

PSYCHOLOGICAL STRESS ISSUES AMONG AIRLINE PILOTS

by

James William Stewart

A Master's Research Project Submitted in Partial Fulfillment

of the Requirements for the Degree

Master of Arts

LIBRARY • OTTAWA UNIVERSITY
OTTAWA, KANS.

OTTAWA UNIVERSITY

August 1998

PSYCHOLOGICAL STRESS ISSUES AMONG AIRLINE PILOTS

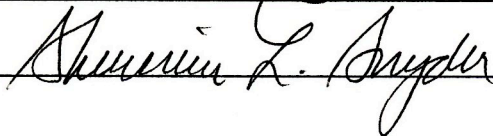
by

James William Stewart

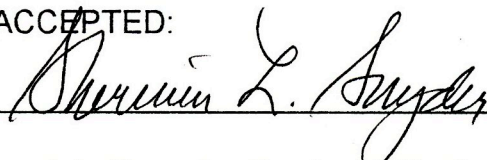
has been approved

APPROVED:





ACCEPTED:



Associate Dean for Graduate Studies

ABSTRACT

The purpose of the study was to identify stressors which adversely affect professional airline pilots. Literature on airline pilot stress, psychological stress and stress management techniques was reviewed. The Pilot Stress Inventory was administered to a sample of 15 pilots from a major U.S. airline. The stress reporting results indicated that Personality Stressors accounted for the highest stress level. The results suggest that cognitive-behavioral stress management techniques would be most effective in treating airlines pilots suffering from stress.

TABLE OF CONTENTS

CHAPTER I THE PROBLEM

Introduction	1
Development of the Problem	2
Need for the Study.	4
Purpose of the Study.	4
Research Question.	5
Definition of Terms.	5

CHAPTER 2 LITERATURE REVIEW

Introduction.	7
Psychological Stress and its Effects.	7
Stress Management Techniques.	9
Psychological Stress and Airline Pilots	12
Summary.	18

CHAPTER 3 METHODOLOGY

Introduction.	19
Research design.	19

Sample and Population.	19
Instrumentation.	20
Procedure.	22
Method of Analysis.	23

CHAPTER 4 PRESENTATION AND ANALYSIS OF THE DATA

Demographic Data.	24
Stress Inventory Data Findings.	25

CHAPTER 5 SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

Summary.	26
Conclusions.	26
Recommendations.	27

REFERENCE LIST.	30
-----------------	----

APPENDIX A.	32
-------------	----

CHAPTER 1

THE PROBLEM

Introduction

Mental health practitioners have practiced their trade with many different populations, including "stressed-out" employees and workers. Airline pilots are among the population they serve (Johnson, 1989). Various employee assistance companies have developed stress management programs for corporate America, including high-stress related occupational fields such as police and the airlines (Deitz and Thoms, 1991). Such programs have, amongst their goals, developed psychological stress management trainings for employees suffering high levels of psychological stress and applied the techniques used with these populations to airline personnel, namely pilots, as well. However, little information has surfaced to specifically assist the practitioner with prevention and treatment of psychological stress experienced by airline pilots.

This research will provide the mental health practitioner with comprehensive information on pilots, specifically airline pilots, and effective treatment methods for their unique forms of psychological stress. Information on psychological stress among airline pilots include pilot personality factors, life and technology related stressors and pilot stress management methods. In addition, effective psychometric testing tools to measure psychological stress, an opinion survey on psychological stress, effective pilot stress management techniques and therapies and effective therapeutic techniques for the

management of pilot psychological stress are also presented.

Development of the Problem

Airline accidents are certainly not a new phenomena, and have in fact been an unfortunate part of aviation since the beginning of airline travel in the 1920's (Haws, 1989). As of 1984, the costs of airline accidents since the early 1950s was approximately 4 billion dollars and the costs in lives lost or injuries sustained can be numbered in the thousands (Billings and Reynard, 1984). Many of these accidents can be traced to misjudgments in the decision-making process of pilots which lead to misapplication of control inputs, causing accidents in many cases. Such misjudgments are often labeled 'pilot error', and research has correlated pilot psychological stress to incorrect performance of flight duties (McFarland, 1953; Sloan and Cooper, 1989).

In addition, pilots have been coping with stress in the cockpit since the inception of aviation, however, it has been only within the past 45 years that psychological stress has been factored into the 'pilot error' equation, and only in the past 15 years since it has gained considerable attention from researchers (McFarland, 1953; Sloan, 1985). For example, before 1950, little information on pilot mental stress and its link to performance in the air seemed to surface. For instance, in 1943 Zim reported many physiological potentials leading to pilot errors, but no research or information on how psychological condition affects flight behavior. In the early 1950s, research on psychological stress effects on airline pilot performance began to gain more attention from researchers but was

still not considered a major issue in aviation. However, by the late 1970s and 1980s, the topic had started receiving its due attention from researchers (Sloan, 1985; Alkov, Gaynor, and Borowsky, 1985).

