Examining the Relationship Between Part 121 Air Transport Pilots and Burnout

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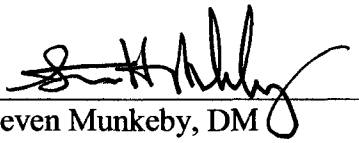

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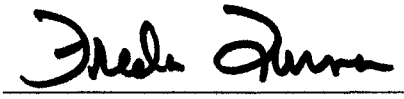

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ABSTRACT

Examining the Relationship Between Part 121 Air Transport Pilots and Burnout

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Lisa M. Kearney

Northcentral University, October 2008

The current air transport industry environment and evidence of fatigue in Part 121 air transport pilots (ATPs) indicated the need to examine the relationship between Part 121 ATPs and burnout. The Maslach Burnout Inventory-General Survey (MBI-GS) measured burnout for this quantitative, correlational research study. Identified were organizational, situational, and individual factors as potential correlates of the three dimensions of the burnout syndrome: (a) exhaustion, (b) cynicism, and (c) professional efficacy. One thousand one hundred randomly sampled Part 121 ATPs received the survey packet. The effective response rate was 12.6%, yielding 138 usable survey packets. The study findings indicated that situational factor, quantitative work overload and organizational factor, fair rewards were the only Part 121 ATP environment dimensions examined that had statistically significant correlations with the three dimensions of the burnout syndrome.

DEDICATION

This dissertation is dedicated to the loving memory of my dad, Ralph F. Kearney.

ACKNOWLEDGEMENTS

First, I want to acknowledge the Part 121 air transport pilots who chose to participate in the research study. I greatly appreciate their participation and willingness to help me achieve my educational goals. Next, I want to acknowledge my dissertation chair, Dr. Steven Munkeby. His professionalism, expert guidance, and exceptional support enabled me to complete the doctoral program. My dissertation committee, Dr. David Bouvin, for his willingness to join my committee at the 11th hour and provide support, Dr. John Hannon, for his unwavering support, in spite of numerous obstacles that were encountered, and Dr. Sara Cook, for her advice and encouragement, for which I am grateful to all. My academic advisor, Carly Rudzinski, was awesome. I commend her for giving me endless moral support. A special acknowledgment to Dr. Freda Turner, without her, crossing the finish line would not have been possible.

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Finally, I would like to acknowledge my dear friends Carol, Robert, and GRM for listening; Wolfgang for his unconditional love; and Mom, my biggest fan.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

CHAPTER 1: INTRODUCTION

Approximately 80% of commercial aviation accidents are due to human errors (Harris, Sauchau, Harris, & Allen, 2001). Nearly 21% of the human errors are due to fatigue. Fatigue is a critical factor in aviation accidents (Harris et al., 2001). Advanced technology has simultaneously relieved pilots of manual control tasks, while increasing cognitive supervisory tasks (Harris et al., 2001). Pilot workload is an issue for two primary reasons: (a) performance declines as the workload exceeds the individual's ability to process information and (b) workload is a significant source of fatigue (Bourgeois-Bougrine, Cabo, Gounelle, Mollard, Coblentz, & Speyer, 1999; Harris et al., 2001; Kantowitz & Casper, 1988).

Fatigue management needs an understanding of the relationship between working conditions and fatigue (Jackson & Earl, 2006). Fatigue is highly correlated with exhaustion (Enzmann, Schaufeli, Janssen, & Rozeman, 1998), which is a dimension of the burnout syndrome (Maslach & Jackson, 1981). Maslach, Schaufeli, and Leiter (2001) confirmed exhaustion is the most widely reported dimension of burnout. Maslach et al. (2001) also found exhaustion is the dimension that adequately gauges the stressfulness of burnout. Schaufeli and Enzmann (1998) stated an imbalance between job demands and the worker's ability to cope with job demands as the catalyst of occupational stress.

Statement of the Problem

Burnout is a serious and well-documented problem in society today. Halbesleben, Osborn, and Mumford (2006) suggested that employee burnout cost American businesses $300 billion a year. In the context of aviation, one negative consequence, decreased work performance, can lead to devastating and potentially fatal results. In 1980, the members

of the U.S. Congress mandated the Ames Research Center, a division of the National Aeronautics and Space Administration, examine whether "there is a safety problem of uncertain magnitude, due to transmeridian flying and a potential problem due to fatigue in association with various factors found in air transport operations" (Mann, 1999, p. 1). Research obtained by the Ames Research Center has already shown that "pilot fatigue is a significant safety issue in aviation" (Mann, 1999, p. 1). Other airline-pilot-based studies have consistently shown that fatigue is an issue with complex, diverse causes and potentially critical consequences (Mann, 1999). Gander et al. (1998b) found that in long-haul operations, the non-24-hr duty-rest cycles, the circadian desynchronization during transmeridien flights, and sleep loss conducive to nighttime flying are associated with fatigue. Short-haul operations have problems too. Gander et al. (1998a) found that "long duty days, sleep loss as a result of short nighttime layovers, and shortened sleep episodes due to progressively earlier report times across trips serve to create flight crew fatigue" (p. 8).

The current air transport industry environment and the evidence of fatigue at the Part 121 ATP level necessitated a study to examine the relationship between Part 121 ATPs and burnout. The problem is a lack of relationship evidence between Part 121 ATP environment dimensions and burnout subscales. Two intuitively obvious critical burnout indicators are exhaustion and fatigue. Maslach et al. (2001) confirmed exhaustion is the most widely reported dimension of burnout. Maslach et al. also found exhaustion is the dimension that adequately gauges the stressfulness of burnout, furthering a previous study by Enzmann et al. (1998). Enzmann et al. demonstrated that fatigue is highly correlated with exhaustion.

The most commonly accepted definition of burnout is a concept based on three burnout dimensions or subscales (Cordes & Dougherty, 1993). There are many antecedents of burnout. According to Leiter and Maslach (2005), there are six primary sources of burnout: (a) work overload, (b) lack of control, (c) insufficient reward, (d) role conflict, (e) breakdown of community, and (f) unfairness in the system. Many studies have shown that work-related stressors such as role conflict, role ambiguity, and work overload are predictors of job burnout (Bacharach, Bamberger, & Conley, 1991). Burnout may result if a significant difference between the individual and these job areas prevails. This mismatch is the foundation for the Job Demands-Resources (JD-R) model of burnout (Demerouti, Bakker, Schaufeli, & Nachreiner, 2001).

Broad categories (environment dimensions) of antecedents of burnout are (a) organizational factors, (b) situational factors, and (c) individual factors (Maslach et al., 2001). The focus for the quantitative study included antecedents (factors) of burnout that were representative of each environment dimension. These factors were further classified as a job demand or job resource as stipulated by the JD-R model (Demerouti et al., 2001). The purpose of this study was to provide the aviation industry with Part 121 ATP environment dimension data that may indicate burnout factors. Supported by research conducted by Bacharach et al. (1991), Cordes and Dougherty (1993), and Leiter and Maslach (1995), the antecedents of burnout chosen for this study were (a) fair rewards, (b) role conflict, (c) role ambiguity, (d) autonomy, (e) organizational politics, (f) qualitative work overload, and (g) quantitative work overload.

The data obtained may help the aviation industry, airline researchers, and the federally based airline regulators understand the interaction better between an airline's

job structure and pilot burnout. The goal was to ascertain whether there was a correlation between Part 121 ATP environment dimensions and the burnout subscales. Knowledge about the relationship between environment dimensions and the burnout subscales might lead to enhanced air carrier safety.

Background and Significance of the Problem

The Federal Aviation Administration's (FAA) charter through the Air Transportation Oversight System is to provide regulatory oversight of air carriers operating in accordance with Title 14 of the Code of Federal Regulations, Parts 119 and 121 (Federal Aviation Administration [FAA], 2007). The Air Transportation Oversight System also helps the Flight Standards Service and these air carriers to operate in accordance with Title 49 United States Code 14 Code of Federal Regulations and FAA policy. "Title 49 [United States Code] empowers the FAA to prescribe regulations and minimum safety standards and requires air carriers to provide service with the highest possible degree of safety in the public interest" (FAA, 2007, Order 8900.1, ¶ 6-165). Airline pilots have a tremendous responsibility in assuring the safety of air carrier passengers. Butcher (2002) stated that commercial airline pilots are the most psychologically problem-free and reliable populations.

Airline flight operations are safe, efficient, and service-oriented. Air carriers can achieve these qualities through (a) the capabilities and training of personnel; (b) policies, procedures, and regulations; and (c) the efforts and skills of the personnel to uphold the guidance as stipulated by the policies, procedures, and regulations. The federal government assures the predication of aviation regulations and technologies on safety through continual improvement and excellence.

The U. S. Congress passed the Air Commerce Act of 1926 to promote air commerce (Kane, 2003). The Kelly Act, which preceded the Air Commerce Act of 1926 by one year, provided that the airlines would carry the mail (Kane, 2003). Together, these two acts are essentially the foundation of civil air transportation in the United States. The majority of today's aviation regulations stem from the Air Commerce Act of 1926, including the derivation of requirements for pilots to hold a medical certificate (Kane, 2003).

The Code of Federal Regulations (National Archives and Records Administration [NARA], 2007), divided into 50 titles and representing broad areas subject to federal regulation, contains the permanent rules published in the *Federal Register* by the executive departments and agencies of the federal government. Chapter 1 under Title 14 Aeronautics and Space (FAA, 2007) is comprised of Parts 1-199, as stipulated by the FAA. The FAA is one of several organizations within the Department of Transportation. The regulations covering operations and performance of the FAA are the Federal Aviation Regulations (FAR). The FAA categorizes ATPs as either captain or first or second officers per Part 121 regulations (Bankit, 2004). "A First Officer would be trained as a copilot on a particular type or types of aircraft" (Bankit, 2004, p. 2). Second officers receive training as flight engineers. Pilots holding and operating under an ATP certificate must also possess a current first-class airman medical certificate per Part 67-Medical Standards and Certifications of the FAR (NARA, 2007). As stipulated in the FAR, "A first-class medical certificate expires at the end of the last day of the sixth month after the month of the date of the examination shown on the certificate for operations requiring an airline transport pilot certificate" (NARA, 2007, p. 325).

Airline pilots form a unique occupational group. Even though an airline pilot is considered a shift worker, airline pilots do not follow the same work routine (Bor, Field, & Scragg, 2002). The individual who desires to become an airline pilot must undergo intense and physically demanding training. Pilots perform tasks that demand good physical health and psychological stability. As an individual, each pilot must be proficient in handling complex systems on board the aircraft as well as have the ability to work as a member of a small team or crew. Rafaeli and Worline (2001) considered an airline pilot to be the manager of a small organization.

In the aftermath of the September 11, 2001 (9/11), terrorist attacks, the impact and long-term psychological effects on airline pilots are still uncertain (Bor et al., 2002). Errors or mistakes by airline pilots can be disastrous and could potentially result in a large loss of life. A workload stressor may be an antecedent to burnout. Burnout has serious consequences, including substantial financial and personnel loss for organizations, and detrimental effects to an individual's health and solvency (Cordes & Dougherty, 1993). In their meta-analysis, Lee and Ashforth (1996) concluded that burnout might explain different types of behaviors and attitudes exhibited by individuals in stressful work environments. Research by Golembiewski, Boudreau, Munzenrider, and Luo (1996) suggested that a broad array of social and managerial variables relate to burnout.

Fatigue is a significant factor in aviation. Fatigue is associated with sleep loss and shift work (Jackson & Earl, 2006). Fatigue is highly correlated with exhaustion (Enzmann et al., 1998), which is a dimension of the burnout syndrome (Maslach & Jackson, 1981). In addition, long duty cycles can compromise pilot performance through

inattentiveness, carelessness, and inefficiencies (Jackson & Earl, 1981). The members of the National Transportation Safety Board (NTSB) recently expressed concern about the hours worked by short-haul pilots, stating that "fatigued pilots with up to 19 hours waking time were more prone to make errors of judgment in tactical decision making" (Ariznaverreta et al., 2002, p. 447). However, before one can address fatigue management, an understanding of the relationship between working conditions and fatigue is required (Jackson & Earl, 1981).

