up their resting time, even the lunch hour, therefore, they complaint about insufficient personal time and time pressures. Insufficient time for rest, overload with time pressures are expected to affect the individuals' psychological and physical health.

While within the domain of lack of support, results show that lack of opportunity for advancement, experience negative attitude toward organization and lack of recognition for good work were rated highly by the workers. Studies of organizational literature identified that organizational supports (salary increases, promotions, and recognition of good performance) may buffer the negative effects of occupational stress in the individuals, and have found to be inversely related to job pressure (Cropanzano et al, 1997), however if these supports are absent, stress may result. Based on the discussion above, because the aircraft maintenance personnel cannot get the outcomes that they desired and expected (insufficient salary, lack of opportunity for advancement, and lack of recognition for good work), and they have negative attitude towards their organization,

these are the factors contribute to their job dissatisfaction.

The other purpose of the current study was to test the direct and moderating effects of optimism, neuroticism and coping strategies on the occupational stress-outcomes relationship.

Role of Coping Strategies

The results of the present study show that support coping is a moderator in the relationship of occupational stress and physical health. This result corroborates with findings of Siu et al. (2002), showing moderating effects of support coping in stress-physical-well-being relationship. The moderating effect was significant among the present sample of aircraft maintenance personnel, when under high stress level, people who frequently used of support coping reported significantly fewer physical health problems than their counterpart who did not frequently use support coping. This study provides support for the positive buffering effects of support coping under extremely high levels of stress. It would be logical to assume that workers who employed support coping strategies may reduce their negative emotions resulted from the occupational stressors by seeking social support or talking with friends or relatives. According to transactional process model proposed by Lazarus (1988), reappraisal occurs when people evaluate their effectiveness in coping with the stressors, since the aircraft maintenance workers who

employed support coping could reduce their negative emotions, so that when they reappraised the occupational stressors, they might perceive the stressors as less stressful than before. In other words, support coping makes the stressors perceived as less stressful, and lowered stress level have less aversive effect on physical health.

As discussed before, aircraft maintenance personnel work in conditions which are full of potential dangers, such as handling highly complex and sophisticated aircraft systems, working in darkness, and using tools that can be considered as dangerous if faulty uses or accident happens. It is logical to assume that if aircraft maintenance personnel work under high level of stress, the potential for getting injuries is increased. The results of the current study revealed that control coping was a moderator of the relationships between occupational stress and work injury. It is not surprising that if coping strategies are effective, the deleterious consequences of stress are reduced. Under stressful conditions, aircraft maintenance workers who employed control coping frequently reported less work injuries than their colleagues who did not employed control coping frequently. A possible explanation for this is that people who employed control coping (e.g. analyzing the problem logically, planning solutions, and executing the plans that will directly address and remove the problems) can deal with the problems effectively. For example, if an aircraft maintenance worker who is doing some unfamiliar jobs, he employs control coping, such as analyzing the problem first and then referring to

the maintenance manual and dealing with the problems with appropriate tools and equipments as indicated in the maintenance manual. These behaviors can protect the workers from potential dangers induced by faulty use of hardware and incorrect procedures followed.

Role of Neuroticism

There is positive relationship between neuroticism and poor physical health demonstrated in the sample of aircraft maintenance personnel. This result corroborates those of previous Western studies on the effects of neuroticism at physical illness (Van Heck, 1997). When people who characterized as neurotic are under stressful conditions, they will react exaggeratedly with physiological reactivity, because they appraise the situations as very threatening. In other words, when these people need to deal with excessive and demanding work, high levels of physiological arousal is resulted as a reaction to the stressful situation, leading to physical illness (Van Heck, 1997). Since neuroticism amplifies the vulnerability of getting physical illness, therefore, neurotic aircraft maintenance workers reported more physical symptoms and thus poorer physical health. Therefore, Neuroticism was a predictor of physical health.

The moderating effect of neuroticism on the relationship between occupational stress and work injury was found to be significant. Many studies in stress literature

proved the impact of neuroticism as a personality trait on physical health and occupational injury. One possible reason as mentioned before, people who are neurotic tend to experience negative and distressing emotions, and exacerbate the environmental stressors by using more cognitive appraisals in negative direction, which in turn increasing the vulnerability to work injuries. Clarke & Cooper (2004) also stated that neuroticism may consider as a proactive factors in risking the individuals' work injuries. Another explanation is provided by Johnson (1995) and McCrae et al. (1986), who suggested that neuroticism is associated with the use of ineffective coping strategies, for instance avoiding and distracting coping strategies (e.g. denying), instead of more adaptive coping (e.g. concentrate the efforts on doing something about it) which can protect the worker from potential work injuries due to distraction during work. Based on the findings reviewed before, it is reasonable to expect aircraft maintenance personnel with neurotic characteristics may exacerbate occupational stress perceived as very threatening and use maladaptive coping which heighten the potential of getting work injuries.

Role of Optimism

Concerning the moderating effect of optimism, results in summarized in Table 3 indicated optimism does not have any moderating effect on all stressor-outcomes

relationships when its effect was being assessed together with that of the other three moderators. This non-significant result may be attributed to the problem of multicollinearity, which is the existence of substantial correlation among the moderators (i.e. optimism, neuroticism, control coping, and support coping) creates difficulties (Cohen et al., 2003). According to Table 2 optimism as one of the moderators is highly correlated with all the other moderators in the regression equation, for instance neuroticism ($r = -.42$, $p < .001$), support coping ($r = .36$, $p < .001$), and control coping ($r = .22$, $p < .01$). There are literatures suggested that optimism is highly related to adaptive coping strategies (Scheier & Carver, 1993), and highly correlated to neuroticism (Williams, 1992). Since it is assumed each predictor can potentially add to the prediction of the outcome variables (i.e. job satisfaction, physical health, and work injury) in multiple regression, as optimism is highly related to other moderators in the regression equation, the estimated regression coefficient for optimism may not be very reliable because little unique information is given by optimism to estimate its value. Furthermore, although there are abundant literatures about the moderating effects of optimism on stressor-strain relationship, most of these studies were in health psychology context. It should be noted that optimism has been found to moderate the relationship of stressor-well being (Sumi, 1997), daily hassles-physical symptoms (Lai, 1996), psychological health-coping (Lai, 1997). However, literature about the moderating effects

of optimism on the relationship between occupational stress and adaptational outcomes is very limited. It implies that optimism works in other contexts but not necessarily in the occupational setting.

Conclusion

Results of the current study reveal that occupational stress has deleterious consequences on both of the employees and organization in the context of aviation maintenance industry like any other groups of occupation. First, occupational stress was a significant predictor of work injuries and poor physical health among the aircraft maintenance personnel in positive direction, which means the higher the level of occupational stress, the more the work injuries and the poorer the physical health among the workers. Second, occupational stress also found to be a predictor of job satisfaction in negative direction, which means the higher the occupational stress, the lower the job satisfaction will be perceived by the workers. Furthermore, occupational stress also positively related to illness absence among the aircraft maintenance personnel.