Most literature on the topic recognizes the need for practitioners to address pilot stress (Johnson, 1989; Sloan and Cooper, 1986). For example, self-help remedies for stress symptoms as well as individual counseling are suggested means for pilots to manage psychological stress. Mental relaxation exercises are often provided for the pilot-reader to utilize. If such techniques do not seem to work for the pilot, individual counseling is often suggested as the next attempted resource, in order to address possibly deep-seeded issues which might interfere with self-relaxation/stress reduction effectiveness. In addition, having complete aircraft knowledge reduces a potential of slow response to emergencies situations such as sudden mechanical or engine difficulties. This degree of aircraft knowledge is akin to a pilot's symbiotic relationship with an airplane, where a pilot feels no differentiation between himself or herself and the airplane; they are "as one" with each other.

Although the idea of stress management for pilots may not be anything new, evidence of current practice in counseling pilots suggests that there has been little in the way of specific material, geared towards the mental health professional, on the prevention and treatment of airline pilot psychological stress. Surprisingly, there also seems to be little research on specific materials that bridge the treatment of technological stress and psychological stress in a

manner that might motivate more pilots to engage in stress management for the safety of their passengers, as well as for their own welfare.

Need for the Study

Every year, people view, read, and hear media reports of airline accidents. Unfortunately, many of these accidents involve fatalities and serious injuries to both crew and passengers. In addition, pilot error and psychological stress leading to pilot error have been determining factors in airline accidents (McFarland, 1953 and Gaffney, Rosen, and Bender, 1990). Therefore, providing the mental health practitioner with an effective therapeutic program geared towards assisting the airline pilot population with managing psychological stress, could increase the delivery of valuable information for pilots and airlines, by providing practitioners with a much-needed comprehensive program for the treatment of pilot stress. The successful implementation of such a program could, in turn, lead to safer behavioral outcomes in the cockpit, and a safer air travel system. Thus, this research may offer practitioners a new avenue of specialization, where their work could very well save many lives, by providing a delivery system of stress management counseling for pilots, much needed to reduce airline accidents.

Purpose of the Study

The purpose of the study was to identify stressors which adversely affect professional airline pilots.

Research Question

The specific question that this study addressed was: what are the stressors which adversely affect professional airline pilots?

Definition of Terms

What is meant by the term stress? According to Webster (1989), stress is "mental or physical tension or strain." One can also define psychological stress by describing what it is not (Ruff, 1963). Non-stressed bodily systems maintain a measured level within a specified range. This range is considered the "unstressed" range. Any stress measure or reading which falls outside of, or exceeds this range is considered 'stress.'

These definitions, however, do not provide a comprehensive explanation of the airline pilot's stress experiences (Thomas, 1989). Pilot stress is defined as "an unresolved pressure, strain, or force, acting upon the pilot's mental and physical systems which, if continued, will cause damage to those systems (Sloan and Cooper, 1989)."

Technological stress relates to stress associated with the operation of high-tech equipment. Technological stress literature has been linked to stress experienced by those who work with machines and equipment. Part of the pilot's job requires a symbiotic relationship with the airplane, or becoming "as one" with the airplane.

The term 'pilot error' refers to a mistake made by a pilot, and is a causative agent of aircraft accidents. Pilot error is often the result or the

behavioral outcome of mental stress (Sloan and Cooper, 1986). Thus, mental stress can be considered an indirect cause to pilot error and airline accidents.

The term 'stressor' defines variables which are considered as stress-producing agents (Burns, 1963). For the purpose of this guide, stressors, will be grouped into three major areas; work-related, home-related, and person-related.

CHAPTER 2

LITERATURE REVIEW

Introduction

Much of the research on this topic focuses on how the pilot can affect change in personal reaction to stressors, with little emphasis on how the practitioner can assist airline pilots. The review is divided into two sections. Section one describes stress, and psychological stress in particular, with reference to behavioral outcomes of an unspecified or defined population. Section Two discusses stress management techniques for the mental health practitioner or therapist. Finally, stressors characteristic of airline pilots will be addressed in the third section.

Psychological Stress and its Effects

Emotional or psychological stress has been likened to the "fight or flight response," where one's body is mobilized for action, and can affect physiological changes in the body as well (Barrow, 1994). Such physiological changes include heart rate, blood pressure, and muscle tension. Stress can be helpful by motivating a person to perform activities, such as studying for a test, or by increasing mental alertness, such when taking tests or giving a presentation.

However, problems imposed by stress occur when amounts of it exceed productive levels and interferes with one's ability to think clearly. Such problems range from changes in emotional or behavioral patterns and memory recall, to weakened emotional response reflexes (Barrow, 1994; Sime, 1996).