Research Question

According to Gay and Airasian (2003), "Relationship studies attempt to gain insight into variables that are related to complex variables" (p. 316). The purpose of this quantitative study was to provide the aviation industry with Part 121 ATP environment dimension data that may indicate burnout factors. The objective of this study was achieved by investigating the relationship between Part 121 ATP environment dimensions and burnout subscales. The research question developed as the foundation of the study was

To what extent, if any, is there a significant relationship between the Part 121 ATP environment dimensions and burnout subscales?

Brief Review of Related Literature

More than 30 years ago, Freudenberger (1974) coined the term *burnout*. In his groundbreaking study of volunteers in a drug rehabilitation center, he observed, "many volunteers experienced a gradual energy depletion and loss of motivation and commitment, which was accompanied by a wide array of mental and physical symptoms (Schaufeli & Enzmann, 1998, p. 3). Freudenberger also noted the volunteers became

increasingly less effective over the course of a year and showed signs of depersonalization with the patients. Freudenberger sparked further research on burnout in the human services industry.

Many job-related burnout studies followed the Freudenberger (1974) study. The result, identification of a series of burnout correlates. The most commonly cited antecedents of which are the organization design components: (a) autonomy, (b) work overload, (c) role conflict, (d) role ambiguity, (e) interpersonal conflict, and (f) lack of management (Cordes & Dougherty, 1993).

Today, the research community embraces the concept of burnout as a phenomenon comprised of three dimensions. These dimensions are (a) emotional exhaustion, (b) cynicism or depersonalization, and (c) professional inefficacy (Maslach & Jackson, 1981). Emotional exhaustion begins when an individual's job demands exceed his or her available resources to address those demands. As a coping mechanism, the individual begins to withdraw and becomes cynical. Inefficacy follows when the individual no longer perceives that efforts to accomplish the work tasks are adequate (Maslach & Jackson, 1981).

Fatigue is an important factor in aviation. Fatigue management requires an understanding of the relationship between working conditions and fatigue (Jackson & Earl, 2006). Fatigue is also a key aspect of exhaustion. Information obtained through an extensive investigation of burnout literature was utilized to support this study. The strategy for this study included the expansion of previous research conducted on fatigue by melding the previous research into the construct developed and refined by Maslach, Jackson, and Leiter (1996).

Although studied extensively in the human service industries and numerous other professions, research into why Part 121 ATPs might experience burnout is limited. Freudenberger (1974) was the first to address burnout as an emotional and physical depletion of one's state of well-being because of differences in an employee's work contribution and the employee's resulting work expectations. Cherniss (1980), Farber (1983), and Maslach (1982) set the groundwork for future research by introducing studies to examine professionals in the service-oriented industries.

Originally, Maslach et al. (1996) defined burnout as "a crisis in one's relationship with work, not necessarily as a crisis in one's relationship with people at work" (p. 20). More recently, Maslach (2003) redefined burnout to be "a prolonged response to chronic emotional and interpersonal stressors on the job" (p. 189). Maslach et al. modified the original three dimensions of burnout to be applicable to professionals who do not work in the human service industries. Maslach et al. redefined the dimensions (subscales) of the burnout syndrome as exhaustion, cynicism, and professional efficacy. Examining the relationship between Part 121 ATP environment dimensions and burnout subscales, as defined by Maslach et al., in order to identify any significant correlations that may indicate burnout in Part 121 ATPs, was the focus of this study. Extensive research data produced since the 1970s was the foundation for this quantitative study.

Definition of Terms

Autonomy is described by Schaufeli and Enzmann (1998) as "freedom and control over the decisions affecting one's work" (p. 16). In addition, worker exhaustion is an effect of lack of autonomy (Maslach et al., 2001).

Burnout is defined by Leiter and Maslach (2005) as "a chronic state of being out of synch with your job" (p. 2). Burnout consists of three dimensions or subscales: (a) exhaustion, (b) cynicism, and (c) professional efficacy.

Cynicism is defined by Maslach et al. (1996) as "indifference or a distant attitude towards work" (p. 231). The behavior is in response to exhaustive, discouraging aspects of the job (Maslach et al., 1996). Within the Maslach Burnout Inventory-General Survey (MBI-GS), as defined by Maslach et al., cynicism represents dysfunctional coping. Cynicism also lessens the job's potential for cultivating efficacy.

Exhaustion is one stress aspect of burnout. "It prompts actions to distance oneself emotionally and cognitively from one's work" (Maslach et al., 2001, p. 403).

Fair rewards according to Maslach et al., (2001), includes insufficient financial compensation or benefits, inadequate social rewards, and diminished appreciation by coworkers or supervisors. "Lack of rewards is closely associated with inefficacy" (Maslach et al., 2001, p. 414).

Organizational politics is defined by Parker, Dipboye, and Jackson (1995) as "an intentional social influence process in which behavior is strategically designed to maximize short-term or long-term self-interests" (p. 892). Organizational politics can arise from several different sources. Ferris and Kacmar (1992) suggested that supervisor behavior, coworker behavior, and organization policies and practices are the primary sources.

Professional efficacy is primarily due to an individual's expectation of continued effectiveness at work (Leiter & Schaufeli, 1996). According to Maslach et al. (2001), "It

refers to feelings of incompetence and a lack of achievement and productivity at work" (p. 399).

Qualitative work overload according to Sanders, Fulks, and Knoblett (1995), is "[s]tress created by job requirements which exceed the individual's ability or skill level" (p. 47).

Quantitative work overload is "[s]tress created by the perception of too great a volume of work to accomplish in the allocated time" (Sanders et al., 1995, p. 47). Researchers of burnout acknowledged the notion that burnout is a response to overload (Maslach et al., 2001).

Role ambiguity according to Maslach et al. (2001), results "when there is lack of adequate information to do the job well" (p. 407).

"*Role conflict* occurs when conflicting demands at the job have to be met" (Maslach et al., 2001, p. 407).

Highlights and Limitations of Method

The data used to examine the relationship between Part 121 ATPs and burnout, answer the research question, and address the hypotheses were quantitative. The intent was not to show a causal correlation between the Part 121 ATP environment dimensions and the burnout subscales, but to determine to what extent, if any there was a significant correlation. The three dimensions of the burnout syndrome: (a) exhaustion, (b) cynicism, and (c) professional efficacy, as described by Maslach et al. (1996), were the burnout subscales.

Data obtained through the administration of survey instruments supported the research method. Approximately 1% of the populations of Part 121 ATPs with an ATP

certificate, a flight engineer rating, and a first-class medical certificate received surveys delivered by U.S. Postal Service first-class mail. Random selection from a comprehensive database maintained by Aviation DataSource, Inc., using the latest database populated in January 2008, determined the sample. Currently, Aviation DataSource, Inc. is under contract to the FAA and tasked to distribute the FAA's public domain data.

Individuals participated in the study voluntarily. Used to generate the random sampling and perform the data analyses, was the Statistical Package for the Social Sciences (SPSS®) version 15, from SPSS, Inc. As with all self-report studies, data accuracy depends upon participant responses (Gay & Airiasian, 2003). Compromised data may result if the participants do not provide honest responses to the research survey statements, the statements on the MBI-GS, or the demographic questionnaire. In addition, there was an assumption the responses were those of the participants and the participants clearly understood each survey statement and demographic category.

Summary

The relationship between environment dimensions and burnout was examined to answer the research question. Categorized as either an organizational, situational, or an individual factor, the environment dimensions may exhibit a significant correlation with the burnout subscales. The purpose of this study was to provide the aviation industry with Part 121 ATP environment dimension data that may indicate burnout factors. The research and methods developed by Maslach and Jackson (1981) formed the basis of the conceptual study framework.

Four chapters organize the remainder of the study's data. Presented in chapter 2 is literature relevant to this study, antecedents of burnout, the effects of burnout, and

burnout in Part 121 ATPs. Discussed in chapter 3 is a detailed description of the research methodology. Presented in chapter 4 is information pertaining to the data analysis and findings. Finally, provided in chapter 5 are the summary, recommendations, and conclusions of this study.

CHAPTER 2: LITERATURE REVIEW

Since the 1970s, interest in burnout, in fields ranging from academia to industry, has increased dramatically as understanding of its significant negative impact on employees has developed (Halbesleben & Buckley, 2004). In 2002, analysts at the American Institute of Stress estimated that stress and burnout cost American businesses $300 billion a year (Halbesleben et al., 2006). Even though burnout is costly and pervasive, there has been minimal research dedicated to designing methods to intervene or prevent burnout (Halbesleben & Buckley, 2006).

Herbert Freudenberger (1974) coined the term burnout to express a person's lack of ability to function effectively in a work environment because of prolonged and extensive work-related stress (Advani, Jagdale, Garg, & Kumar, 2005). Pines, Aronson, and Kafry (1981) defined burnout as a state of mind that frequently affects individuals that work closely with others and devote more than these individuals receive from these interactions. Maslach (1982) defined burnout as "a syndrome of emotional exhaustion, depersonalization, and reduced personal accomplishment that can occur among individuals who do 'people work' of some kind" (p. 63). Advani et al. (2005) characterized emotional exhaustion as a lack of energy because of feelings of fatigue as the energy begins to drain. Depersonalization represents a negative and dehumanizing attitude combined with callousness and cynicism (Jackson, Turner, & Brief, 1987). The tendency to self-evaluate work and work-related clients defines the third dimension of the burnout syndrome, personal accomplishment (Maslach, 1981). However, defining burnout to be a construct of three separate entities is not a universally accepted ideal. Lee and Ashforth (1996) argued there is a correlation among the dimensions. Emotional

exhaustion and depersonalization develop in parallel and not sequentially. Thus, the subscales in combination negatively affect personal accomplishment. Moore (1997) also suggested that depersonalization and diminished professional efficacy are because of emotional exhaustion and are exclusive of the burnout construct. Shirom (1989) upheld that exhaustion strongly identifies with burnout and the other dimensions of the syndrome are incidental.

Burnout, classified as a psychosocial disorder and not a psychological disorder, makes the burnout syndrome difficult to diagnose (Farber, 2000). The *Diagnostic and Statistical Manual of Mental Disorders, 4th Edition, Text Revision* (DSM-IV TR®) and the *International Classification of Mental and Behavioral Disorders* (ICD-10), the most widely utilized diagnostic systems, do not list burnout as a specific diagnostic classification (American Psychiatric Association, 2005; World Health Organization, 2007). However, the criteria utilized to diagnose unspecified subtypes of Adjustment Disorder in the DSM-IV TR® are similar to the symptoms of burnout (Schaufeli & Enzmann, 1998). Maladaptive reactions to work stressors such as physical complaints, social withdrawal, or work inhibition closely match the descriptions and symptoms of burnout (Schaufeli & Enzmann, 1998). According to Shaufeli and Enzmann, the diagnosis of neurasthenia, as listed in the ICD-10, closely relates to the burnout syndrome. Exhaustion, irritability, and somatic complaints are select neurasthenia symptoms.

The Maslach Burnout Inventory (MBI) instrument was developed in 1986, to measure burnout (Maslach et al., 1996). The MBI, predicated on the three components of the burnout syndrome, is a widely accepted model (Maslach & Jackson, 1986). Of the

three dimensions of MBI, emotional exhaustion relates most strongly to possible causes and consequences of burnout (Schaufeli & Enzman, 1998).

The MBI is the dominant measure of burnout (Schaufeli & Enzman, 1998). However, the original definition of burnout, with most of the early empirical work, developed from the use of participants from the human service industries (Halbesleben & Buckley, 2004; Schaufeli, Enzmann, & Girault, 1993). The literature search revealed a comprehensive knowledge base on burnout for human service-oriented professionals such as healthcare providers and teachers. Burnout has been associated with several types of job withdrawal behavior, such as intent to quit, reduced job commitment, and reduced job satisfaction (Maslach et al., 2001). Researchers have also shown that burnout relates to health issues (Cordes & Dougherty, 1993).