It should be noted that although occupational stress truly has its aversive impacts on the aircraft maintenance personnel, the severity of the impacts were different among different workers. The fact is some workers may found the impacts resulted from work-related stress were very deleterious while some may not. The occupational stress related outcomes should not only attribute to the occupational stress itself, but also the combination effect of occupational stress and individual differences. In this study, different coping strategies and personality trait (i.e. neuroticism) were found to make a

difference in the stress-related outcomes among different workers. Concerning neuroticism, as a personality trait, it was found to have direct predicting power on poor physical health, and it also has moderating effect on the stressor-outcome relationship by intensifying the aversive effect of occupational stress on work injuries among the workers as well. While concerning coping strategies, support coping and control coping were found to reduce the aversive effect of occupational stress on physical health and work injury among the workers respectively.

It is reasonable to assume that the negative impacts on the employees by the workplace stress may eventually impose adverse consequences on the organization, for instance job dissatisfaction, and absenteeism due to poor physical health or work injuries may affect the workers' performance which in turn not only lead to potential loss of resources for the organization, but also the poor image and financial burden due to flight delay or cancellation resulted from poor maintenance work. More seriously, it may also affect the safety of passengers. Since this study is one of the very few studies focusing on the effect and outcomes of occupational stress among aircraft maintenance personnel, research areas in occupational stress among aircraft maintenance workers should be explored in the future.

Limitation

There are a number of limitations of this study need to be acknowledged. First, Due to limited time and resources, the respondents in the study were recruited by snowball sampling method, relies on referrals from initial respondents to generate additional respondents. This technique may introduce bias and reduce the representation of a cross-sectional study. Since all scales administered in this study were measured by self-report manner and all data came from a cross-sectional designed survey, these may cause common method variance and thus causal conclusions cannot be drawn confidently when interpreting results. Second, this study investigated a specific group of employees, namely aircraft maintenance personnel; this means that the findings of this study may not be readily generalized to other occupational group. Third, a low internal reliability with alpha coefficient equaled to .30 was found in the Job Satisfaction Scale. Item 3 (i.e. Are you planning to change jobs?) was identified to be problematic in this scale, and if this item is deleted, the alpha coefficient will be equaled to .70. However, after deleted the Item 3 of the job satisfaction scale, the problems are still existed for non-significant direct and moderating effects of all moderators (i.e. optimism, neuroticism, support coping, and control coping) on the occupational stress – job satisfaction relationship.

Since this study was a cross-sectional design, causal conclusions cannot be drawn as mentioned above. With specific concern given to the personality, there may be a possibility that job experience might affect personality, which means it is possible that a

neurotic worker may experience a high level of occupational stress, but it is also possible that a worker who under high levels of occupational stress may become more neurotic. To rule out this problem, future studies on personality may use a longitudinal design, in which personality traits should measured a period of time before assess other variables, in order to evaluate causal relationships more properly.

Recommendation

Concerning individual differences in the stressor-outcomes relationship, it is obvious that the role of individual differences is very important. Personality traits are considered as vulnerability / resistance factors influencing stressor exposure, cognitive appraisal, coping strategies, emotional and physiological response, risk of stress-related illness and disease, and susceptibility to work injuries and accidents (Code & Langan-Fox, 2001). As demonstrated in this study, neuroticism is an important determinant in the stressor-outcome relationship. However, only one trait of the Big Five personality traits was examined in this study independently. It omitted the possible combination effects among the traits in the occupational stressor-strain relationship. Recently, some theorists proposed that the combined / interactive effect of the Big Five traits should also be examined, rather than only investigate the independent effect of the traits (Grant & Langan-Fox, 2006). According to the study of Grant et al. (2006), high neuroticism

combined with low conscientiousness can predict higher exposure of stress, more maladaptive coping, poorer physical health and less job satisfaction. Therefore, more comprehensive findings on the outcomes of occupational stress can be obtained by investigating the interaction effect of different traits, and this may considered as a potential future research area. Furthermore, results in this study show that neuroticism was a significant moderator in the stress-physical health relationship, it was found to intensify occupational stress levels and amplify the vulnerability of getting work injuries in the aircraft maintenance workers. Based on this finding, aircraft maintenance organizations may consider conducting a personality test, screening out people with high neurotic characteristics in the pre-employment screening process, in order to reduce possibility of occupational accidents and protect the neurotic workers from getting work injuries.

Different coping strategies benefit the aircraft maintenance personnel in different ways in the stressor-outcomes relationship. In this study, control coping reduce the negative effect of occupational stress on work injuries. A possible explanation is provided by Hoffman and Stetzer (1996) who stated that high levels of occupational stress perceived by the workers were related to the tendency of doing unsafe acts, because the workers' attention were drawn in completing the stressful work, so that they were less focus on the work procedure which increase potential work injuries. However, using

control coping strategies (i.e. analyzing the problem logically and planning the solutions) when perceived high levels of stress, the aircraft maintenance workers may find the job less stressful; effectiveness of coping in turn reduces perceived occupational stress via the reappraisal process. Therefore, by using control coping strategies, aircraft maintenance workers were less likely to engage in unsafe acts which pose potential dangers to them.

Results from this study also reveal that support coping (seeking social support and talking to friends and relatives) can also reduce the negative effects of occupational stress on the workers' physical health. In addition to seeking more support, better physical health among the aircraft maintenance personnel can also be achieved by promoting a life-work balance as suggested by William and Cooper (1998), which can be effected by encouraging aircraft maintenance personnel to engage in hobbies and leisure activities that they are interested in.

Based on these findings, aircraft maintenance organizations are recommended to provide stress management workshop to the employees. There are few reasons for this practice; first, it can help the employees to understand what occupational stress is, what their physiological, emotional, behavioral, cognitive responses are when high occupational stress perceived. Second, it helps the employee to aware their vulnerability to occupational stress. Third, it helps them to explore and identify their own coping behaviors. Finally, it helps them to develop adaptive coping strategies in different

situations, for example, employees may advise to use control coping at work, such as get their work organized, plan their time and schedule, and establish job priorities. By doing so, they do not risk themselves in engaging unsafe act in the workplace, and protect them form getting work injuries. Furthermore, they are encouraged to develop support coping in dealing with the negative emotion resulted from their work. For example, they are also encouraged to develop more hobbies and leisure activities that they are interested in at their free time, in this way a better life-work balance maintained, and a better physical health can be obtained.

Acknowledgements

I would like to give my sincere thanks to my supervisor, Dr. Lai, Chuk Ling Julian, for his patience in providing sufficient guidance and valuable advice to this paper. Apparently, without his supervision, this paper would not be successful in completion.

Furthermore, I would like to express my appreciation to Mr. Chan Cho Wai for helping in data collection and all the responded air maintenance professionals for their participations.

Reference

Aldwin, C. M., Spiro, A., Levenson, M. R., & Cupertino, A. P. (2001). Longitudinal findings from the normative aging study: III. Personality, individual health trajectories, and mortality. Psychology and Aging, 16(3), 450-465.