Other perceptual/psychological signs and symptoms of psychological stress include forgetfulness, preoccupation, thought blocking, errors in judging distance, diminished or exaggerated fantasy life, reduced creativity, lack of attention to detail, mental orientation to the past, decreased psychomotor reactivity and coordination, thought disorganization, and lack of control or too much need for control (Barrow, 1994; Sime, 1996).

Similarly, stress can negatively affect physiological functioning with such stress-related physical disorders, however, this is not an area under investigation in this study, and is only briefly mentioned in the study for clarity.

Furthermore, certain socio-cultural factors influence one's susceptibility to stress (Sime, 1996). These include age, sex, and cultural variables. The young and the elderly are the most stress prone, as are men for heart disease from stoicism and anger issues, and women to immune system disorders and cancer. It is understood that such findings are only representative of general research trends and not of all persons in the specific study population.

Several concepts relate to the individual impact of psychological stress. These include self-perception, locus of control, learned helplessness, self-efficacy, impact of change in life events, role of uncertainty, overload and burnout, and self-generated stressors (Sime, 1996).

Likewise, several types of mental and physiological stressors have been identified in non-specific populations (Sime, 1996). Psychological stressors include attitude, personality, self-esteem, and ethnicity. Physical stressors

include the environment, nutrition, drugs and chemicals. Role stressors include role conflict/abiguity and issues relating to mutiple roles. Sociological issues include political, economic, ethnic, and cultural background. Physical illness/disability includes birth defects and chronic illnesses. Biomechanical stressors include physical strains on the job, such as computer operators' having to deal with Carpal Tunnel Syndrome, and repetitive motions. In addition (Bunce & West, 1996), placing the focus of job stress management on innovative process variables, such as changing work methods and changing interaction patterns with colleagues, shows promise in reducing occupational stress. Finally, the stages of human growth and developement in and of themselves are considered stressors due to the physical and emotional growth required at each stage.

Stress Management Techniques

Stress management training originates from contributions of a few researchers. For instance, one original piece of research is Walter Cannon's "fight or flight" theory, where one responds either by acknowledging and facing the source of the stress (fight), or by mentally disengaging from the stress source or not acknowledging the source (flight) (Sime, 1996). Hans Selye's "General Adaptation Syndrome," defined as a patterned, somatic response to harmful stimuli such as physical injury, exposure to temperature extremes, or injection of toxic substances. John Mason challenged the "Non-Specific" response and demonstrated unique, specific responses to stress (Murphy,

1996). Finally, Richard Lazarus' "Appraisal and Coping" method describes how perceptions of life events determines the ability to cope with such events successfully. Within this framework, it is determined that subjective factors play a much greater role in the stress experience than objective factors. For example, one pilot might perceive an aircraft engine failure as a life threatening emergency, while another pilot might perceive and react to that same engine failure as a nuisance which lengthens flight time due to the loss of speed created by the failure (Murphy, 1996).

Several suggested individual techniques for stress management which are not population-specific, are available (Barrow, 1994). and contained under five general headings; progressive-muscle relaxation, meditation, biofeedback, and cognitive-behavioral skills training. In addition, several therapeutic interventions are available for use by practitioners of psychological stress management and which fit under one or more of the above categories (Sime, 1996 and Murphy, 1996). Some of these include Behavioral Rehearsal, Cognitive Restructuring/Reframing, Stress Inoculation, Systematic Desensitization, Anger Management, thought stopping techniques, Control and Perception of Control, Self-Esteem Enhancement, goal setting, Active (Reflective) Listening, modification of life style, and strategies for coping with deprivational stress such as sleep loss and lack of stimulation.

Similarly, other topics are important for training practitioners in stress management therapy (Sime, 1996). For example, the importance of candid, two-

way communications, cueing strategies, how to deal with change resistance, the role of adaptability and flexibility, and recognition of appropriate physiological arousal are several such topics.

Strategies for coping with stress include a Band-Aid Approach, the stress management approach the ideal approach (Orman, M., 1995). The band-aid approach includes using alcohol or drugs, cigarettes, food, sex, or anythings else which might temporarily reduce stress symptoms. While they might work in the short term to alleviate stress symptoms, the long term effects are harmful and thus precludes this approach as desirable. More generic stress management approaches include such activities as dieting, exercising, meditation, and biofeedback. However, as with the previous approach, these only alleviate symptoms temporarily, and focus on symptoms, not the root cause of the stress. Ortman's Ideal Approach consists of modifying or altering the behavioral component which causes the stress. Through an understanding of what causes the stress, one can learn alternate approaches to deal with the problem. One method through which this may be accomplished is by categorizing possible causes into obvious causes and non-obvious causes. Obvious causes usually include visible things that happen to people and around people. Non-obvious causes include conversations and bodily behavioral responses, such as expectations, personal judgements, control needs, approval needs, and evaluative situations.