Initially, some surmised that burnout exclusively occurred among human service workers (Schaufeli & Bakker, 2004). Through extensive research, Leiter and Schaufeli (1996) expanded the occupational domain underlying burnout to include technical workers, maintenance staff, and managers based on the consistency of the MBI dimensions. Leiter and Schaufeli also determined consistency between open-ended questions related to work experiences and the MBI. The research conducted by Leiter and Schaufeli demonstrated the study of burnout should not be limited to individuals in the human service industries.

Additional research conducted by Maslach and Leiter (1997) supported the notion that burnout is not solely an artifact of the human service industry. As a result, the original Maslach Burnout Inventory Survey (Maslach & Jackson, 1986) underwent modification to address work environments beyond the human service industry. The

Burnout has been associated with several types of job withdrawal behavior, such as intent to quit, reduced job commitment, and reduced job satisfaction (Maslach et al., 2001). MBI-GS is for use with workers, other than those in the human service industries (Maslach et al., 1996). The conceptualization of the three components of the burnout construct is broader with respect to the job. The conceptualization is not only about the personal relationships that may be a part of the job (Maslach et al., 2001). Therefore, the three dimensions of the MBI-GS model are (a) exhaustion, (b) cynicism, and (c) professional efficacy. The aviation industry was the focus for this research study. The MBI-GS model was used for this study.

Effects of Burnout

According to Maslach et al. (2001), chronic emotional and interpersonal stressors on the job cause burnout. Burnout is a prolonged response defined by three qualitative dimensions: (a) emotional exhaustion, (b) cynicism, and (c) inefficacy. Pennebaker (1982) highlighted psychosomatic complaints such as headaches, dizziness, fainting, muscle tension, gastrointestinal symptoms, and cardiac and respiratory symptoms. These symptoms indicate that the body is attempting to address and alleviate the demands of the environment. Continued exposure to stressors and the manifestations that reflect the individual's readiness to cope with the sensed stressful environment may lead to mental and physical exhaustion or deteriorated health (De Dreu, Van Dierendonck, & Dijkstra, 2004). These health issues, including burnout-induced anxiety and depression, may negatively affect the employee's performance and commitment and manifest in reduced productivity for the organization (Gill, Flaschner, & Shachar, 2006).

Researchers conducted studies to investigate the effects of stress on several components of the immune system including immunosuppression (Zeier, Brauchli, & Joller-Jemelka, 1996). Researchers reported such effects for several situations including exposure to chronic environmental stress (Zeier et al., 1996). Pines et al. (1981) argued symptoms of burnout include emotional, psychological, and physical fatigue; feelings of helplessness and hopelessness; general malaise; and lack of enthusiasm about work and occasionally, life in general. These symptoms usually occur gradually over time. In addition, burnout usually affects those employees who are among the most enthusiastic and idealistic.

Through much analysis, Schaufeli and Enzmann (1998) organized the symptoms of burnout into five psychological categories: (a) affective, (b) physical, (c) behavioral, (d) motivational, and (e) cognitive. Fear, nervousness, and anxiety represent affective symptoms. Physical symptoms include suppressed immune systems, body weight issues, chronic fatigue, headaches, dizziness, and muscle pain. Behavioral outcomes encompass absenteeism, increased isolation, and interference with personal and professional relationships. Schaufeli and Enzmann (1998) classified reduced motivation to work, loss of zeal and enthusiasm, and indifference as motivational symptoms. Burnout also contributes to poor work performance and reduced productivity (Cherniss, 1980; Maslach et al., 2001). Cognitive symptoms include the inability to concentrate, forgetfulness, making numerous mistakes, rigidity in thinking, and increased isolation (Schaufeli & Enzman, 1998).

Antecedents of Burnout

Within the constructs of job-illness stress, burnout has been a widely studied syndrome for more than 25 years (Barnett, Brennan, & Gareis, 1999). There are potentially many antecedents of burnout. According to Leiter and Maslach (2005), there are six primary sources of burnout: (a) work overload, (b) lack of control, (c) insufficient reward, (d) role conflict, (e) breakdown of community, and (f) unfairness in the system. Many studies have shown that work-related stressors such as role conflict, role ambiguity, and work overload are predictors of job burnout (Bacharach, Bamberger, & Conley, 1991). Burnout may result if a significant difference between the individual and these job areas prevails. This mismatch is the foundation for the Job Demands-Resources (JD-R) model of burnout (Demerouti, Bakker, Schaufeli, & Nachreiner, 2001). Broad categories of antecedents of burnout are either situational factors or organizational factors and individual factors. Both organizational or situational factors as well as individual factors were the focus for this study. These factors were further classified as a job demand or job resource as stipulated by the JD-R model.

Organizational factors include compensation and organizational politics. Situational factors include quantitative workload, role ambiguity, role conflict, and autonomy. Qualitative workload is an individual factor. Leiter and Maslach (1988) suggested that burnout is a by-product of combining individual, situational, and organizational factors. Demographics such as age or education (Maslach et al., 2001) or personality traits may predict levels of job burnout (Micklevitz, 2001; Riolli & Savicki, 2003).

Situational Factors

A consistently identified antecedent of burnout is heavy workload (Bakker, Demerouti, & Verbeke, 2004). Lee and Ashforth (1996) and Cordes and Dougherty (1993) documented the existence of a correlation between work overload and emotional exhaustion. According to Cedoline (1982), both qualitative and quantitative work plays a role in work overload. For example, job requirements that exceed an individual's skills constitute qualitative work overload. Quantitative work overload occurs when the individual believes there is too much work to complete in the designated period (Sanders et al., 1995). Researchers, through continued studies, supported the hypothesis that workload and time pressure have a strong and consistent relationship to job burnout (Maslach et al., 2001). The research coincided with other empirical research that has shown a correlation between quantitative and qualitative work overload and several physiological, psychological, and behavioral strain symptoms (Beehr & Newman, 1978; Miller, Ellis, Zook, & Lyles, 1990). Fong and Kleiner (2004) further cautioned that work overload leads to stress, fatigue, accidents, exhaustion, depression, and other negative outcomes if not properly addressed.

Role ambiguity occurs when there is lack of clarity in job objectives and/or scope of responsibilities (Levert, Lucas, & Ortlepp, 2000). This finding parallels the research conducted by Maslach et al. (2001), which supports the concept that doing work well is not possible if adequate information is not available. Lee and Ashforth (1996) stated that role ambiguity correlates significantly to the burnout syndrome dimensions of emotional exhaustion and, to a lesser extent, depersonalization. The results of the meta-analytic study conducted by Pfennig and Hüsch (1994) revealed that 14% of emotional exhaustion

results from role ambiguity, 8% of depersonalization stems from role ambiguity, and 10% of personal accomplishment attributes to role ambiguity.

Role conflict, according to Rizzo, House, and Lirtzman (1970), developed when different sources levy inconsistent expectations onto the same individual. The results of the aforementioned meta-analytic study showed that 23% of emotional exhaustion, 13% of depersonalization, and 2% of personal accomplishment results from role conflict (Pfennig & Hüsch, 1994). According to Cordes and Dougherty (1993), individuals who reported higher levels of role conflict also reported higher levels of burnout.

Lack of autonomy or control in the decision-making process leads to worker exhaustion (Maslach et al., 2001; Pines et al., 1981). Through extensive research, Schaufeli and Enzman (1998) pointed out that autonomy negatively correlates with burnout (Shaufeli & Enzman, 1998). In particular, further analysis showed that up to 18% of explained variance for personal accomplishment, also negatively correlated to burnout, relates to lack of autonomy (Shaufeli & Enzman, 1998). Jackson et al. (1987) related the lack of participation in the decision making process to depersonalization, which is one of the three dimensions of burnout. Cordes and Dougherty (1993) documented that the individuals who work in bureaucratic, strict, or rigid work environments experience greater levels of burnout.

Major sources of job demands included work overload, role conflict, and role ambiguity (Leiter, 1991). These job demands eventually lead to exhaustion (Houkes, Janssen, De Jonge, & Bakker, 2003). Bakker et al. (2005) showed that several job resources play a role in buffering various job demands including the major sources of job demands previously discussed. However, a withdrawal process attributes to lack of job

resources. Employee motivation and ability to learn is undermined if that individual does not have adequate job resources. Studies on the interaction between job demands and job resources demonstrated that these factors account for a significant proportion of variance in exhaustion and cynicism (Bakker et al., 2005). Results indicated that the highest levels of fatigue and demoralization occurred when high job demands coincided with low job resources. Autonomy, which is categorized as a situational factor and job resource, can help an individual cope with job demands, since the employee is able to partake in the decision making process as to when and how to respond to these demands. Contrarily, a lack of autonomy leads to exhaustion and burnout (Schaufeli & Enzmann, 1998). These ideals are the foundation of the JD-R model (Bakker, Demerouti, De Boer, & Schaufeli, 2003; Demerouti et al., 2001). Additionally, the incorporated into the construct of the JD-R model is the assumption that burnout develops irrespective of the type of job or occupation, when particular job demands are high, and when particular job resources are limited (Demerouti et al., 2001).

Organizational Factors

Organizational factors that pertain to job resources include interpersonal conflict, unsupportive supervisors, and organizational trust. Interpersonal conflict, such as interactions with co-workers, is the primary source of job burnout (Gaines & Jermier, 1983). Conflicts stemming from organizational policies, conflicting personal values, or disagreements pertaining to the execution of tasks relate to negative interpersonal contacts (Leiter & Maslach, 1988). In addition, Leiter and Maslach successfully correlated negative interpersonal contacts to the three dimensions of burnout described as emotional exhaustion, depersonalization, and decreased professional efficacy.

Researchers postulated that failure to mitigate conflict properly leads to long-term negative consequences for individual health and well-being and generates feelings of burnout (De Dreu et al., 2004).

Organizational politics is a form of interpersonal conflict (Ferris & Kacmar, 1992). Organizational politics is a phrase utilized to describe intra-organization actions that are manipulative and self-serving (Ferris & Kacmar, 1992). Workers who believe that a high level of organizational politics exists are more likely to distance themselves psychologically from the organization and thus protect themselves from burnout (Advani et al., 2005).

Social support from individuals may buffer job stress and the sources of stressful events by instilling the belief others are available to provide the resources to cope with the situation, or by merely helping reevaluate a perceived harmful situation (Cohen & Wills, 1985). Additionally, social support has a positive effect on psychological and physical health, regardless of whether job stressors are present (Dignam, Barrera, & West, 1986). Given the positive benefits of social support, showing that lack of social support is a factor contributing to burnout comes as no surprise (Dignam & West, 1988; Maslach et al., 2001).

Maslach et al. (2001) discovered that lack of support from supervisors is more strongly associated with burnout than lack of support from colleagues. These authors also correlated a lack of feedback with all three components of the burnout syndrome. This is a direct demonstration of the effort-reward balance associated with burnout (Pines et al., 1981; Schaufeli & Enzmann, 1998).

Employees' sensed trustworthiness of the organization also contributes to job burnout. Employees who are committed to their organization expect reciprocation in the form of assured job security (Kulnert & Vance, 1992). If an employee perceives the organization to be remiss in this implied contract, a lack of trust may result. Eventually, the lack in organizational trust may serve to cultivate an environment in which burnout will develop. Researchers Kalbers and Fogarty (2005) indicated the element of trust has a marked impact on emotional exhaustion and depersonalization, which are two dimension of the burnout syndrome.