Bakker, A. B., Van Der Zee, K. I., Lewig, K. A., & Dollard, M. F. (2006). The relationship between the big five personality factors and burnout: a study among volunteer counselors. *The Journal of Social Psychology, 146*(1), 31-50.

Barling, J., Kelloway, E. K., & Loughlin, C. (2002). Development and Test of a Model Linking Safety-Specific Transformational Leadership and Occupational Safety. Journal of Applied Psychology, 87 (3), 488-498.

Baron, R. A. (1989). Personality and organizational conflict: the type A behavior pattern and self-monitoring. Organizational Behavior and Human Decision Processes, 44, 281-297.

Barton, J., Folkard, S. (1993). Advanced versus delaying shift systems. Ergonomics, 36, 59-64.

Bolger, N., & Zuckerman, A. (1995). A framework for studying personality in the stress process. Journal of Personality and Social Psychology, 69, 890-902.

Bureau of Air Safety Investigation. (1997). Human factors in airline maintenance: A

study of incident reports. Cancerra, Australia: Author.

Campbell, J. D. (2002). Personal Communication from Canadian Department of National Defence- Directorate of Flight Safety. Ottawa, Canada.

Chan, F. M. (2004). The effects of optimism and the five-factor model of personality on stress and performance in the work place. Dissertation Abstracts International: Section B: The Sciences and Engineering, 65, 1585.

Civil Aviation Safety Authority. (2000). When the shifts hits the fan. Flight Safety Australia, 4. Canberra, Australia. Retrieved from http://www.casa.gov.au/avreg/fsa/download/00Nov/38-43.pdf.

Clarke, S., & Cooper, C. L. (2004). Managing the risk of workplace stress. London: Routledge.

Code, S., & Langan-Fox, J. (2001). Motivation, cognitions and traits as predictors of occupational health, well being and performance. Stress and Health, 17, 159-174

Cohen, S. (1996). Psychological stress, immunity, and upper respiratory infections. Current Directions in Psychological Science, 5, 86-90.

Cooper, C. L., Luikkonen, P., & Cartwright, S. (1996). Stress Prevention in the Workplace. Dublin, Ireland: European Foundation for the Improvement of Living and Working Conditions.

Cotton, P., & Fisher, B. (1995). Current issues and directions for the management of

workplace psychological health issues. In Psychological Health in the Workplace, edited by P. Cotton. Victoria: Australian Psychological Society.

Costa, G.. (1996). The impact of shift and night work on health. Applied Ergonomics, 27, 9-16.

Costa, G., Flokard, S., & Harrington, J. M. (2000). Shift work and extended hours of work. In P. Baxter, P.H. Adams, T-C. Aw, A. Cockcroft, & J.M. Harrington (Eds.), Hunter's diseases of occupations. London: Arnold.

Costa, P. T., Jr., & McCrae, R. R. (1980). Influence of extraversion and neuroticism on subjective well-being: happy and unhappy people. Journal of Personality and Social Psychology, 38, 668-678.

Deary, I. J., Blenkin, H., Agius, R. M., Endler, N.S., Zeally, H., & Wood, R. (1996). Models of job-related stress and personal achievement among consultant doctors. British Journal of Psychology, 87, 3-29.

Elkin, A. J., & Rosch, P. J. (1990). Promoting mental health at the workplace. Occupational Medicine: State of the Art Review, 5(4), 734-754.

Feyer, A., Herbison, G. P., & Purnell, M. T., (2002). The impact of a nap opportunity during the night shift on the performance and alertness of 12-h shift workers. Journal of Sleep Research, 11(3), 219-227.

Fisher, G., Semko, E. M., & Wade, F. J. (1995). Defining and measuring hostile

environment: development of the Hostile Environment Inventory. In S. L. Sauter, & L. R. Murphy (Eds.), Organizational Risk Factors for Job Stress. Washington, DC: American Psychological Association.

Fogarty, G. J. (2004). The role of organizational and individual variables in aircraft maintenance performance. International Journal of Applied Aviation Studies, 4(1), 73-90

Folkman, S., & Lazarus, R. S. (1988). Coping as a mediator of emotion. Journal of Personality and Social Psychology, 54(3), 466-475

French, J. R. P., Jr., Caplan, R. D. (1972). Occupational stress and individual strain. In A. J. Marrow (Eds.), The failure of success. New York: Amacon.

French, J. R. P., Jr., Caplan, R. D., & Harrison, R. V. (1982). The mechanisms of job stress and strain. England: Wiley.

Fry, P. S. (1995). Perfectionism, humor, and optimism as moderators of health outcomes and determinants of coping styles of women executives. Genetics, Social, and General Psychology Monographs, 121, 211-245.

Glasscock, D. J, Rasmussen, K., Carstensen, Ole., &Hansen, O. N. (2006). Psychosocial factors and safety behaviour as predictors of accidental work injuries in farming. Work & Stress, 20(2),173-189.

Grant, S., & Langan-Fox, J. (2006). Occupational stress, coping and strain: The

combined/interactive effect of the Big Five traits. Personality and Individual Differences, 41(4), 719-732

Grimshaw, J. (1999). Employment and health: psychological stress in the workplace. London : British Library.

Hart, P. M, & Cooper, C. L. (2002). Occupational stress: Toward a more integrated framework. In N. Anderson, D. S. Ones, H. K. Sinangil, & C. Viswesvaran (Eds.), Handbook of industrial, work and organizational psychology, Volume 2: Organizational psychology. US: Sage Publications, Inc.

Hart, P. M., & Wearing, A. J. (1995). Occupational stress and well being: A systemic approach to research, policy and practice. In P. Cotton (Ed.), Psychological Health in the Workplace. Victoria: Australian Psychological Society.

Hart, P. M., Wearing, A. J. & Headey, B. (1993). Assessing police work experiences: Development of the Police Daily Hassles and Uplifts Scales. Journal of Criminal Justice, 21, 553-572.

Hayes, N., & Joseph, S. (2003). Big 5 correlates of three measures of subjective well-being. Personality and Individual Differences, 34, 723-727.

Hemenover, S. H. (2001). Self-reported processing bias and naturally occurring mood: mediators between personality and stress appraisals. Personality and Social Psychology Bulletin, 27, 387-394.

Hoffmann, D.A., & Stetzer, A. (1996). A cross-level investigation of factors influencing unsafe behaviors and accidents. Personnel Psychology, 49, 307-339.

Hobbs, A., & Williamson, A. (2003). Associations between errors and contributing factors in aircraft maintenance. Human Factors, 45(2), 186-201

International Civil Aviation Organization. 1995. Human factors in aircraft maintenance and inspection, Circular 253-AN/151, International Civil Aviation Organization, Montreal.

John, O. P. (1990). The big five factor taxonomy: Dimensions of personality in the natural language and in questionnaires. In L. A. Pervin (Ed.), Handbook of Personality: Theory and research. New York: Guilford.