As a singular approach (Murphy, 1996), cognitive-behavioral skills

training appeared to be most successful, and produced the most consistent results on the psychological outcomes of workers, especially anxiety. Reasons for this include helping workers deal with irrational thoughts leading to anxiety. Taking these principles into account, Murphy (1996) suggests that a combination of approaches provides the most effective relief of stress symptoms. For example, when combining relaxation techniques and cognitive-behavioral skills training workers gained a balance of both somatic and cognitive skills enabling them to be the most effective in managing psychological stress than with the use of a singular technique.

Psychological Stress and Airline Pilots

Research on pilot psychological stress received little serious attention from mental health professionals up to around the early 1940's (Zim, 1943). The reason appears in the literature's focus on physiological affects of stress mostly. Data on psychological effects was very limited, and the issue of pilot psychological stress was just not considered or focused upon. By the late 1980's, more serious attention, yet still somewhat sparse attention, was given to the issue (MacFarland, 1953; Thomas, 1989). Today, little change seems to be evident in pilot psychological stress, let alone airline pilot psychological stress.

McFarland (1953) describes the effects of psychological and neuropsychiatric disorders on pilot performance. Such disorders may differ more in degree and frequency than in type. The author suggests that in any large group of airline pilot population, a certain number of pilots have neurotic

ways of reacting to stress, however, major mental disorders such as manic-depressive and schizophrenia are not often discovered in airline pilots.

In a study of 232 airline pilots, 32 pilots diagnosed with neuropsychiatric disorders complained mostly of excessive anxiety, fatigue, gastrointestinal symptoms, insomnia, and hyperactivity of the sympathetic system (McFarland, 1953). Excessive drinking of twelve of the participants was considered a complicating factor in the maladjustment to their psychiatric disorders.

As might be expected, the suitability to airline flying for the 32 pilots diagnosed with neuropsychiatric disorders was considered rather poor (McFarland, 1953). Several case examples are provided in McFarland's work to support his conclusions.

Airline pilot psychological stressors include many of the same variables common to other populations, however, some variables apply specifically to aviators. Pilots who are mentally taxed with preoccupations not pertinent to flight safety can also be considered, temporarily at least, unfit for flight duty (McFarland, 1953). Such preoccupations may include home life problems, such as marital difficulties, money problems, and even stressors from flight delays and weather problems. As with any human being, pilots are also susceptible to the effects of stressors.

Many factors are identified as personal stressors. For instance, pilots describe control as a stressor (Sloan, 1985). Control is distinguished as an interpersonal stressor and a situational stressor. For example, a captain's

interpersonal control is stressed when others do not follow orders or do not meet performance expectations. A situational control stressor for instance, might include new or unfamiliar experiences and events that proceed incorrectly. Other personal stressors include fatigue and flying patterns which contribute to tiredness and circadian rhythm imbalances.

Home/Work stressors include factors such as level of satisfaction with domestic life and lack of predictability or stability in either of these arenas (Sloan, 1985). In addition, level of satisfaction with pilots' family and co-worker interactions and general state of being at home and work, are important factors for consideration. Other domestic -related stressors include family health and issues associated with children, such as education and health.

Work-related stressors take into consideration many factors (Sloan, 1985). One set of factors are the opportunities or lack of opportunities for advancement, as well as future career uncertainty. In addition, insufficient flying, including not flying enough each month to maintain safe flight proficiency, sharing flying time with co-pilots, and general stress over not having the opportunity to fly as much as desired are also considerations. Scheduling and rostering are another set of reported stressors by pilots. These would include unpredictability with flight schedule, and social problems with the flight roster (Sloan, 1985). For instance, during an airline merger, both companys' pilot seniority rosters are merged, leading some very experienced pilots having to accept undesirable flight routes or times (Deitz and Thoms, 1991; Thomas, 1989). Anxiety over course and

checks is another work-related stressor (Sloan, 1985). This anxiety includes the mental, physical, and temporal preparation needed to ensure successful test outcomes, and the lack of outcome predictability. Another stressor concerns organizational and management issues. Such issues include management style, lack of management support, and morale/organizational climate or mood. Finally, interpersonal problems with other flight crew members and cabin staff contribute to work-related stressors.

Sells and Berry (1961) discuss additional stressors in the lives of pilots, both air and space. They include cosmic radiation, isolation from other persons, weightlessness, sleep deprivation/circadian rhythm imbalances, boredom and physical fatigue.

Along with stressors are the psychological requirements of airline and space pilots (Sells and Berry, 1961). First, there is a certain level of competency and emotional stability required. Knowledge and experience and required to safely execute aircraft controls. High degrees of mental alertness and concentration are necessary along with a proper mental attitude orientated with safety at the helm. This includes the ability to respond quickly and accurately, often under time and workload pressures, to the wide range of possible flight scenarios.