Individual Factors

Factors driving burnout tend to be situational rather than individual. However, researchers support the hypothesis that burnout is due to the combining of individual and environmental factors (Leiter & Maslach, 1988). Moreover, researchers also revealed that several individual demographic or personality factors also contribute to burnout. Kalbers and Fogarty (2005) stated that locus of control, a construct developed by J. B. Rotter in the 1960s, can be invoked to learn if an individual believes he or she has command (internal locus of control) of the course of his or her life or if that life is controlled by events outside of that individual's control (external locus of control). These researchers asserted that external locus of control are the most important antecedent of the three dimensions of the burnout syndrome. Individuals tend to feel more hopeless and have less ability to overcome adversity if these individuals experience external locus of control (Luzzo & Ward, 1995). Consequently, individuals who experience external locus of control are more vulnerable to stress (Clarke, 1995).

A discrepancy between an individual's skills and job expectations is an individual factor that contributes to job burnout. If the individual's skill set closely matches the job demands, the individual may work more smoothly within organizationally defined goals, thus avoiding burnout (Lee & Ashforth, 1996). Kalbers and Fogarty (2005) hypothesized that more highly skilled accountants would report less of the burnout syndrome dimension of professional efficacy. However, higher skill levels did not shield these individuals from the burnout syndrome dimensions of depersonalization or emotional exhaustion. In addition, according to some researchers, the best employees in an organization tend to be the most susceptible to burnout (Pines, 1993), which suggests that only highly motivated individuals experience burnout.

Burnout in Part 121 Air Transport Pilots

An extensive literature search did not reveal research data pertaining exclusively to burnout in Part 121 ATPs. However, there is a broad array of research on pilot fatigue documented over the past several decades (Powell, Spencer, Holland, Broadbent, & Petrie, 2007). According to Powell et al. (2007), fatigue may significantly influence pilot performance.

Some consider exhaustion the main quality of burnout (Maslach et al., 2001). Exhaustion is the most widely reported dimension of burnout. Exhaustion reflects the stress aspect of burnout and manifests in job demands such as workload and time pressures. Fatigue exhibits a high correlation with exhaustion (Enzmann et al., 1998).

Fatigue

Fatigue has the potential to influence airline pilot performance significantly (Powell et al., 2007). On August 18, 1993, AIA-808, a military contract flight registered

to American International Airways, Inc., crashed while attempting to land at the U.S. Naval Air Station, Guantànamo Bay, Cuba, even though visual meteorological conditions prevailed. The flight's three crewmembers sustained serious injuries. The crash destroyed the Douglas DC-8-61 airfreighter. Members of the National Transportation Safety Board determined that the probable cause of the accident included "the impaired judgment, decision-making [sic], and flying abilities of the captain and flight crew due to the effects of fatigue" (National Transportation Safety Board [NTSB], 1994, p. 78). The flight operated under 14 Code of Federal Regulations, Part 121, Supplemental Air Carriers (NARA, 2007), as an international, nonscheduled, military contract flight. This was the first time the NTSB cited fatigue as the probable cause for a major U.S. aviation accident (Rosekind et al., 1996).

Approximately 80% of commercial aviation accidents are due to human errors (Harris et al., 2001). Nearly 21% of the human errors are due to fatigue. Pilot workload is an issue for two primary reasons: (a) performance deteriorates as the workload exceeds the individual's capacity to process information and (b) workload is a significant source of fatigue (Bourgeois-Bourgrine et al., 1999; Harris et al., 2001; Kantowitz & Casper, 1988).

On June 1, 1999, at 2350:44 central daylight time, American Airlines (AA) flight 1420, a McDonnell Douglas DC-9-82 (MD-82), tail number N215AA, overran the end of runway 4R during landing at Little Rock National Airport in Little Rock, Arkansas, and crashed. There were 2 flight crewmembers, 4 flight attendants, and 139 passengers aboard AA flight 1420. There were 11 fatalities: the captain and 10 passengers. Impact forces and post-crash fire destroyed the MD-82. The flight had operated under the

provisions of 14 Code of Federal Regulations, Part 121 (NARA, 2007) on an instrument flight rules flight plan (NTSB, 2001). Flight crew fatigue and situational stress were contributing accident factors, as stated by the NTSB in the following accident report excerpt:

> The National Transportation Safety Board determines that the probable causes of this accident were the flight crew's failure to discontinue the approach when severe thunderstorms and their associated hazards to flight operations had moved into the airport area and the crew's failure to ensure that the spoilers had extended after touchdown.
>
> Contributing to the accident was the flight crew's (1) impaired performance resulting from fatigue and the situational stress associated with the intent to land under the circumstances, (2) continuation of the approach to a landing when the company's maximum crosswind component was exceeded, and (3) use of reverse thrust greater than 1.3 engine pressure ratio after landing. (pp. 169-170)

The NTSB (2001) also cited several safety issues that focused on the flight crew: (a) performance, (b) decision making regarding operations in adverse weather, and (c) fatigue. Applying the JD-R model, the tragic end to AA flight 1420 is perhaps the ultimate result of extreme job demands that acted as the catalyst for stress and, finally, exhaustion. Due to the unique situational environment of the flight deck, there were no means to mitigate the significant increase in workload during the final approach to land at Little Rock National Airport through insertion of additional job resources. According to Schaufeli and Enzmann (1998), the mitigation of the increase in workload, could have offset or buffered the instantaneous increase in job demands and thus alleviated the pilot's exhaustion.

Organizational Politics and Role Ambiguity

Organizational politics is present in the air transportation industry. Many full-service airlines, such as United Airlines and British Airways, have chosen to challenge

the no-frills air carrier market segment by introducing low-cost subsidiary air carriers. These low-cost air carriers survive by transporting as many passengers as possible as often as possible over relatively short distances. This short-haul strategy requires that pilots frequently work an irregular pattern of early starts and late finishes, which can disrupt normal sleep routines and increase fatigue (Powell et al., 2007). Lessening aircraft turnaround time increases air carrier profit margins. Any deviation to the planned flight schedule could affect the routing model and potentially the air carrier's financial balance sheet. Recently, Jackson (2006) found that several former low-cost pilots no longer trusted air carriers that upheld a culture in which pilots were required to work close to the legal maximum of flying hours. This finding supported the research of Kalbers and Fogarty (2005), who showed the element of trust has a marked impact on emotional exhaustion and depersonalization. There is a suggestion that the low-cost model of air travel generates excessive levels of stress and fatigue among flight crews (Bennett, 2003). Bennett interviewed pilots that flew for a UK-registered low-cost carrier. Most of the pilots experienced stress and fatigue.

Adhering to the scheduling models and flight plan is fundamental to the air carrier that wants to meet financial goals. Tragically, overzealous management can erode safety while striving to meet corporate objectives. The following accident highlights the disastrous outcome when safety is no longer the primary objective. In the afternoon of January 31, 2000, Alaska Airlines, Inc., flight 261, a McDonnell Douglas MD-83, tail number N963AS, crashed into the Pacific Ocean approximately 2.7 miles north of Anacapa Island, California (NTSB, 2002). The MD-83 was destroyed. The 2 pilots, 3 cabin crewmembers, and 83 passengers on board perished.

Alaska Airlines' flight 261 was operating under the provisions of 14 Code of Federal Regulations Part 121 en route from Lic Gustavo Diaz Ordaz International Airport, Puerto Vallarta, Mexico, to Seattle-Tacoma International Airport, Seattle, Washington, with an intermediate stop planned at San Francisco International Airport, San Francisco, California (NTSB, 2002). Visual meteorological conditions prevailed for the flight. Alaska Airlines' flight 261 operated on an instrument flight rules flight plan.

Even though members of the NTSB determined the probable cause of the accident to be a loss of airplane pitch control resulting from the in-flight failure of the horizontal stabilizer trim system jackscrew assembly's acme nut threads, extraneous and organizational dynamics existed. The following scenario and communication data came from the cockpit voice recorder (NTSB, 2002):

> At 1552:02, after the captain had stated his intention to divert to LAX, Alaska Airlines dispatch personnel cautioned that if the flight landed at LAX rather than SFO, "we'll be looking at probably an hour to an hour and a half [before the airplane could depart again] we have a major flow program going right now." At 1552:41, the captain responded, "I really didn't want to hear about the flow being the reason you're calling us cause I'm concerned about overflying suitable airports." At 1555:00, the captain commented to a flight attendant, "it just blows me away they think we're gonna land, they're gonna fix it, now they're worried about the flow, I'm sorry this airplane's [not] gonna go anywhere for a while...so you know." After a flight attendant replied, "so they're trying to put the pressure on you," the captain stated, "well no, yea." (p. 137)

Organizational politics weighed heavily in the conversation between the captain and the dispatch personnel. Safety should have been the priority of all parties. The situation was an example of role ambiguity. The captain was responsible for the safety of the flight crew and passengers. However, by imposing financially motivated concerns onto the captain, Alaska Airlines' executives effectively imposed conflicting responsibilities, which is the essence of role ambiguity according to Levert et al. (2000).

Role Conflict Consequences

The effects of role conflict in the aviation industry can lead to devastating results. Tragically, the results of role conflict occurred on January 13, 1982, when Air Florida flight 90, a Boeing 737-222, tail number N62AF, which was a regularly scheduled flight to Fort Lauderdale, Florida, from Washington National Airport, Washington, D.C., crashed at 1601 eastern standard time following takeoff from runway 36 (NTSB, 1982). Air Florida flight 90, laden with snow and ice, hit "the barrier wall of the northbound span of the 14th Street Bridge, which connects the District of Columbia with Arlington County, Virginia, and plunged into the ice-covered Potomac River" (NTSB, 1982, p. i). Only 4 of the 74 passengers and 1 of the 5 crewmembers survived the crash. Members of the NTSB (1982) submitted Aircraft Accident Report, NTSB-AAR-82-8 to the FAA stating the following

> The National Transportation Safety Board determines that the probable cause of this accident was the flight crew's [sic] failure to use engine anti-ice during ground operation and takeoff, their decision to take off with snow/ice on the airfoil surfaces of the aircraft, and the captain's failure to reject the takeoff during the early stage when his attention was called to anomalous engine instrument readings. (p. 82)

Data extracted from the cockpit voice recorder revealed that the first officer, who was piloting the aircraft for takeoff, advised the captain of his concerns several times, voicing comments about instrumentation readings and the environmental conditions. The captain chose to disregard his comments and continue the takeoff. Members of the NTSB concluded

> that there was sufficient doubt about instrument readings early in the takeoff roll to cause the captain to reject the takeoff while the aircraft was still at relatively low speeds; that the doubt was clearly expressed by the first officer; and that the failure of the captain to respond and reject the takeoff was a direct cause of the accident. (p. 65)

The pilot-in-command (captain) was solely responsible for the final assessment of the condition of the aircraft and the decision regarding whether to abort takeoff. The actions on the flight deck indicated that who was the pilot-in-command was not clear. A decade earlier, Rizzo et al. (1970) defined this *Catch-22* scenario as role conflict.

Lack of Rewards

As previously, discussed, insufficient reward for work completed is one of the six primary sources of burnout (Leiter & Maslach, 2005). Understandably, employees desire to maintain equity between contributions and rewards (Adams, 1965). According to Maslach and Leiter (1997), a greater contributor to burnout is "the loss of the intrinsic reward of doing enjoyable work" (p. 45).

The 9/11 tragedy had an immediate and profound effect on the job-related views of air carrier pilots. The pilots came to the defense of their industry and to their respective companies. Toward the end of 2001, there was a noticeable surge of support for management (Comstock, 2005). Pilots largely accepted economic concessions. However, current attitudes of air carrier pilots regarding their jobs and contracts, management, and contract goals are at their lowest point since the late 1980s (Comstock, 2005). There is a widespread disdain for airline management due to the belief that management is unable to execute a viable business plan (Comstock, 2005). Such negative sentiments toward management exist for those who have negotiated concessions with major air carriers, regional carriers, traditional low-cost carriers, and among pilots at cargo companies, some of which are not economically distressed (Comstock, 2005). Several air carrier directors received a discernable level of complaints pertaining to management's failure to implement contract provisions already negotiated (Comstock, 2005). Pilots perceived the

request for economic relief by some air carriers as greed rather than necessity (Comstock, 2005). During the 1990s, militancy among pilots employed by several of the low-cost regional or freight carriers was relatively low. Pilots' attitudes have changed since 2003 (Comstock, 2005). According to Maslach et al. (2001), lack of reward was closely associated with professional inefficacy, which is one of the three dimensions of the burnout syndrome.