Johnston, J. J. (1995). Occupational injury and stress. Journal of Occupational Environment Medication, 37,1199-1203.

Jones, B., Flynn, D. M., and Kelloway, E. K. (1995). Perception of support from the organization in relation to work stress, satisfaction, and commitment. In S. L. Sauter, & L. R. Murphy (Eds.), Orgnizational Risk Factors for Job Stress, Washington, DC: American Psychological Association, 41-52.

Judge, T. A., Locke, E. A., Durham, C. C. & Kluger, A. N. (1998). Dispositional effects on job and life satisfaction. Journal of Applied Psychology, 83, 17-34.

Kalleberg, A. L. (1977). Work values and job rewards: A theory of job satisfaction.

American Sociological Review, 42, 124-143.

Kahn, R. L., & Byosiere, P. (1992). Stress in organizations. In M. D. Dunnette, & L. M. Hough (Eds.), Handbook of industrial and organizational psychology. Palo Alto, CA: Consulting Psychologists Press.

Lai, J. C. L. (1995). The moderating effect of optimism on the relation between hassles and somatic complaints. Psychological Reports, 76, 883-894.

Lai, J. C. L. (2003, July). Psychological Impact of Economic Restructuring in Hong Kong. Paper presented at the 5th Biennial Conference of the Asian Association of Social Psychology, Manila, Philippines.

Lai, J. C. L., Cheung, H., Lee, W. M., & Yu, H. (1998). The utility of the revised Life Orientation Test to measure optimism among Hong Kong Chinese. International Journal of Psychology, 33, 45-56.

Lai, J. C. L. & Wan, W. (1996). Dispositional optimism and coping with academic examinations. Perceptual & Motor Skills, 83, 23-27.

Lai, J. C. L., & Wong, W. S. (1998). Optimism and coping with unemployment among Hong Kong Chinese women. Journal of Research in Personality, 32, 454-479.

Landy, F. (1992). Work design and stress panel. In P. Keita, & S. S. Sauter (Eds.), Work and Well Being, Washington, DC: American Psychological Association, 115-158

Lazarus, R. S. (1991). Psychological stress in the workplace. In P. L. Perrewé (Ed.),

Handbook on job stress. CA: Select Press.

Liu, F. Y. (1991). The Generalizability of the NEO-Personlity Inventory to an university sample in Hong Kong. Unpublished undergraduate thesis, Chinese University of Hong Kong.

Lu, L., Kao, S. F., Cooper, C. L., & Spector, P. E. (2000). Managerial stress, locus of control, and job strain in Taiwan and UK: A comparative study. International Journal of Stress Management, 7, 209-220.

Luna, T.D., French, J., & Mitcha, J. L. (1997). A study of USAF air traffic controller shiftwork: sleep, fatigue, activity, and mood analyses. Aviation Space and Envionmental Medicine, 68, 18-23.

Marx, D. A., & Graeber, R.C. 1994. Human error in aircraft maintenance, in Johnston. N., McDonald, N., & Fuller, R. (eds), Aviation Psychology in Practice, 87-104. Aldershot: Avebury.

McCrae, R. R., & Costa, P. T., Jr. (1984). Emerging lives, enduring positions: Personality in adulthood. Boston: Little, Brown and Company.

Maurina, D. E., Reason, J., Johnston, N., & Lee, R. B. 1995, Beyond aviation human factors. Brookfield, VT: Ashgate.

Nelson, D. L., & Sutton, C. (1990). Chronic work stress and coping: A longitudinal study and suggested new directions. Academy of Managerial Journal, 33, 859-869.

Oshagbemi, T. (1999). Overall job satisfaction: How good are single vs. multiple-item measures? Journal of Managerial Psychology, 14, 388-403.

Russell, P. D. 1994. Management strategies for accident prevention, Air Asia, 6, 31-41.

Ryland, E., & Greenfeld, S. (1991). Work stress and well being. In P. Perrewé (Ed.), Handbook on job stress (pp.39-54). Corte Madera, CA: Select Press.

Schat, A. C. H., & Kelloway, E. K. (2000). The effects of perceived control on the outcomes of workplace aggression and violence. Journal of Occupational Health Psychology, 4, 386-402.

Schat, A. C. H., & Kelloway, E. K. (2003). Reducing the adverse consequences of workplace aggression and violence: The buffering effects of organizational support. Journal of Occupational Health Psychology, 8, 110-122.

Schat, A. C. H., Kelloway, E. K., & Desmarais, S. (2005). The physical health questionnaire (PHQ): Construct validation of a self-report scale of somatic symptions. Journal of Occupational Health Psychology, 10, 363-381.

Scheier, M. F., & Carver, C. S. (1985). Optimism, coping and health: assessment and implications of generalized outcome expectancies. Health Psychology. 4, 219-247.

Scheier, M. F., & Carver, C. S. (1992). Effects of optimism on psychological and physical well-being: Theoretical Overview and Empirical Update. Cognitive Therapy and Research, 16, 201-228.

Scheier, M. F., & Carver, C. S. (1993). On the power of positive thinking: The benefits of being optimistic. Current Directions in Psychological Science, 2(1), 26-30.

Semmer, N. (1996). Individual differences, work stress and health. In M. J. Schabracq, J. A. M. Winnubst, & C. L. Cooper (Eds.), Handbook of Work and Health Psychology. Chichester: John wiley.

Siu, O. L. (2001). Moderating the stress impact of environmental conditions: the effect of organizational commitment in Hong Kong and China. Journal of Environmental Psychology, 21, 353-368.

Siu, O. L. (2002). Managerial stress in Greater China: the direct and moderator effects of coping strategies and work locus of control. Applied Psychology: An International Review, 51(4), 608-632.

Siu, O. L. (2003). Job stress and job performance among employees in Hong Kong: The role of Chinese work values and organizational commitment. International Journal of Psychology, 38(6), 337-347.

Sparks, K., Cooper, C., Fried, Y., & Shirom, A. (1997).The effects of hours of work on health: A meta-analytic review. Journal of Occupational and Organizational Psychology, 70(4), 391-408.

Spence, J. T., Helmreich, R. L., & Pred, R. S. (1987). Impatience versus achievement strivings in the Type A pattern: Differential effects on students' health and

academic performance. Journal of Applied Psychology, 72, 522-528.

Spielberger, C. D. (1986). Preliminary professional manual for the job stress survey (JSS). Odessa, FL: Psychological Assessment Resources.

Spielberger, C. D., & Vagg, P. R. (1999). Job stress survey- professional manual. Odessa, FL: Psychological Assessment Resources.

Spielberger, C. D., & Reheise, E. C. (1995). Measuring occupational stress: The Job Stress Survey. In R. Crandall, & P. L. Perrewé. (Eds). Occupational stress: A handbook. Series in health psychology and behavioral medicine. Philadelphia, PA, US: Taylor & Francis

Spielberger, C. D., Reheise, E. C., Reheiser, J. E., & Vagg, P. E. (2000). Measuring stress in the workplace: The job stress survey. In D. T. Kenny, J.C. Carlson, E.J. McGuigan & J. L. Sheppard (Eds.), Stress and health: Research and clinical applications. The Netherlands: Harwood Academic Publishers.