Not all aviation researchers embrace the terms used to define various pilot-related circumstances and behaviors. For instance, Roscoe (1980), challenged the use of the term 'pilot error.' Roscoe suggests that use of the term 'pilot error'

results in blame for a crash or accident being placed solely on the pilot, instead of considering other error sources such as air traffic control, aircraft manufacturers, or even the airline involved in the accident. The result of this is that pilots have to grapple with the fact that should an accident occur, there is a good chance that they will receive blame for it.

Picano 's (1990) study of the stress coping styles of military aviators discusses pilot personality and stress coping methods. For example, pilots tend to be action-oriented and dominant, to be less inclined towards self understanding, and to have higher than average needs for mastery and control over their environment. The Coping Orientation to Problems Experienced (COPE) assessment instrument is used to measure pilot coping style and concluded that pilot personality is not in and of itself one entity, but a collection of thought processes, behaviors or reactions to thought processes, and other idiosyncratic traits which relate to airline pilots (Thomas, 1989). Comprehensive profiles of pilot personality are listed in Table 1 on the following page.

TABLE 1**Personality Traits of Pilots**

Physically healthy	Inner feelings perceived as external
Lack of neurosis	Avoid intropection
Self-sufficient	Cautious about close
Maintain a high need to achieve	Avoid revealing true feelings
Prefer short-range goals to long range goals	Avoid brooding and fighting
Non intellectually oriented	Rarely become tearful
Seek responsibility and novelty	Use humor to cope with anxiety or stress
Male pilots are unconflicted with other males	Keep thoughts concrete
Male pilots exhibit anxiety when feeling too close to	Have difficulty with ambiguous situations
More concerned with modifying their environment than	Don't handle failure well
Limited choice in activities	Find it difficult to cope when confronted with
Low tolerance toward personal imperfections	Need excitement
Need individual initiative	Ignore and avoid inner feelings

Source: Ursano, r. (1980) "Stress and adaptation: the interaction of the pilot personality and disease."

Aviation Space and Environmental Medicine, 51(11), 1245-1249.

The emphasis here is on major trends in personality. It is understood that variances due to the human nature can occur, and that this review is only a generalizable profile, not necessarily applicable to every specific instance.

The results of the study indicate that pilots tend to take active, problem-solving approaches in coping with mental stress (Picano, 1990) . They tend to disengage their minds from the stressors, and seek out instrumental support (problem-solving) from others and greatly reduced desire for emotional support from others.

Summary

Excessive amounts of stress result in adverse effects ranging from memory recall and inability to effectively focus on tasks to hostility and weakened emotional response reflexes. Furthermore, several suggested individual techniques for stress management which are not population-specific, are available (Barrow, 1994). from progressive-muscle relaxation and meditation to cognitive-behavioral skills training. In addition, several therapeutic interventions are available for use by practitioners of psychological stress management from Behavioral Rehearsal to Control and Perception of Control (Sime, 1996 and Murphy, 1996). Airline pilot psychological stressors include many variables which are common to other populations, from home life problems to marital difficulties and money problems. Unique pilot stressors include weather-related flight delays and in-flight weather problems and scheduling (Sloan, 1985). Finally, pilots take active, problem-solving approaches in coping with mental stress (Picano, 1990) .

CHAPTER 3

METHODOLOGY

Introduction

The purpose of the study was to provide effective, comprehensive information for the prevention and treatment of psychological and postmodern stress disorders in airline pilots for mental health specialists. The research question pertains to what information, gained from this author's original data and that of the literature review, can be utilized in the prevention and treatment of psychological stress disorders in airline pilots. Some such disorders are specific to airline work, and will be addressed in this chapter.

Research Design

The design selected for the study was descriptive in nature. Descriptive research design can be defined as an approach that systematically describes the facts and characteristics of a given phenomena, population or area of interest (Merriam and Simpson, 1995). The researchers makes no attempt to control or manipulate the environment in which the research takes place. Included in the approach can be a collection of facts that describe existing phenomena, identifying problems or providing reasons for current states and practice, project or product evaluation, and a comparison between groups with similar problems as a guide to future planning and decision making.

Sample and Population

This study included male and female pilots, from a major U.S. airline,

between the ages of 18 and 60. Two hundred surveys were distributed during the study and 15 were returned as usable. Due to the sample size and the method of sample selection, the data collected from the sample may not be representative of the airline population as a whole.

Instrumentation

Because of the complete, inclusive design of the survey, and its recency, it was deemed to be the most appropriate choice for airline pilot data collection. The first part of the inventory, adapted from Thomas (1989), is called the Pilot Stress Inventory. It is designed to determine which categories of stressors most adversely affect a pilot and contains fifty, closed-ended question-response options. A numeric scale system of 1 to 5 is used, with one representing 'rarely' and five 'usually.' The categories of stressors are listed in Table 2 on the following page.