Workload Revisited

For the first aviators, piloting demanded considerable physical and perceptual motor skills. Today, in contrast to the pioneers of aviation, pilots rely primarily on high-level cognitive skills such as decision making, planning, and appropriate management of their workload (Hardy & Parasuraman, 1997). Modern commercial aircraft are highly automated by design. Increased automation resulted in qualitative and quantitative changes in the cognitive demands that flying imposes on pilots (Bainbridge, 1983; Parasuraman & Mouloua, 1996; Sarter & Woods, 1994; Wiener, 1988). Even though maintaining perceptual motor skills, maintaining the flight path during turbulence, and responding to avoid collision are still important, the physical demands of flying are fewer. However, the cognitive demands have concomitantly increased (Hardy & Parasuraman, 1997). Therefore, workload has effectively increased. As previously discussed, Maslach, Jackson, and Leiter (1996) postulated that workload is an antecedent to burnout.

Summary

Part 121 ATPs are a unique occupational group in terms of their selection, training, lifestyle, and frequent competency and medical checks. The organizational or

operating environment is also unique, as is the nature of continually changing job demands. These job demands weigh heavily on the individual and suggest an occupational construct that fosters burnout.

Fatigue is highly correlated with the burnout dimension of exhaustion. Research indicates that fatigue is a common problem in short-haul commercial pilots (Powell et al., 2007). Extended duty periods and high workloads are significant causes of fatigue (Powell et al., 2007). Workload, as previously discussed, is one of four aspects of job demand (Bakker, Demerouti, & Euwema, 2005). High job demands, combined with low job resources such as autonomy and performance feedback including financial compensation produce the highest levels of burnout (Bakker et al., 2005). Lack of rewards can negatively affect professional efficacy and thus be considered an antecedent of burnout (Maslach et al., 2001).

Extensive literature review did not disclose scholarly research on burnout in Part 121 ATPs. In the aftermath of 9/11, the impact and long-term psychological effect on airline pilots is still uncertain (Bor et al., 2002). The job tasks demand that pilots are physically and psychologically fit. Errors or mistakes can be disastrous and could result in fatalities. The workload stressor may be an antecedent to burnout (Maslach et al., 1996). Additionally, the unique work environment of Part 121 ATPs necessitates further research to improve the understanding of burnout among these aviation professionals.

Provided in chapter 3, is a detailed description of the research methodology. The overview includes a brief discussion of the purpose of the study, the analytical methods utilized, and the research instruments used to obtain the necessary data. Also in chapter 3, is a restatement of the research problem, the research question addressed, the hypotheses

assessed, a description of the research design, and the operational definition of the variables. Described in the data processing section is the data collection methodology and the statistical tools implemented to conduct the analyses. Finally, presented in chapter 3 is a discussion of the methodological assumptions and limitations and the ethical assurances.

CHAPTER 3: METHODOLOGY

The strategy for this research study was to examine the relationship between Part 121 ATP environment dimensions and the burnout syndrome dimensions. Quantitative methods were utilized for this correlation study, to address the research question and hypotheses. The primary research instrument was the MBI-GS. Collected from the research survey were the environment dimension data. Data collected from the demographic questionnaire provided information about the participants.

This chapter includes a restatement of the research problem, the research question, and the hypotheses. Also provided are a description of the research design and the operational definition of the variables. The data processing section describes the data collection methods and the statistical tools implemented to conduct the analyses. Chapter 3 closes with a discussion of the methodological assumptions and limitations followed by the ethical assurance section.

Restatement of the Problem

Burnout is a serious and well-documented syndrome. Stress and burnout cost American businesses $300 billion a year (Halbesleben et al., 2006). The negative effects, in particular decreased work performance, might lead to devastating and potentially fatal results. The current air transport industry environment and the evidence of fatigue at the Part 121 ATP level necessitated a study to examine the relationship between Part 121 ATPs and burnout. The problem is a lack of relationship evidence between Part 121 ATP environment dimensions and burnout subscales. The purpose of the study was to provide the aviation industry with Part 121 ATP environment dimension data that indicate burnout factors. The research data may enable the aviation industry to focus on detection

and prevention of burnout, and continue to support and promote a safe air transport industry. By investigating the relationship between Part 121 ATP environment dimensions and burnout subscales, the objectives of this study were achieved.

Statement of Research Question / Hypotheses

Statement of Research Question

To what extent, if any, is there a significant relationship between the Part 121 ATP environment dimensions and burnout subscales?

Hypotheses

Based on previous research and models such as those documented by Maslach et al. (1996), burnout was assumed an artifact of the Part 121 ATP profession. Hypothesized were there was not a statistically significant difference in the level of burnout of Part 121 ATPs that experience burnout factors and Part 121 ATPs that did not experience burnout factors. The environment dimensions (burnout factors) (X_i) for the study were role ambiguity (X_1), role conflict (X_2), quantitative work overload (X_3), qualitative work overload (X_4), autonomy (X_5), organizational politics (X_6), and fair rewards (X_7). The burnout subscales (Y_j) for this study were exhaustion (Y_1), cynicism (Y_2), and professional efficacy (Y_3). The null and alternative hypotheses were

H_0: There is no statistically significant difference in the level of exhaustion (Y_1) of ATPs that experience role ambiguity (X_1).

H_a: There is a statistically significant difference in the level of exhaustion (Y_1) of ATPs that experience role ambiguity (X_1).

H_0: There is no statistically significant difference in the level of cynicism (Y_2) of ATPs that experience role ambiguity (X_1).

H_a: There is a statistically significant difference in the level of cynicism (Y_2) of ATPs that experience role ambiguity (X_1).

H_0: There is no statistically significant difference in the level of professional efficacy (Y_3) of ATPS that experience role ambiguity (X_1).

H_a: There is a statistically significant difference in the level of professional efficacy (Y_3) of ATPS that experience role ambiguity (X_1).

H_0: There is no statistically significant difference in the level of exhaustion (Y_1) of ATPs that experience role conflict (X_2).

H_a: There is a statistically significant difference in the level of exhaustion (Y_1) of ATPs that experience role conflict (X_2).

H_0: There is no statistically significant difference in the level of cynicism (Y_2) of ATPs that experience role conflict (X_2).

H_a: There is a statistically significant difference in the level of cynicism (Y_2) of ATPs that experience role conflict (X_2).

H_0: There is no statistically significant difference in the level of professional efficacy (Y_3) of ATPs that experience role conflict (X_2).

H_a: There is a statistically significant difference in the level of professional efficacy (Y_3) of ATPs that experience role conflict (X_2).

H_0: There is no statistically significant difference in the level of exhaustion (Y_1) of ATPs that experience quantitative work overload (X_3).

H_a: There is a statistically significant difference in the level of exhaustion (Y_1) of ATPs that experience quantitative work overload (X_3).

H_0: There is no statistically significant difference in the level of cynicism (Y_2) of ATPs that experience quantitative work overload (X_3).

H_a: There is a statistically significant difference in the level of cynicism (Y_2) of ATPs that experience quantitative work overload (X_3).

H_0: There is no statistically significant difference in the level of professional efficacy (Y_3) of ATPs that experience quantitative work overload (X_3).

H_a: There is a statistically significant difference in the level of professional efficacy (Y_3) of ATPs that experience quantitative work overload (X_3).

H_0: There is no statistically significant difference in the level of exhaustion (Y_1) of ATPs that experience qualitative work overload (X_4).

H_a: There is a statistically significant difference in the level of exhaustion (Y_1) of ATPs that experience qualitative work overload (X_4).

H_0: There is no statistically significant difference in the level of cynicism (Y_2) of ATPs that experience qualitative work overload (X_4).

H_a: There is a statistically significant difference in the level of cynicism (Y_2) of ATPs that experience qualitative work overload (X_4).

H_0: There is no statistically significant difference in the level of professional efficacy (Y_3) of ATPs that experience qualitative work overload (X_4).

H_a: There is a statistically significant difference in the level of professional efficacy (Y_3) of ATPs that experience qualitative work overload (X_4).

H_0: There is no statistically significant difference in the level of exhaustion (Y_1) of ATPs that experience autonomy (X_5).

H_a: There is a statistically significant difference in the level of exhaustion (Y_1) of ATPs that experience autonomy (X_5).

H_0: There is no statistically significant difference in the level of cynicism (Y_2) of ATPs that experience autonomy (X_5).

H_a: There is a statistically significant difference in the level of cynicism (Y_2) of ATPs that experience autonomy (X_5).

H_0: There is no statistically significant difference in the level of professional efficacy (Y_3) of ATPs that experience autonomy (X_5).

H_a: There is a statistically significant difference in the level of professional efficacy (Y_3) of ATPs that experience autonomy (X_5).

H_0: There is no statistically significant difference in the level of exhaustion (Y_1) of ATPs that experience organizational politics (X_6).

H_a: There is a statistically significant difference in the level of exhaustion (Y_1) of ATPs that experience organizational politics (X_6).

H_0: There is no statistically significant difference in the level of cynicism (Y_2) of ATPs that experience organizational politics (X_6).

H_a: There is a statistically significant difference in the level of cynicism (Y_2) of ATPs that experience organizational politics (X_6).

H_0: There is no statistically significant difference in the level of professional efficacy (Y_3) of ATPs that experience organizational politics (X_6).

H_a: There is a statistically significant difference in the level of professional efficacy (Y_3) of ATPs that experience organizational politics (X_6).

H_0: There is no statistically significant difference in the level of exhaustion (Y_1) of ATPs that experience fair rewards (X_7).

H_a: There is a statistically significant difference in the level of exhaustion (Y_1) of ATPs that experience fair rewards (X_7).

H_0: There is no statistically significant difference in the level of cynicism (Y_2) of ATPs that experience fair rewards (X_7).

H_a: There is a statistically significant difference in the level of cynicism (Y_2) of ATPs that experience fair rewards (X_7).

H_0: There is no statistically significant difference in the level of professional efficacy (Y_3) of ATPs that experience fair rewards (X_7).

H_a: There is a statistically significant difference in the level of professional efficacy (Y_3) of ATPs that experience fair rewards (X_7).

Description of Research Design

For this study, a quantitative correlational survey design was utilized (Leedy & Ormond, 2005). Evaluation of the participant responses to the statements on the surveys occurred. Constas (1992) stated that quantitative measures provide researchers with methods to gather observations from a variety of cases, including survey respondents. Additionally, quantification of observations allows for exact statistical analysis between measured concepts and reduces complicated information to basic summaries for evaluation (Westbrook, 1994).

The intent was not to establish a causal correlation between the Part 121 ATP environment dimensions (burnout factors) and burnout subscales, but to ascertain the extent, if any, there was a significant correlation between the burnout factors and burnout

subscales, as described by Maslach et al. (1996). The burnout factors (independent variables) were the potential indicators of burnout. The dependent measures were the dimensions of the burnout syndrome: (a) exhaustion, (b) cynicism, and (c) professional efficacy as described by Maslach et al. (1996).

Operational Definition of Variables

The dependent measure (criterion variable) was operationalized based on the burnout subscales from the MBI-GS (Maslach et al., 1996). The burnout subscales (a) exhaustion, (b) cynicism, and (c) professional efficacy measure the different aspects of burnout, as described by Maslach et al. (1996). Lee and Ashforth (1996) emphasized the necessity to distinguish between each burnout subscale since different causes and consequences are associated with each subscale.

Environment Dimensions (burnout factors): Independent variable (X_i). According to Leiter and Maslach (1988), Jackson and Maslach (2005), and Maslach et al. (1996), the environment dimensions (a) role ambiguity, (b) role conflict, (c) quantitative work overload, (d) qualitative work overload, (e) autonomy, (f) organizational politics (g), and fair rewards are the primary antecedents of burnout (see Table 1).