Sumi, K. (1997). Optimism, social support, stress, and physical and psychological well-being in Japanese women. Psychological Reports, 81, 299-306.

Suls, J. (2001). Affect, stress, and personality. In J. P. Forgas (Ed.). Handbook of affect and social cognition. Mahwah, NJ: Lawrence Erlbaum.

Sutherland, V. J., & Cooper, C. L. (2002). Models of job stress. In J. C. Thomas, & M. Hersen (Eds.), Handbook of mental health in the workplace. USA: Sage

Publications, Inc.

Tokar, D. M., Fischer, A. R., & Subich, L. M. (1998). Personality and vocational behavior: a selective review of the literature, 1993-1997. Journal of Vocational Behavior, 53(2). 115-153.

Trimpop, R. K. B., Athanasou, J.,& Cooper, C. (2000). Individual differences in working hours, work perceptions and accident rates in veterinary surgeries. Work & Stress, 14, 181-188.

Van Heck, G. L. (199). Personality and physical health: Toward an ecological approach to health-related personality research. European Journal of Personality Research, 11, 415-443.

Vener, K. J., Szabo, S., & Moore, J. G. (1989). The effect of shift work on gastrointestinal (GI) function: a review. Chronobiologia, 16, 421-439.

Wan, W. W. N., Luk, C. L., & Lai, J. C. L. (2000). Personality correlates of loving styles among Chinese students in Hong Kong. Personality and Individual Differences, 29, 169-175.

Widiger, T.A., & Trull, T.J. (1992). Personality and psychopathology: An application of the five-factor model. Journal of Personality, 60, 363-393.

Wong, C. K., & Lai, J. C. L. (2004), Occupational stress, neuroticism, and psychological well-being among public bus drivers in Hong Kong. International Journal of

Psychology, 39, 439-440.

Williams, D. G., (1992). Dispositional optimism, neuroticism, and extraversion. Personality and Individual Differences, 13(4), 475-477

Williams, S., & Cooper, C. L. (1997). Occupational stress indicator. In C. P. Zalaquett & R. J. Wood (Eds.), Evaluating stress: A book of resources. FL: Scarecrow Press, Inc

Williams, S., & Cooper, C. L. (1998). Measuring occupational stress: Development of the Pressure Management Indicator. Journal of Occupational Health Psychology, 3, 306-321.

Wright, L. A., & Smye, M. D. (1996). Corporate abuse: How lean and mean robs people and profits. New York: Macmillan.

星島日報 (2006 年 11 月 21 日). 九成六專業人士承認有工作壓力. 星島日報. Retrieved from http://hk.news.yahoo.com/061121/60/1wt4q.html.

星島日報 (2006 年 12 月 30 日). 學者指工作壓力是家庭問題惡化主因. 星島日報. Retrieved from http://hk.news.yahoo.com/061230/60/1z3ed.html.

星島日報 (2006 年 12 月 30 日). 十大安全航空公司. 星島日報. Retrieved from http://hk.news.yahoo.com/070323/60/24b7h.html.

Table 1 Distribution of Demographic Variables

	Frequency	*Percentage (%)*
Gender		
Male	130	94.2
Female	8	5.8
Marital Status		
Single	112	81.2
Married	21	15.2
Divorced	0	0
Widowed	1	0.7
N.A.	4	2.9
Educational level		
Primary	1	0.7
Junior Secondary	16	11.6
Senior Secondary	43	31.2
Diploma/ Degree	66	47.8
Post-graduate	7	5.1
N.A.	5	3.6

	Frequency	*N.A.*	*Mean*	*SD*	*Range*
Age	135	3	26.59	5.57	18-48
Working Year	134	4	4.48	6.53	0.25-34
Assumed Working Hours	129	9	48.1	6.82	40-70
Actual Working Hours	132	6	50.82	9.84	35-70
Absence within 3 months	134	4	1.05	1.93	0-13

Table 2 Means, Standard Deviations, Correlations and Coefficient Alphas for the Main Variables

Variables	*M*	*SD*	α	*1*	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*	*11*	*12*
1 TS	670.18	454.01	.96	–	.95***	.94***	-.34***	.39***	.48***	-.27**	-.33***	-.10	.05	.22*	.13
2 JP	214.72	157.09	.89		–	.81***	-.33***	.38***	.47***	-.23**	-.29**	-.07	.09	.18*	.10
3 LS	219.46	163.26	.89			–	-.38***	.39***	.42***	-.29**	-.29**	-.13	-.02	.20*	.10
4 JS	14.12	2.81	.30				–	-.19*	-.22*	.09	-.01	.16	.05	-.21*	-.06
5 PH	39.96	13.06	.83					–	.60***	-.10	.38***	.00	.01	.11	-.04
6 WI	16.67	5.99	.84						–	-.10	.15	-.08	.01	.19	-.01
7 LOT	18.22	3.73	.68							–	-.42***	.36***	.22**	-.14	-.13
8 NEU	37.55	6.84	.80								–	-.20**	-.08	.12	.15
9 SP	15.61	3.55	.64									–	.54***	.01	-.01
10 CP	24.03	4.70	.78										–	-.03	-.08
11 AB	1.05	1.93	–											–	.10
12 EHR	2.25	8.34	–												–

Notes. TS = Total Stress (JSS Index Items); JP = Job Press (JSS Index Items); LS = Lack of Organizational Support (JSS Index Items); JS = Job Satisfaction; PH = Physical Health; WI = Work Injury; LOT = Optimism; NEU = Neuroticism; SP = Support Coping; CP = Control Coping; AB = Illness absence; EHR = Extra Working Hours.

Table 3 Hierarchical Regression with Job Satisfaction, Physical Health, and Work Injury as Dependent Variables

		Job Satisfaction				Physical Health				Work Injury			
Step	**Predictor**	**β**	R^2	ΔR^2	F	**β**	R^2	ΔR^2	F	**β**	R^2	ΔR^2	F
1	Control variables		.03	–	1.75		.01	–	.70		.02	–	.73
	Illness absence	-.15				.11				.12			
	Extra working hours	-.05				-.04				.04			
2	Predictor variable		.15	.12	6.66***		.13	.12	6.07***		.22	.20	7.68***
	Total stress	-.35***				.36***				.46***			
3	Moderator variables		.16	.02	3.19**		.26	.12	5.63***		.23	.01	3.38**
	Optimism	.00				.12				.06			
	Neuroticism	-.08				.41**				.10			
	Support coping	.15				.04				-.10			
	Control coping	-.07				.04				.06			
4	Interaction		.20	.03	2.46**		.34	.08	5.14***		.37	.14	4.05***
	Total stress x Optimism	-.06				.13				.10			
	Total stress x Neuroticism	-.15				-.04				.22*			
	Total stress x Support coping	.03				-.30*				.10			
	Total stress x Control coping	.06				-.03				-.39*			

Notes.