TABLE 2**Airline Pilot Stressors**

CONTROL
SCHEDULING AND ROSTERING
TEST/COURSE ANXIETY
HOME TO WORK INTERFACE
CAREER AND ACHIEVEMENT
INSUFFICIENT FLYING
RESPONSIBILITY/DECISION MAKING
INTERPERSONAL PROBLEMS
MANAGEMENT AND ORGANIZATIONAL ISSUES
DOMESTIC STATUS
FATIGUE AND FLYING PATTERNS

Once the Pilot Stress Inventory is completed, total points for each category of stressors are added and divided by five. If a tenth or hundredth decimal place results, one rounds up to the next highest number. The corresponding number is matched to the level below in order to discover which categories tend to create the greatest degree of stress.

STRESS LEVELS

1=very low 2=slight 3=moderate 4=considerable 5=extreme

Following the Pilot Stress Inventory, the Stress Dynamics Scale was utilized to categorize the pilot-specific questions on the survey into the types of stress common to more general stress research (Thomas, 1989) . See Table 3 below.

TABLE 3

Stress Dynamics Scale

QUESTIONS	STRESSORS	POINTS	/5=	TOTAL
1-5	CONSCIOUS		/5=	
6-10	UNCONSCIOUS		/5=	
11-15	PERSONALITY		/5=	
16-20	PSYCHOLOGICAL		/5=	
21-25	PHYSIOLOGICAL		/5=	
26-30	ENVIRONMENTAL		/5=	
31-35	EXPERIENTIAL		/5=	
36-40	SOCIOCULTURAL		/5=	
41-45	LIFE- CHANGE		/5=	
46-50	ACUTE REACTIVE		/5=	

Thomas, M. (1989). Managing pilot stress. New York: Macmillan.

Procedure

Two hundred surveys were distributed to pilots of a major U.S. airline. Biographical information was also requested by each participant. Self addressed, stamped envelopes were provided for the return of the surveys to this project's author for analysis.

After asking the subjects to complete the biographical data sheets by placing an 'X' in the appropriate category for each question, they were asked to place a number from one to five indicating their attitudes, behaviors, or experiences to each of the survey's fifty questions.

Method of Analysis

Once surveys were completed and returned, the questions were grouped into categories or types of stress identified in Table 3.

Following this compilation, mean values of the types of stress were calculated.

CHAPTER 4

PRESENTATION AND ANALYSIS OF THE DATA

Demographic Data

Returns obtained from this study were few. Fifteen (15) out of two hundred people who were sampled responded by returning complete surveys. One survey was returned partially completed but was discounted due to incomplete data.

Analysis of the study demographic data revealed that participants divided into three age groups; six (6) persons in the thirty one to forty group, four (4) persons in the forty one to fifty group and and five (5) persons in the fifty one to sixty group. In addition, all the participants were male and all were Caucasian. Most (five) worked for the airlines from between five to ten years, one worked between eleven to fifteen years, three from sixteen to twenty years, four from twenty one to twenty five years and two of them from thirty one to thirty five years as airline pilots (See Table 4 below).

Table 4

Age Distribution

Number of Pilots	Years Worked as Airline Pilot
5	5-10 years
1	11-15 years
3	16-20 years
4	21-25 years
2	31-35 years

In addition, eight participants were of the rank of Captain, six were First Officers and one was a Flight Engineer.

Stress Inventory Findings

Means for the Stressor types are listed in Table 5 below.

TABLE 5

Stressor Type Means- Entire Sample

CONSCIOUS	1.31
UNCONSCIOUS	1.29
PERSONALITY	2.77
PSYCHOLOGICAL	1.28
PHYSIOLOGICAL	1.60
ENVIRONMENTAL	1.52
EXPERIENTIAL	1.57
SOCIOCULTURAL	1.41
LIFE-CHANGE	1.51
ACUTE-REACTIVE	1.37

Stress reporting results indicated that Personality Stressors accounted for the highest stress level at 2.77 out of a possible 5. This indicates between a slight to moderate stress level. Physiological and experiential stressor types accounted for the next highest stress levels with means of 1.60 and 1.52 respectively.

CHAPTER 5

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

Summary

The purpose of the study was to identify stressors which adversely affect professional airline pilots. Literature on airline pilot stress, psychological stress and stress management techniques was reviewed. The Pilot Stress Inventory was administered to a sample of 15 pilots from a major U.S. airline. The stress reporting results indicated that Personality Stressors accounted for the highest stress level

Conclusions

Personality Stressors accounted for the highest level of stress followed by physiological and experiential stressors.