Table 1

*Operational Definitions of Independent Variables (X_i)**

Environment dimension (burnout factor)	Operational definition	Variable	Data
Role ambiguity	Occurs when there is lack of adequate information to do the job well	Independent X_1	Ordinal
Role conflict	Occurs when conflicting demands at the job have to be met	Independent X_2	Ordinal
Quantitative work overload	Stress created when there is the perception of too great a volume of work to accomplish in the allocated time	Independent X_3	Ordinal
Qualitative work overload	Stress created when job requirements exceed the individual's ability or skill level	Independent X_4	Ordinal
Autonomy	Freedom and control over decisions affecting one's work	Independent X_5	Ordinal
Organizational politics	Intentional social influence process. Behavior is strategically designed to maximize self-interests	Independent X_6	Ordinal
Fair rewards	Includes financial compensation or benefits, social rewards, and appreciation by coworkers or supervisors	Independent X_7	Ordinal

Note. Information derived from article by Maslach et al. (2001).
*Index i = 1 to 7.

Burnout Subscales: Dependent variables (Y_j). The MBI-GS burnout subscales are (a) exhaustion, (b) cynicism, and (c) professional efficacy (Maslach et al., 1996) (see Table 2).

Table 2

*Operational Definitions of Dependent Variables (Y_j)**

Burnout subscale	Operational definition	Variable	Data
Exhaustion	Reflects stress aspect of burnout. Results from exerting high levels of effort.	Dependent Y_1	Ordinal
Cynicism	Reflects cognitive distancing by developing an attitude of indifference. Results from immediate reaction to exhaustion.	Dependent Y_2	Ordinal
Professional efficacy	Reflects sense of accomplishment. Inefficacy arises from lack of resources.	Dependent Y_3	Ordinal

Note. Information derived from article by Maslach et al. (2001).
*Index $j = 1$ to 3.

Description of Materials and Instruments

Researchers use the Maslach Burnout Inventory (MBI) to measure aspects of the burnout syndrome (Maslach & Jackson, 1981). According to Maslach and Jackson (1981) researchers initially focused on industries that required extensive human interaction. Leiter, Clark, and Durup, (1994) reported, for studies of burnout among the professional staff in the human services industries, researchers used the MBI to gather data for burnout assessment.

The MBI is the most universally implemented instrument to assess work-related burnout (Maslach et al., 1996). However, a validation and reliability evaluation is fundamental prior to the utilization of the MBI or any assessment method. Maslach and Jackson (1981) demonstrated convergent validity by correlating the MBI scores with job characteristics that were expected to contribute to burnout, outcomes that were

hypothesized to contribute to burnout, and independent behavioral ratings provided by persons who knew the participating subject well.

Maslach et al. (1996) determined the reliability of the MBI through the calculation of Cronbach's alpha (α) coefficient for the three dimensions of burnout: (a) emotional exhaustion, (b) depersonalization, and (c) personal accomplishment. Through numerous studies, researchers demonstrated the consistently high reliability and validity of the MBI (Corcoran, 1995; Maslach & Jackson, 1981; Quick, Quick, Nelson, & Hurrell, 1997). Leiter and Schaufeli (1996) confirmed the reliability and validity of the MBI-GS by examining the relationship between MBI-GS responses and written comments from each study participant.

Utilizing the MBI to measure burnout of professionals in industries other than those that are extensively human service-oriented was not feasible (Leiter & Schaufeli, 1996). For occupations that embrace self-management or autonomous opportunities, the MBI could fail to address key aspects of work outside of the service provision (Maslach & Schaufeli, 1993). Researchers found that MBI scores for workers not in a human service occupation, such as police officers, military personnel, computer programmers, and entrepreneurs, differed from the norms established with human service providers (Gryskiewicz & Buttner, 1992; Lee & Ashforth, 1996; Leiter et al., 1994).

Researchers use the MBI-GS to measure burnout of professionals who work in non-people oriented industries (Maslach et al., 2001). The three subscales of the MBI-GS, exhaustion, cynicism, and professional efficacy, parallel the subscales of the MBI. The exhaustion dimension, without reference to service recipients, is generic and does not emphasize emotions. The emotional exhaustion subscale of the MBI measures the

depletion of emotional energy. This is distinct from physical or mental fatigue (Schaufeli & Enzmann, 1998). Cynicism replaces depersonalization. This dimension differs most from the corresponding MBI dimension (Leiter & Schaufeli, 1996). Depersonalization is a quality most closely associated with human services. However, cynicism is an indifference to or a distancing from one's work. The professional efficacy subscale relates to the personal accomplishment subscale for the MBI (Leiter & Schaufeli, 1996). However, this dimension is broader and encompasses both social and non-social aspects of professional accomplishments. Additionally, this subscale focuses more on efficacy.

Schutte, Toppinen, Kalimo, and Schaufeli (2000) demonstrated the factorial validity across the three dimensions of the MBI-GS, exhaustion, cynicism, and professional efficacy. The research dissertation conducted by Cook (2006) demonstrated the validity of the MBI-GS for subjects in the information technology industry. Leiter and Schaufeli (1996) confirmed the reliability of the MBI-GS through the calculation of Cronbach's alpha coefficient for the three subscales, exhaustion, cynicism, and professional efficacy (Leiter & Schaufeli, 1996).

The MBI-GS instrument was utilized, since this instrument is statistically reliable and valid across industries other than human service-oriented industries (Advani et al., 2005; Jackson, Turner, & Brief, 1987; Leiter & Schaufeli, 1996). However, for this study a subset of the MBI-GS questionnaire consisting of 15 of the 16 questions comprised the survey. The deleted question, *I just want to do my job and not be bothered*, is not psychometrically sound (Schaufeli & Bakker, 2004). The seven statements on in the research survey were developed from an extensive literature review, that included research conducted by Cook (2006). Appendix D contains the research survey. Each

research survey statement pertained to one of the burnout factors (see Table 1). The participant's responses to each research survey statement were the data used to test the hypothesis. The calculated Cronbach's alpha coefficients confirmed sufficient reliability for each subscale of exhaustion, cynicism, and professional efficacy.

Selection of Participants

Part 121 ATPs was the focus of the study. Air transport pilots are captain, first, or second officer per Part 121 regulations. "A First Officer would be trained as a copilot on a particular type or types of aircraft" (Bankit, 2004, p. 2). Second officers received training as flight engineers. Pilots holding and operating under an ATP certificate must also possess a current first-class airman medical certificate per Part 67-Medical Standards and Certifications of the FARs (NARA, 2007). Under Part 61-Certification: Pilots, Flight Instructors, and Ground Instructors of the FARs, "A first-class medical certificate expires at the end of the last day of the sixth month after the month of the date of the examination shown on the certificate for operations requiring an airline transport pilot certificate" (NARA, 2007, p. 325). The random selection of participants came from the total population database for Part 121 ATPs compiled in January 2008 by Aviation DataSource, Inc.

Using SPSS version 15, 1100 randomly sampled ATPs, received the survey packet. The effective response rate was 12.6%, yielding 138 usable survey packets. Results from a Power analysis based on a type III sum of squares model indicated an observed power range of 0.884-1.000, for the means of each MGI-GS subscale (see Table 3).

Table 3

Observed Power Analysis for the MBI-GS Subscale Means

Type III Sum of Squares Model	Exhaustion	Cynicism	Professional efficacy
Observed power	0.99	1.00	0.88

Note. Data compiled from the SPSS version 15.
$\alpha = 0.05$.

Procedures

Prior to initiating the study, obtaining the total population database of Part 121 ATPs was necessary. The owner of Aviation DataSource, Inc. provided the database information. The random selection of study participants occurred through the application of SPSS version 15. A sample size of 1% was extracted from the database to support a 95% confidence level ($\alpha = 0.05$) and a minimum sample size (n) of 85. These statistical parameters are consistent with the statistical parameters that Maslach et al. (1996) used to develop the MBI-GS.

Research study participants received a research survey packet containing (a) a cover letter; (b) a participant consent form; (c) the three survey instruments (demographic questionnaire, research survey, and MBI-GS; and (d) a self-addressed stamped envelope for data collection purposes. The randomly selected participants received the research packet by U.S. Postal Service. The information obtained and evaluated through an extensive literature review predicated the design of the survey instruments. A detailed description of the survey instruments is provided with in this chapter in the sections entitled Description of Research Design and Description of Materials.

Destruction of the return envelopes occurred upon receipt of the completed surveys, and raw data was stored in a locked cabinet when not in use. The raw data was compiled and input data files were populated and formatted for analysis with SPSS

version 15. The section of this chapter entitled Discussion of Data Processing describes the analytical methodology. In accordance with Northcentral University's Institutional Review Board approved research study plan, data destruction occurs following the completion of this study (NARA, 2008).

Discussion of Data Processing

The data collected included data from the administration of a demographic questionnaire, a research survey, and the MBI-GS (see Appendices C, D, & E). The confidence level was 95% to test the hypotheses. Approximately 1% of the total population data of Part 121 ATPs with an ATP license, a flight engineer rating, and a first-class medical certificate received the research packet containing the survey instruments, cover letter, and consent form, via U.S. Postal Service first-class mail. The random sample was extracted using SPSS version 15, from a comprehensive database maintained by Aviation DataSource, Inc.

Data pertaining to the levels of burnout of Part 121 ATPs was derived from the MBI-GS. The demographic questionnaire was used to obtain the following information about the study participants: (a) gender, (b) age range, (c) current position (e.g., captain, first officer, second officer, other), (d) total flight hours in current position, (e) air carrier (e.g., major, regional, non-Part 121 operation), (f) total flight hours for all air carriers, (g) number of years flying for a Part 121 air carrier, (h) total flight hours for current air carrier, and (i) highest level of education (e.g., doctorate degree, master's degree, bachelor's degree, associate's degree, high school diploma, other).

The research survey, based on information gathered through an extensive review of the literature, consisted of seven statements that addressed the burnout factors: (a) role

conflict, (b) role ambiguity, (c) quantitative workload, (d) qualitative workload, (e) autonomy, (f) organizational politics, and (g) fair rewards (Cook, 2006). The participants rated the survey statements on a 7-point Likert scale similar to the MBI-GS rating system. To answer the research question, and thus gain insight into the relationship between Part 121 ATPs and burnout, hypotheses testing and correlational analyses were conducted using the quantitative data obtained from the research survey and the MBI-GS. All analyses were conducted using SPSS version 15. The hypotheses were evaluated for significant differences between the mean scores calculated from the MBI-GS data, for the burnout subscales (exhaustion, cynicism, and professional efficacy) obtained from ATPs that experience a particular burnout factor (i.e., role ambiguity, role conflict, quantitative workload, qualitative workload, autonomy, organizational politics, and fair rewards) and the means scores for the burnout subscales obtained from ATPs that did not experience a particular burnout factor, using the Mann-Whitney rank sum *U* test (Cook, 2006). Due to the violation of the normality assumption, the use of a non-parametric test was necessary (Gay & Airasian, 2003).

Spearman's rho (ρ) correlation coefficient was evaluated to determine the significance of the correlation between the burnout factors and the burnout subscales. Each burnout factor, role ambiguity, role conflict, quantitative workload, qualitative workload, autonomy, organizational politics, and fair rewards was correlated with each burnout subscale, exhaustion, cynicism, and professional efficacy. The strength and direction of the correlations was also measured. Cronbach's alpha coefficient was used to estimate the reliability of the responses to each item on the two surveys.

Methodological Assumptions and Limitations

The MBI-GS is the leading measure of burnout of occupations other than human services and education (Maslach et al., 1996). The MBI-GS is consistent across "nations, organizations, and occupational groups" (Maslach et al., 1996, p. 26). The assumption was that the MBI-GS was applicable to Part 121 ATPs. A self-report method was implemented to facilitate the collection of the necessary data to answer the research question. The accuracy of the collected data was dependent upon the participants' honest responses to the research survey statements, the MBI-GS, and demographic questionnaire. An assumption was that each participant responded to each survey question and statement honestly. Data corruption was also possible if a respondent misunderstood a survey question or demographic category and therefore provided an inaccurate answer. An additional assumption was SPSS version 15 was verified and validated and did not contain any embedded or undetectable data processing errors.