F: F responsible for ΔR^2

* $p < .05$; ** $p < .01$; *** $p < .001$

Figure 1 The Moderating Effect of Support Coping on the Relationship of Total Stress and Physical Health

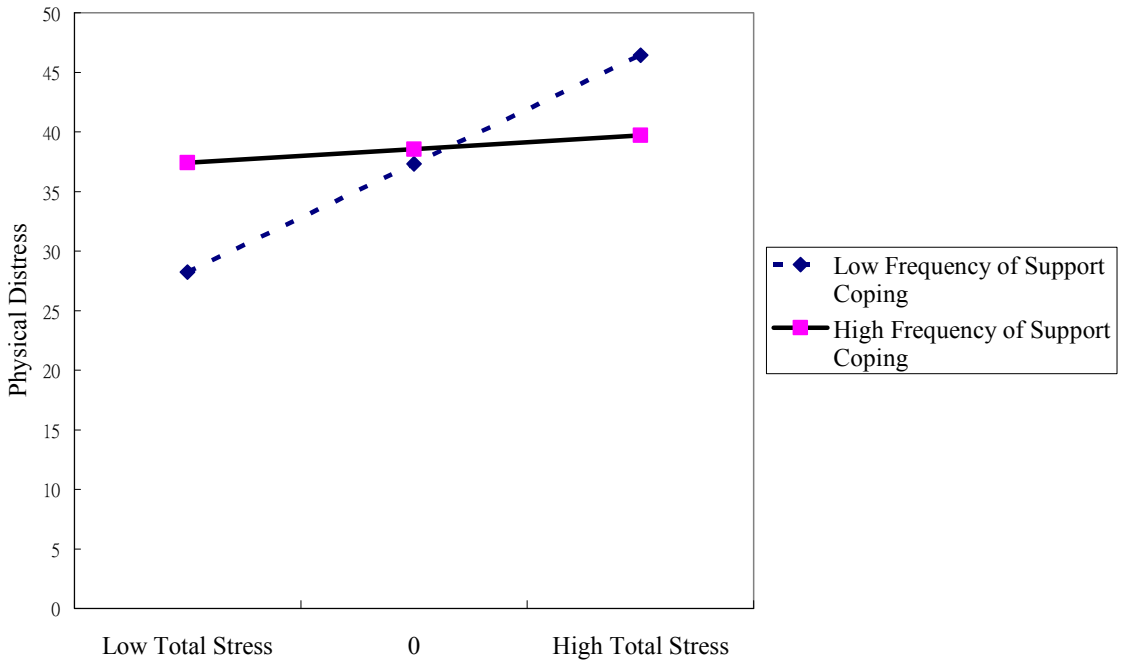


Figure 2 The Moderating Effect of Neuroticism on the Relationship of Total Stress and Work Injury

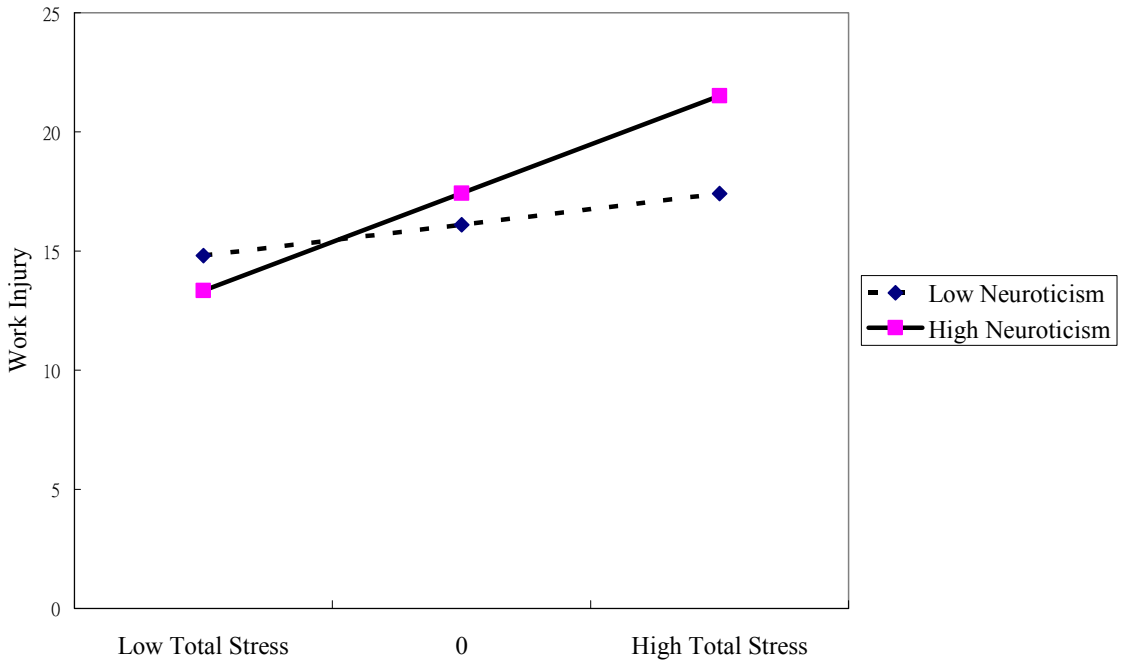
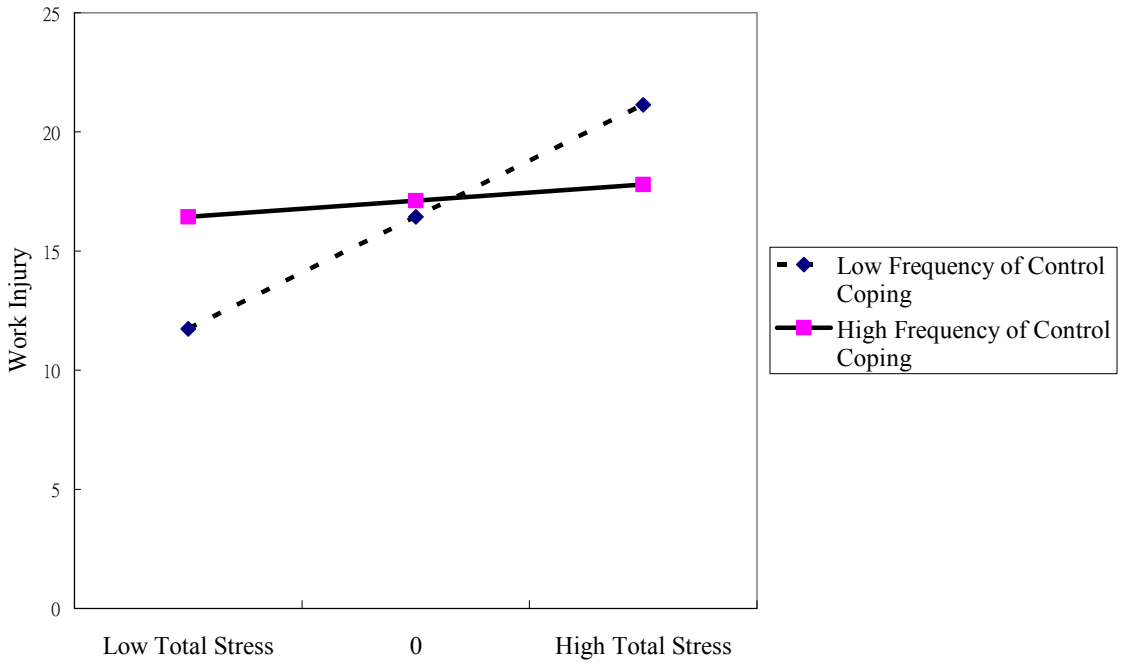