The results suggest that cognitive-behavioral stress management techniques would be most effective in treating airlines pilots suffering from stress. Two reasons support this conclusion. Budman and Gurman (1988) suggest that cognitive-behavioral treatment methods have been proven effective in treating personality-related disorders, especially those centering around perceived or actual stressful events. Secondly, the pilot stress research (Bunce and West, 1996) suggests that pilots accept cognitive, problem-solving treatment approaches over emotionally-based treatment methods, and place importance in understanding the relationship between thinking and behavioral outcomes. Such approaches might include Cognitive Restructuring/Reframing,

thought stopping techniques and Control/Perception of Control techniques.

Recommendations

One recommendation for future research is to change the distribution process for the surveys from a one-person source to a company-wide sponsored approach. Perhaps company personnel department managers or other sources of company sponsorship could be used. In this way pilots may feel more inclined to complete and return the survey knowing that their company supports the project. Furthermore, more ethnic and gender population diversity might be included by such an approach to distribution.

Another recommendation is to change some of the questions from negative-event orientation, such as "I have poor relations on the job," to more positive-event orientations such as "I really enjoy my job." When the survey distributor was asked what reasons pilots gave for not completing the surveys, a few select responses were noted. Among the comments included opinions that the questions were "weird" and written to be too emotional or too "touchy feely" for pilots to agree to answer. It is possible that participants did not share their true feelings regarding each question because of negative impressions about the survey itself. Thus re-wording some questions and providing more positive-event questions might increase the response rate.

Finally, by encouraging additional studies or experimental approaches new information, or a reinforcement of the current research on the effects of psychological stress for airline pilots, could allow mental health practitioners to

gain a new perspective and assist in building effective therapeutic relationships with airline pilots, so that treatments will be more successful. To this end, decreased airline accidents, with pilot psychological stress as a cause, is the ultimate aim of treatment.

REFERENCE LIST

- Barrow, J. (1994). "Emotional health: stress." <http://owworld.compuserve.com/homepage/parks/>. 1994.
- Budman, S.H., Gurman, A.S. (1988). Theory and practice of brief therapy. New York: The Guilford Press.
- Bunce, D.J., West M.A. (1996). Stress management and innovation interventions at work. Human Relations, 49, Tavistock Institute.
- Deitz, S., Thoms, T. (1991). Pilots, personality, and performance: human behavior and stress in the skies. New York: Quorum Books.
- Jones, D. (1991). Stress and workloads: models, methodologies, and remedies. In Farmer, E. (Ed.). Stress and error in aviation. Brookfield: Grover Publishing Company.
- Haws, C. (Producer), & Edwards, J. (Director). (1989). The fastest planes in the sky [Film].
- Little, L., Gaffney, I., Bender, M. (1990). Corporate instability is related to airline pilots' stress symptoms. Aviation, space, and environmental medicine. Falls Church: Virginia Polytechnic Institute and State University.
- McFarland, R. (1953). Human factors in air transportation. New York: McGraw-Hill.
- Murphy, L. (1996). Stress management in work settings: a critical review of the health effects. American Journal of Health Promotion. Cincinnati: National Institute of Occupational Safety and Health.
- North, R., Gopher, D., Roscoe, S. (1980). Aviation psychology. Iowa: Iowa State University Press.
- Ortman, M. (1995). Stress and cardiovascular disease: is there a relationship? Strategies for coping with stress. Internet address <http://www.stresscure.com/health/stresscv.html>

APPENDIX A

- Ruff, G. (1963). Psychological and psychophysiological indices of stress. In N.M. Burns (Ed.), Unusual environments and human behavior. (pp.33-59). New York: Macmillan.
- Sells, S.B., Berry, C., Neiss, O. (1961). Human requirements for space travel. In Sells, S.B., and Berry, C. (Eds.). Human factors in jet and space travel. New York: Ronald Press Company.
- Sime, W. (1996). "Stress management: a comprehensive review of principles." [[http://www.webcom.com/*hrtmath/IHM/Press Release](http://www.webcom.com/*hrtmath/IHM/Press%20Release)]. March 1996.
- Sloan, S.J., Cooper, C.L. (1986). Pilots under stress. New York: Routledge & Kegan, Inc.
- Thomas, M. (1989). Managing pilot stress. New York: Macmillan Publishing Company.
- Zim, H. (1943). Man in the air: The effects of flying on the human body. New York: Hartcourt, Brace, and Company.

APPENDIX A

COVER LETTER AND PILOT STRESS INVENTORY

June 1997

Dear Pilot:

I am currently conducting a survey of airline pilots. The purpose of this study is to collect exploratory data on the level of psychological stress associated with airline pilots. The first part of the survey collects information on basic demographics and years and level of experience as an airline pilot. The second part of this survey is a standardized instrument which measures levels of psychological stress.

I would greatly appreciate your completing both parts of the survey as soon as possible and return the packet in the enclosed pre-paid envelope. Since the validity of the results depends on obtaining a high rate of response, your participation is important to the success of this project. The demographic sheet and stress level inventory take about 15 minutes to complete.