The data obtained for the study were not exhaustive. The results and subsequent conclusions represent analysis on a sample size of 1% or less of the total population. The total population was the accessible population contained in a database compiled by Aviation DataSource, Inc., analysts in January 2008. Thus, an inherent limitation of this research study potentially exists. Despite the confidentiality and anonymity of the instrument, participants that believe responding in a manner acceptable to the air transport industry is necessary may introduce a bias. Financial constraints also represented a limitation. Thus, the quantity of data collected and sophistication of the analytical tools utilized for data processing and analysis were limited.

Ethical Assurances

Research studies must protect the human rights of the participants, thus this study made every attempt to comply with the principles established by the federal government, as well as the scientific, professional, and academic communities. The research investigation maintained strict confidentially of all participants. The data obtained remained confidential and under strict control within the study. The study proceeded with the approval granted by Northcentral University's Institutional Review Board.

CHAPTER 4: FINDINGS

This chapter includes the data obtained through the administration of survey instruments necessary to conduct this study. The purpose of this study was to provide the aviation industry with Part 121 ATP environment dimension data that may indicate burnout factors. Offered is a discussion of the survey response rate, followed by the demographic description of the study participants. Next is the presentation of the results of the MBI-GS subscale reliability analysis and descriptive statistical calculations for the burnout subscales. A description of the burnout classifications follows. Presented next is the exploratory data analysis. The chapter continues with the presentation of the results of the statistical analysis pertaining to the hypotheses, followed by the correlational data analyses between the burnout factors and burnout subscales. This chapter concludes with a summary of the findings.

Results

Survey Response Rate

Approximately 1,100 randomly sampled ATPs who also held a first-class medical certificate and a flight engineer rating received a survey packet distributed via U. S. Postal Service first-class mail. Five survey packets were undelivered and returned to the researcher. Thus, the potential survey response count was 1,095. The total number of returned surveys was 184. However, 15 surveys returned incomplete and 31 surveys were from respondents not flying under Part 121 regulations. The returned incomplete surveys lacked responses ranging from a minimum of three survey statements to entirely unanswered. Due to the missing response data pertaining to the 15 incomplete surveys, these surveys were not included in the data analysis. The surveys received from pilots not

flying under Part 121 regulations were not included in the data analysis since the focus for this research study was on Part 121 ATPs. These exclusions, non-returned surveys, and non-deliverable surveys resulted in an effective response rate of 12.6% and 138 usable surveys. The number of useable responses exceeded the minimum response criterion of 85 surveys necessary to conduct a statistically viable research study.

Demographic Description of Study Participants

The study participants included 134 males, representing 97.1% of the total participants (*N*), and 4 females, representing 2.9% of the total participants. The median age range of the pilots was 40 to 49 years of age. The median age range sample size (*n*) was 41 pilots, which represented 29.7% of the total participants. The mode age range was 50 to 59 years of age ($n = 56$, 40.6%). The majority of the respondents ($n = 100$, 72.5%) had earned a bachelor's degree; 22 pilots (15.9% of the total participants) had earned a master's degree. The remaining 26 pilots indicated their highest level of education was a high school diploma ($n = 5$, 3.6%), an associate's degree ($n = 9$, 6.5%), a doctorate degree ($n = 1$, 0.7%), or other ($n = 1$, 0.7%). Presented in Tables 4-6 are the frequency data for the demographic variables: (a) gender, (b), age range, and (c) education.

Table 4

Demographic Frequency Data for Gender

Variable	*N*	*n*	%
Gender	138		
Male		134	97.1
Female		4	2.9

Note. *N* = total sample; *n* = sub-sample size; % = frequency.

Table 5

Demographic Frequency Data for Age Range

Variable	*N*	*n*	%
Age range (years)	138		
29 or younger		2	1.4
30 to 39		31	22.5
40 to 49		41	29.7
50 to 59		56	40.6
60 and older		8	5.8

Note. N = total sample; n = sub-sample size; % = frequency.

Table 6

Demographic Frequency Data for Education

Variable	*N*	*n*	%
Education	138		
Doctorate degree		1	0.7
Master's degree		22	15.9
Bachelor's degree		100	72.5
Associate's degree		9	6.5
High school diploma		5	3.6
Other		1	0.7

Note. N = total sample; n = sub-sample size; % = frequency.

A majority of the respondents (n = 102, 73.9%) flew for a major air carrier. This subgroup was comprised of 68 (49.3%) captains, 32 (23.2%) first officers, and 2 (1.4%) second officers. The remaining respondents (n = 36, 26.1%) flew for a regional air carrier. Pilots within this subgroup held positions of captain (n = 34, 24.7%) and first officer (n = 2, 1.4%). Shown in Table 7 are the demographic data and cross-tabulation for current position and air carrier.

Table 7

Demographic Data, Cross-Tabulated by Current Position and Carrier

	Current position			
Air carrier	Captain *n* (%)	First officer *n* (%)	Second officer *n* (%)	Total *n* (%)
Major	68 (49.3)	32 (23.2)	2 (1.4)	102 (73.9)
Regional	34 (24.7)	2 (1.4)	0 (0.0)	36 (26.1)
Total	102 (74.0)	34 (24.6)	2 (1.4)	138 (100.0)

Tables 8 and 9 present data related to the respondents' flying experience. Presented in 5,000-hour flying time increments are a cross-tabulation of current air carrier, current position, and the all air carriers demographic variables. According to FAR 121.515 (NARA, 2007), "No airman may be aloft as a flight crewmember [sic] more than 1,000 hours in any 12-calendar-month period" (p. 850). Therefore, each 5,000-hour time increment is equivalent to five 12-calendar-month periods (see Table 8). Only six pilots (4.3%) flew more than 20,000 hours with their current air carrier, while 49 pilots (35.5%) flew less than 5,000 hours with their current air carrier. Only four pilots (2.9%) flew more than 20,000 hours in their current position, while 71 pilots (51.4%) flew less than 5,000 hours in their current position. The all air carrier demographic variable indicates that 82 pilots (59.4%) flew more than 10,000 hours.

Table 8 details the descriptive statistics for the current air carrier, current position, and all air carriers demographic variables. The respondents' mean flying time with their current air carrier is 8,514.62 hours and the standard deviation (*SD*) = 6,143.24 hours.

Table 8

Total Flying Time Distribution Data

	Flying time (hours)					
	< 5,000	5,000 – 10,000	10,001 – 15,000	15,001 – 20,000	> 20,000	Total
Variable	*n* (%)	*n* (%)	*n* (%)	*n* (%)	*n* (%)	*N*
Current air carrier	49 (35.5)	39 (28.3)	30 (21.7)	14 (10.2)	6 (4.3)	138
Current position	65 (47.1)	47 (34.1)	14 (10.1)	8 (5.8)	4 (2.9)	138
All air carriers	19 (13.8)	47 (34.0)	35 (25.4)	27 (19.6)	10 (7.2)	138

Note. N = total sample; n = sub-sample size; % = frequency.

The mean flying times for the current position and all air carriers variables are 6,397.74 hours (SD = 5,907.77 hours) and 11,744.10 hours (SD = 6,325.96 hours), respectively.

Table 9

Frequency Statistics for Total Flying Time (hours) Demographics

Variable	Mean	Median	Mode	SD
Current air carrier	8,514.62	7,000.00	6,000	6,143.24
Current position	6,397.74	5,000.00	2,500[a]	5,907.77
All air carriers	11,744.10	11,000.00	10,000	6,325.96

[a]Multiple modes exist. Smallest is shown.

Figure 1 indicates the distribution of frequency data for the number of years each participant flew under Part 121. The mean flying time was 15.58 years (SD = 7.63 years).

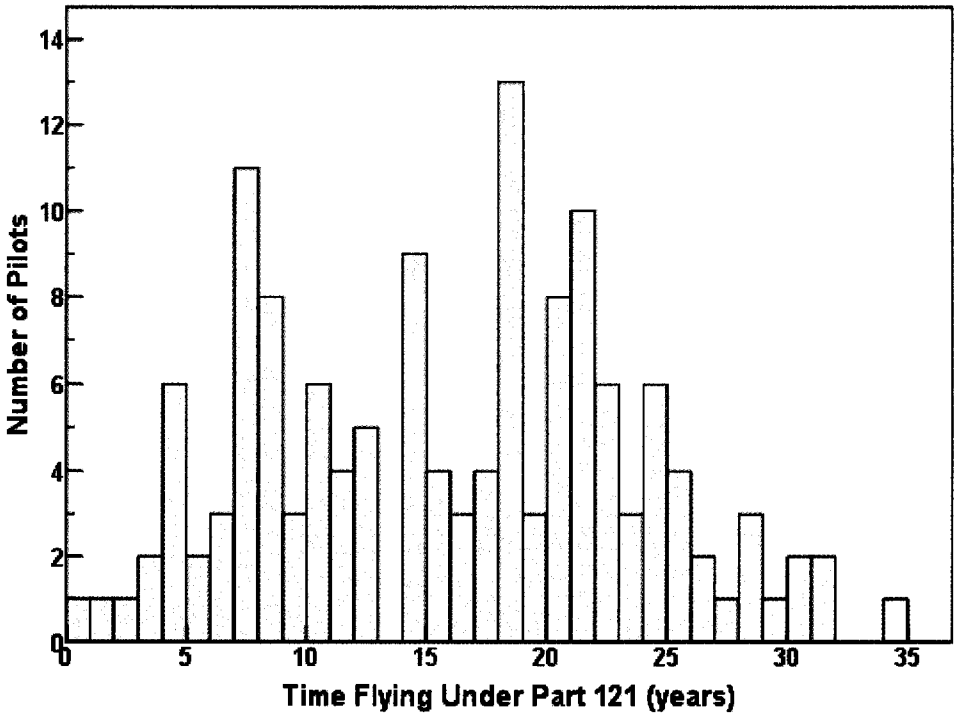

Figure 1. Frequency data of flight time distribution for pilots flying under Part 121.

MBI-GS Data Analysis

The MBI-GS was adapted from the MBI to measure burnout in workers not in the human service industry (Maslach et al., 1996). Unlike the MBI, the MBI-GS does not focus on people-oriented service, but on job performance in general. "The MBI-GS measures respondents' relationships with their work on a continuum from engagement to burnout" (Maslach et al., 1996, p. 20). The MBI-GS data analyses utilized responses to the 15 survey statements contained in the MBI-GS. Statements 1, 2, 3, 4, and 6 pertain to the exhaustion subscale; statements 8, 9, 13, and 14 addresses the cynicism subscale; and statements 5, 7, 10, 11, 12 and 15 pertain to the professional efficacy subscale (Maslach et al., 1996) (see Appendix E). The Likert scale-value mean, standard deviation, minimum and maximum, and range for each subscale were calculated.

Validity and Reliability

The MBI-GS instrument has demonstrated reliability and validity across industries other than human service-oriented industries (Advani et al., 2005; Jackson et al., 1987; Leiter & Schaufeli, 1996). Calculated from the mean scores for each subscale, the Cronbach's alpha coefficient was used to measure the internal consistency and determined the reliability of the MBI-GS instrument as applied in this research study. Internal consistency is a frequently used method of reliability (Gay & Airasian, 2003). Because internal consistency methods require the administration of one test, sources of measurement errors are eliminated (Gay & Airasian, 2003).

The Cronbach's alpha coefficient values were consistent with values accepted to confirm statistically sufficient reliability for each subscale (Leiter & Schaufeli, 1996). The minimum alpha coefficient values determining reliability for exhaustion, cynicism, and professional efficacy subscales are 0.83, 0.83, and 0.70, respectively (Leiter & Schaufeli, 1996). Table 10 shows the results of the reliability test for each subscale: (a) exhaustion, (b) cynicism, and (c) professional efficacy.