Figure 3 The Moderating Effect of Control Coping on the Relationship of Total Stress and Work Injury



Appendix

您好，本人是城市大學心理學三年級學生。現正進行一項有關本港飛機維修人員的工作生活質素問卷調查。希望　閣下抽一點時間回答下列問題。問卷答案沒有對錯之分，您只須根據您的經驗和觀點作答。所有資料均絕對保密，及於本調查完結後立即銷毀。

當您填寫問題時，請確定已閱讀所有指示。在此多謝您參與是次調查。

工作壓力來源

(甲. 以下各項工作事件都可能成爲工作壓力來源。請根據自己的實際情況，選出各項事件的相應壓力程度。**請注意: 第一項事件"被派遣不同意的職務"通常是構成中等的壓力程度(5)，也是量度各項事件的壓力程度標準。若你感到某項事件令你感到壓力高於標準，請選擇(5)以上的數字。相反，若果某項事件令你感到壓力低於標準，請選擇(5)以下的數字。若果某項事件令你感到壓力等同於標準，請選擇(5)。**)

	壓力程度 (1.非常低……. 5. 中等……. 9.非常高)								
1. 被派遣不同意的職務	1	2	3	4	***5***	6	7	8	9
2. 超時工作	1	2	3	4	5	6	7	8	9
3. 缺乏晉升機會	1	2	3	4	5	6	7	8	9
4. 被派遣新的或不熟悉的職務	1	2	3	4	5	6	7	8	9
5. 同事們疏忽職守	1	2	3	4	5	6	7	8	9
6. 上司支持/援不足	1	2	3	4	5	6	7	8	9
7. 處理危機	1	2	3	4	5	6	7	8	9
8. 良好的工作表現缺乏認同	1	2	3	4	5	6	7	8	9
9. 需要執行工作範疇以外的工作	1	2	3	4	5	6	7	8	9
10. 工作設備不足或質素惡劣	1	2	3	4	5	6	7	8	9
11. 處理責任很重的職務	1	2	3	4	5	6	7	8	9
12. 工作中靜止的時段	1	2	3	4	5	6	7	8	9
13. 與上司相處有困難	1	2	3	4	5	6	7	8	9
14. 對現職機構抱著負面態度	1	2	3	4	5	6	7	8	9
15. 處理職務時人手不足	1	2	3	4	5	6	7	8	9
16. 需要即時作出重要決定	1	2	3	4	5	6	7	8	9
17. 遭到顧客/消費者/同事的侮辱	1	2	3	4	5	6	7	8	9
18. 缺乏制訂決策的參與	1	2	3	4	5	6	7	8	9
19. 工資不足夠	1	2	3	4	5	6	7	8	9
20. 晉升的競爭	1	2	3	4	5	6	7	8	9
21. 不足夠或差劣的指導	1	2	3	4	5	6	7	8	9
22. 嘈吵的工作環境	1	2	3	4	5	6	7	8	9
23. 受到頻密的干擾	1	2	3	4	5	6	7	8	9
24. 經常由沉悶的工作轉至苛刻的工作	1	2	3	4	5	6	7	8	9
25. 過量的文書工作	1	2	3	4	5	6	7	8	9
26. 追趕工作限期	1	2	3	4	5	6	7	8	9
27. 私人時間不足(例如:小休或午膳時間)	1	2	3	4	5	6	7	8	9
28. 需要替另一僱員處理他/她的職務	1	2	3	4	5	6	7	8	9

29. 工作動機很低的同事	1	2	3	4	5	6	7	8	9
30. 與其他部門的衝突	1	2	3	4	5	6	7	8	9

(乙. 以上各項工作事件有否在<u>六個月</u>內發生?請根據自己的實際情況，選出各項事件
出現的天數。若某項事件在六個月內未曾發生，請選擇(0)。若某項事件在六個月內持續了 9 天或以上，請選擇(9+))

	事件出現的天數									
1. 被派遣不同意的職務	0	1	2	3	4	5	6	7	8	9+
2. 超時工作	0	1	2	3	4	5	6	7	8	9+
3. 缺乏晉升機會	0	1	2	3	4	5	6	7	8	9+
4. 被派遣新的或不熟悉的職務	0	1	2	3	4	5	6	7	8	9+
5. 同事們疏忽職守	0	1	2	3	4	5	6	7	8	9+
6. 上司支持/援不足	0	1	2	3	4	5	6	7	8	9+
7. 處理危機	0	1	2	3	4	5	6	7	8	9+
8. 良好的工作表現缺乏認同	0	1	2	3	4	5	6	7	8	9+
9. 需要執行工作範疇以外的工作	0	1	2	3	4	5	6	7	8	9+
10. 工作設備不足或質素惡劣	0	1	2	3	4	5	6	7	8	9+
11. 處理責任很重的職務	0	1	2	3	4	5	6	7	8	9+
12. 工作中靜止的時段	0	1	2	3	4	5	6	7	8	9+
13. 與上司相處有困難	0	1	2	3	4	5	6	7	8	9+
14. 對現職機構抱著負面態度	0	1	2	3	4	5	6	7	8	9+
15. 處理職務時人手不足	0	1	2	3	4	5	6	7	8	9+
16. 需要即時作出重要決定	0	1	2	3	4	5	6	7	8	9+
17. 遭到顧客/消費者/同事的侮辱	0	1	2	3	4	5	6	7	8	9+
18. 缺乏制訂決策的參與	0	1	2	3	4	5	6	7	8	9+
19. 工資不足夠	0	1	2	3	4	5	6	7	8	9+
20. 晉升的競爭	0	1	2	3	4	5	6	7	8	9+
21. 不足夠或差劣的指導	0	1	2	3	4	5	6	7	8	9+
22. 嘈吵的工作環境	0	1	2	3	4	5	6	7	8	9+
23. 受到頻密的干擾	0	1	2	3	4	5	6	7	8	9+
24. 經常由沉悶的工作轉至苛刻的工作	0	1	2	3	4	5	6	7	8	9+
25. 過量的文書工作	0	1	2	3	4	5	6	7	8	9+
26. 追趕工作限期	0	1	2	3	4	5	6	7	8	9+
27. 私人時間不足 (例如:小休或午膳時間)	0	1	2	3	4	5	6	7	8	9+
28. 需要替另一僱員處理他/她的職務	0	1	2	3	4	5	6	7	8	9+
29. 工作動機很低的同事	0	1	2	3	4	5	6	7	8	9+
30. 與其他部門的衝突	0	1	2	3	4	5	6	7	8	9+