Your participation in this survey is anonymous and voluntary. All information given is strictly confidential and will not be seen by your employer. As soon as I receive your survey, your responses will be entered into a computer program for statistical analysis, and both the demographic sheet and stress level inventory

will be destroyed. All data collected will be reported for the sample as a whole only as part of my Master's Research Project. Individual results will not be retained or reported.

Thank you for participating in this project by the completing this survey.

This brief questionnaire is designed to assist the researcher in establishing accurate research results. The information given will in no way reveal your identity. The information you give is strictly confidential.

Please put an 'x' in the appropriate area.

1. Age ☐ 18-30 ☐ 31-40 ☐ 41-50 ☐ 51-60

2. Sex ☐ M ☐ F

3. Ethnic group affiliation.

☐ Native American ☐ Asian/Pacific Islander ☐ Caucasian

☐ African American ☐ Hispanic/Mexican American

3. Length of time you have worked as a pilot for airlines.

☐ 0-5 years ☐ 5-10 years ☐ 11-15 years ☐ 16-20 years

☐ 21-25 years ☐ 26-30 years ☐ 31-35 years ☐ 35+ years

4. Current position(s) held.

☐ Captain ☐ First Officer ☐ Flight Engineer

The Pilot Stress Inventory

In each question below, you are to indicate what your normal attitude, behavior, or experience is:

1 = Rarely (less than 10% of the time)

2 = Occassionally (about 30% of the time)

3 = Sometimes (about 50% of the time)

4 = Frequently (about 70% of the time)

5 = Usually (more than 90% of the time)

- ___ 1. I have persistent, recurring thoughts or worries.
- ___ 2. I become mentally overloaded.
- ___ 3. My attention becomes fixated on objects or events while I'm in the cockpit.
- ___ 4. I tend to overlook things.
- ___ 5. My flights terminate between 5:00am and 9:30am.
- ___ 6. I have difficulty recalling important information.
- ___ 7. I have vivid dreams at night.
- ___ 8. I am easily reminded of past events when stressful things occur in the present.
- ___ 9. I am very emotional.
- ___ 10. I find myself reacting emotionally in situations where logical thinking
would be more helpful.
- ___ 11. I do not tolerate my personal imperfections very well.
- ___ 12. My work doesn't give me the excitement that I need.
- ___ 13. I avoid revealing my true feelings to co-workers.
- ___ 14. I am highly driven and ambitious.
- ___ 15. I am self-critical.
- ___ 16. I experience emotional tension.
- ___ 17. I have a physical problem or illness.
- ___ 18. I have one or more fears that I think about.

- ___ 19. I have conflicts with family members or co-workers.
- ___ 20. I have a negative attitude.
- ___ 21. I don't eat a proper diet.
- ___ 22. I smoke, overeat, or drink.
- ___ 23. I experience fatigue.
- ___ 24. I become excited.
- ___ 25. I have difficulty falling asleep or remaining asleep.
- ___ 26. I have either too little or too much work to do on the job.
- ___ 27. I have poor relations on the job.
- ___ 28. I tend to bring my work-related issues home with me.
- ___ 29. I am not satisfied with my job.
- ___ 30. I fly in adverse weather.
- ___ 31. I feel emotionally or physically isolated from my family or friends.
- ___ 32. I don't feel a sense of comraderie with my co-workers.

Pilot Stress Inventory, continued

1 = Rarely (less than 10% of the time)

2 = Occassionally (about 30% of the time)

3 = Sometimes (about 50% of the time)

4 = Frequently (about 70% of the time)

5 = Usually (more than 90% of the time)

- _____ 33. I find it difficult to express doubt, fear, anxiety, embarrassment, or anger
to my spouse or family members.
- _____ 34. I suppress my feelings.
- _____ 35. When I take tests I become very nervous.
- _____ 36. I worry about job instability.
- _____ 37. I have financial problems.
- _____ 38. My work schedule is too demanding.
- _____ 39. My company defers maintenance items.
- _____ 40. Pilots who work for my company don't get along well with management.
- _____ 41. I experience stress from events in my life.
- _____ 42. I experience stress from events in my professional life.
- _____ 43. I am burdened by responsibilities in either my personal or professional life.
- _____ 44. I don't socialize.
- _____ 45. I don't exercise.
- _____ 46. I have had an occupational crisis within the last year.
- _____ 47. I feel threatened by loss of pay.
- _____ 48. I have experienced a personal-life crisis within the last year.
- _____ 49. I have recurring thoughts or recurring dreams about a crisis that has occurred
at some time in my life.
- _____ 50. I grieve over a loved one whom I lost through death, divorce, breakup, or separation.

B 38925 OTTAWA: THS
108M19 07/30/98 5658-