<u>工作滿足感</u>
(以下各項是關於您在公司裡的工作滿足感，請根據自己的實際情況，選擇每項的適當答案)

1. 非常不同意　2. 不同意　3. 沒有意見　4. 同意　5. 非常同意

1.	你會向朋友推介你現時的工作	1	2	3	4	5
2.	若果給你多一次選擇的機會，你也會再選擇現時這份工作	1	2	3	4	5
3.	你很有可能去找一份新的工作	1	2	3	4	5
4.	你現時的工作滿足程度與你最初想得到的相同	1	2	3	4	5
5.	整體來說，你是滿足於現時的工作	1	2	3	4	5

身體狀況

(以下各項是關於您的健康情況，請根據自己的實際情況，選擇最能表達您過去一個月健康情況的答案)

1.從不　2.甚小　3.間中　4.有時　5.常常　6.經常　7.大部份時間

1.	你會於晚上難以入睡嗎?	1	2	3	4	5	6	7
2.	你會於睡夢中驚醒嗎?	1	2	3	4	5	6	7
3.	你會經常做惡夢嗎?	1	2	3	4	5	6	7
4.	你每晚都安然入睡嗎?	1	2	3	4	5	6	7
5.	你經常頭痛嗎?	1	2	3	4	5	6	7
6.	當你要把事情做妥而有很大壓力時，你會經常頭痛嗎?	1	2	3	4	5	6	7
7.	當事情沒像如期中發展，或你被某人困擾著，使你感到沮喪的時候，你會經常頭痛嗎?	1	2	3	4	5	6	7
8.	你會經常腸胃不適(消化不良)嗎?	1	2	3	4	5	6	7
9.	你會經常留意自己的飲食去避免腸胃不適嗎?	1	2	3	4	5	6	7
10.	你會經常想作嘔嗎(因腸胃不適)?	1	2	3	4	5	6	7
11.	你會經常便秘或腹瀉嗎?	1	2	3	4	5	6	7

12.	你會經常患小感冒嗎? (雖然令你感到不適，但沒有使你留在床上休息或令你不能工作)	沒有	1 次	2 次	3 次	4 次	5 次	6 次	7+次
13.	你會經常患上比較嚴重的呼吸道感染疾病，例如支氣管炎，鼻竇炎等，令你臥病在床?	沒有	1 次	2 次	3 次	4 次	5 次	6 次	7+次
14.	當你患上感冒或流行性感冒時，通常會持續多久?	沒有	1 日	2 日	3 日	4 日	5 日	6 日	7+日

工作受傷

(以下各項是在工作上較常見的受傷，請根據自己的實際情況，選擇每項的適當程度)

1. 從不 2. 甚少 3. 有時 4. 經常 5. 頻頻

1.	肌肉或韌帶扭傷	1	2	3	4	5
2.	割傷	1	2	3	4	5
3.	燙傷或燒傷	1	2	3	4	5
4.	撞傷	1	2	3	4	5
5.	骨折	1	2	3	4	5
6.	脫骸	1	2	3	4	5
7.	嚴重肌肉或背部痛楚	1	2	3	4	5
8.	起“水泡”	1	2	3	4	5

生活傾向

(請表示您對以下句子同意或不同意的程度。)

0. 非常不同意 1. 不同意 2. 沒有意見 3. 同意 4. 非常同意

1.	當前途未定的時候，我通常會預想好的結果。	0	1	2	3	4
2.	展望將來，我看不到有令我開懷的境況。	0	1	2	3	4
3.	我對前景常感樂觀。	0	1	2	3	4
4.	我很少想過事情會盡如我意。	0	1	2	3	4
5.	我很少預計好事會發生在我身上。	0	1	2	3	4
6.	總的來說，我預期發生在我身上的好事會多過壞事。	0	1	2	3	4

一般行爲模式

(對您來說，下面描述是否正確?請根據自己的實際情況，選擇每項的適當程度)

0. 非常不同意 1. 不同意 2. 沒有意見 3. 同意 4. 非常同意

1.	我不是一個充滿煩惱的人。	0	1	2	3	4
2.	我很多時感到自己不如別人。	0	1	2	3	4
3.	當我處於極大壓力，我有時會感到好像精神崩潰似的。	0	1	2	3	4
4.	我很少感到寂寞或憂鬱。	0	1	2	3	4
5.	我經常感到緊張和心神不定。	0	1	2	3	4
6.	有時我感到自己完全一文不值。	0	1	2	3	4
7.	我甚少感到恐懼及焦慮。	0	1	2	3	4
8.	我很多時會因他人對待我的方式而感到憤怒。	0	1	2	3	4
9.	很多時當事情不對勁時，我會感到挫敗及想放棄。	0	1	2	3	4
10.	我很少感到憂鬱及沮喪。	0	1	2	3	4
11.	我很多時感到無助，並希望有人能解決我的問題。	0	1	2	3	4
12.	有時我會羞愧得想躲起來。	0	1	2	3	4

適應行爲

(下列各項爲應付壓力的方法，請根據自己的實際情況，選擇每項的使用程度)

1. 從不使用　　2. 甚少使用　　3. 偶爾使用
4. 有時使用　　5. 經常使用　　6. 頻頻使用

1. 借助興趣及消遣。	1	2	3	4	5	6
2. 嘗試用客觀，理智的方法處理事情。	1	2	3	4	5	6
3. 有效地分配時間。	1	2	3	4	5	6
4. 向理解你的朋友傾訴。	1	2	3	4	5	6
5. 預早計劃。	1	2	3	4	5	6
6. 擴闊工作以外的興趣及活動。	1	2	3	4	5	6
7. 選擇性地集中精神(如:把精神集中在某些具體的問題上)。	1	2	3	4	5	6
8. 將問題按輕重緩急排列並依次序處理。	1	2	3	4	5	6
9. 嘗試從旁觀者的角度考慮事情。	1	2	3	4	5	6
10. 盡量尋找更多人的支持。	1	2	3	4	5	6

背景資料

個人及家庭資料:

1. 性別:　　1. □ 男　　2. □ 女
2. 年齡: _____ 歲
3. 婚姻狀況:　　1. □ 單身　2. □ 已婚　3.□ 離婚　4.□ 喪偶
4. 教育程度:　　1. □ 小學程度　　2. □ 初中程度　3. □ 高中程度
   4. □ 大專/大學程度　5. □ 學位以上程度
5. 在目前公司工作的年數: _____ 年
6. 你一週應需要工作的時數: _____ 小時
7. 實際上，你一星期工作的時數: _____ 小時
8. 在過去的三個月(或 12 週內)，你請了多少天病假: _____ 天

~~~~~ **全卷完，非常感謝你的參與！** ~~~~~
~~~~~