Table 10

Reliability Test Results for the MBI-GS Burnout Subscales

Subscale	Cronbach's alpha
Exhaustion	0.91
Cynicism	0.85
Professional efficacy	0.71

Burnout Subscale Classification Levels and Descriptive Statistics

A three-dimensional perspective of burnout is realized when the MBI-GS subscales are utilized together. High scores on exhaustion and cynicism, combined with low scores on professional efficacy, reflect a high degree of burnout (Maslach et al.,

1996). Average scores on all three subscales indicate an average degree of burnout. Low scores on exhaustion and cynicism, combined with high scores on professional efficacy, indicate a low level of burnout (Maslach et al., 1996). Maslach et al. recommended the classification of a low, middle, or high level of burnout for each burnout subscale score. Table 11 illustrates the range for each classification of data obtained from a research study on burnout that included 3,727 participants representing a variety of professions, which served to establish the numerical cutoff points for each subscale (Maslach et al., 1996). The three levels of burnout, low, middle, and high, are one third of a normative distribution pertaining to each subscale (Maslach et al., 1996).

Table 11

Classification Ranges for Burnout Levels on MBI-GS

Subscale	Low	Middle (average)	High
Exhaustion	< 2.01	2.01 – 3.19	> 3.19
Cynicism	< 1.01	1.01 – 2.19	> 2.19
Professional efficacy	> 4.99	4.01 – 4.99	< 4.01

Note. Data obtained from 3,727 participants representing a variety of professions were used to establish the numerical cut-off points for each subscale (Maslach et al., 1996) Each level of burnout, low, middle, and high are one third of a normative distribution pertaining to each subscale (Maslach et al., 1996).

The MBI-GS three-dimensional structure requires that exhaustion differ qualitatively from cynicism (Leiter & Schaufeli, 1996). "If indifference and a lack of enthusiasm were direct indicators of exhaustion, the items would combine as one factor" (Maslach et al., 1996, p. 21). Within the MBI-GS, indifference and cynicism represent dysfunctional coping. Employees become indifferent and cynical about their jobs "in order to gain distance from its exhausting demands" (Leiter & Schaufeli, 1996, p. 231). Cynicism also lessens the job's potential for building professional efficacy (Maslach et

al., 1996). "Therefore, cynicism is expected to be positively correlated with exhaustion and negatively correlated with professional efficacy" (Maslach et al., 1996, p. 22).

Categorized by the burnout subscale, according to Maslach et al. (1996) are the participants' responses to the MBI-GS statements (see Table 12). The mean (*M*) for exhaustion was 2.45 (*SD* = 1.80), which indicated a middle (average) level of burnout. Cynicism (*M* = 2.85, *SD* = 2.34) indicated a high level of burnout. Professional efficacy (*M* = 4.98, *SD* = 1.65) indicated an average level of burnout.

Table 12

Descriptive Statistics for the MBI-GS Burnout Subscales

Subscale	M	SD	Minimum	Maximum	Range
Exhaustion	2.45	1.80	0	6	6
Cynicism	2.85	2.34	0	6	6
Professional efficacy	4.98	1.65	0	6	6

Note. Total participant responses to the MSI-GS provided the input data for SPSS version 15 used to calculate the descriptive statistics for each burnout subscale.

Exploratory Data Analysis

The burnout factors, burnout subscales, and demographic variables were reviewed for accuracy, missing values, and relevant central tendencies. Histograms of the burnout subscales plotted against each of the burnout factors were examined for skewness. Also, conducted for each burnout subscale was the Kolmogorov-Smirnov normality test. Results from these exploratory analyses were used to determine whether parametric statistical methods or nonparametric statistical methods were appropriate for testing the hypotheses and conducting the correlational analyses.

Analysis and Evaluation of Findings

The frequencies and percentages of responses for each burnout subscale were calculated and categorized as a low, middle, or high level of burnout according to Maslach et al. (1996) (see Table 13). High levels of burnout for exhaustion and cynicism were indicated by 25 (18.1%) and 42 (30.4%) of the total participants, respectively. Nine (6.5%) of the total participants indicated a high level of burnout for professional efficacy. These data are consistent with a high level of burnout when combined to build a three-dimensional perspective (Maslach et al., 1996; Schutte et al., 2000). One hundred three (74.7%) of the total participants exhibited a low level of burnout for professional efficacy. However, the low level of burnout for professional efficacy is not consistent with findings by Maslach et al. who reported that cynicism lessens the job's potential for building professional efficacy.

Table 13

Summary of Burnout Level Classifications for Study Participants

Subscale	Low *n* (%)	Middle *n* (%)	High *n* (%)	Total *N*
Exhaustion	80 (58.0%)	33 (23.9%)	25 (18.1%)	138
Cynicism	80 (58.0%)	16 (11.6%)	42 (30.4)	138
Professional efficacy	103 (74.7%)	26 (18.8%)	9 (6.5%)	138

Note. N = total sample; n = sub-sample size; % = frequency

Research Question and Hypotheses Analysis

The purpose of this study was to provide the aviation industry with Part 121 ATP environment dimension data that may indicate burnout factors. The objectives of the study were met by investigating the relationship between Part 121 ATP environment

dimensions and burnout subscales. The research question developed to support the purpose of this research study was

To what extent, if any, is there a significant relationship between the Part 121 ATP environment dimensions and burnout subscales?

To answer the research question associated with this study, the responses to the research survey questions were indicative of either experiencing that particular burnout factor or not experiencing that particular burnout factor. Mann-Whitney rank sum *U* tests were used to test the hypotheses. Spearman's ρ correlation coefficients correlated the burnout factors and burnout subscales. Selection of the nonparametric tests occurred because of the violation of the normality assumption. The mean scores for each burnout subscale, calculated from the MBI-GS data were the dependent measures. The test variables were the burnout factors: (a) role ambiguity, (b) role conflict, (c) quantitative work overload, (d) qualitative work overload, (e) autonomy, (f) organizational politics, and (g) fair rewards. Output statistics from the Mann-Whitney rank sum *U* test were the Mann-Whitney *U* statistic, *z* score, and the *p* value. The *U* statistic indicates the number of times scores in the lower-ranked group within the grouping (dependent) variable preceded scores of the higher-ranked group within the grouping variable. The *z* score is the standardized score associated with the *p* value; a *z* score with a magnitude greater than ± 1.96 indicates a significant difference at the $p < 0.05$ level (George & Mallery, 2007).

Classification of Research Survey Responses

The research survey questions were used to assess burnout factors using a 7-point Likert scale similar to the MBI-GS rating system. The response values of *0*, *1*, and *2*

indicated a classification of negative, while values of *3*, *4*, *5*, and *6* indicated a classification of positive (Cook, 2006). The burnout level classifications formed the basis for the data encoding structure. Thus, negative responses correlated with low levels of burnout and positive responses correlated with middle to high levels of burnout, depending on the subscale analyzed. Burnout is a continuous variable, not a dichotomous variable (Maslach et al., 1996).

Hypotheses Analysis

The Mann-Whitney rank sum *U* test was implemented to determine whether there was evidence of a statistically significant difference between the mean score for a particular burnout subscale for ATPs that experience a particular burnout factor and the mean score for that burnout subscale for ATPs that did not experience a particular burnout factor. The null hypothesis was ascertained to be true unless sufficient statistical evidence indicated otherwise; p values less than the significance level, $\alpha = 0.05$, indicated a rejection of the null hypothesis. Therefore, there was a difference between the mean score for a particular burnout subscale for ATPs that experience a particular burnout factor and ATPs that did not experience that particular burnout factor. Thus, the alternative hypothesis was supported. The investigated environment dimension was an indicator of burnout. The Spearman's ρ correlation coefficients were used to determine the significance of the correlation between the burnout factors and the burnout subscales and to measure the strength and direction of the correlations (i.e., 0.00 – 0.25 indicated *weak*; 0.26 – 0.50 indicated *fair*; 0.51 – 0.75 indicated *moderate*; and > 0.75 indicated *good to excellent*) (Berenson, Levine, & Krehbiel, 2006). The results from the Mann-

Whitney rank sum *U* tests and the Spearman's ρ correlations were used to address the research question.

Burnout Factor Role Ambiguity, X_1

H_0: There is no statistically significant difference in the level of exhaustion (Y_1) of ATPs that experience role ambiguity (X_1).

H_a: There is a statistically significant difference in the level of exhaustion (Y_1) of ATPs that experience role ambiguity (X_1).

H_0: There is no statistically significant difference in the level of cynicism (Y_2) of ATPs that experience role ambiguity (X_1).

H_a: There is a statistically significant difference in the level of cynicism (Y_2) of ATPs that experience role ambiguity (X_1).

H_0: There is no statistically significant difference in the level of professional efficacy (Y_3) of ATPs that experience role ambiguity (X_1).

H_a: There is a statistically significant difference in the level of professional efficacy (Y_3) of ATPs that experience role ambiguity (X_1).

Statement 1 on the research survey, "My duties are prioritized, for me," was the evaluation variable for the null and alternate hypotheses. Examination of the subscale of exhaustion occurred first, using the Mann-Whitney rank sum *U* test. The *p* value of 0.60 was greater than 0.05; therefore, the rejection of the null hypothesis H_0 was not possible (see Table 14). There exists evidence that there was not a statistically significant difference in the level of exhaustion of ATPs that experience role ambiguity. Thus, the alternate hypothesis H_a was rejected.

Table 14

Role Ambiguity Test Statistics for Exhaustion

Test statistic	Mean exhaustion
Mann-Whitney *U*	1930.00
z	-0.53
p value (asymptotic significance, 2-tailed)	0.60

Note. Data compiled from the SPSS version 15 Mann-Whitney rank sum *U* test.

Next examined, using the Mann-Whitney rank sum *U* test, was the subscale of cynicism. The *p* value of 0.36 was greater than 0.05; therefore, the rejection of the null hypothesis H_0 was not possible (see Table 15). There exists evidence that there was not a statistically significant difference in the level of cynicism of ATPs that experience role ambiguity. Thus, the alternate hypothesis H_a was rejected.

Table 15

Role Ambiguity Test Statistics for Cynicism

Test statistic	Mean cynicism
Mann-Whitney *U*	1849.00
z	-0.91
p value (asymptotic. significance, 2-tailed)	0.36

Note. Data compiled from the SPSS version 15 Mann-Whitney rank sum *U* test.

Finally examined, using the Mann-Whitney rank sum *U* test, was the subscale of professional efficacy. The *p* value of 0.47 was greater than 0.05; therefore, the rejection of the null hypothesis H_0 was not possible (see Table 16). There exists evidence that there was not a statistically significant difference in the level of professional efficacy of ATPs that experience role ambiguity. Thus, the alternate hypothesis H_a was rejected.

Table 16

Role Ambiguity Test Statistics for Professional Efficacy

Test statistic	Mean professional efficacy
Mann-Whitney *U*	1922.00
z	-0.73
p value (asymptotic significance, 2-tailed)	0.47

Note. Data compiled from the SPSS version 15 Mann-Whitney rank sum *U* test.

Burnout Factor Role Conflict, X_2

H_0: There is no statistically significant difference in the level of exhaustion (Y_1) of ATPs that experience role conflict (X_2).

H_a: There is a statistically significant difference in the level of exhaustion (Y_1) of ATPs that experience role conflict (X_2).

H_0: There is no statistically significant difference in the level of cynicism (Y_2) of ATPs that experience role conflict (X_2).

H_a: There is a statistically significant difference in the level of cynicism (Y_2) of ATPs that experience role conflict (X_2).

H_0: There is no statistically significant difference in the level of professional efficacy (Y_3) of ATPs that experience between role conflict (X_2).

H_a: There is a statistically significant difference in the level of professional efficacy (Y_3) of ATPs that experience between role conflict (X_2).

Statement 2 on the research survey, "I receive ambiguous instructions about what I should be doing with my on-duty time," is the evaluation variable for the null and alternate hypotheses. The subscale of exhaustion was examined first, using the Mann-Whitney rank sum *U* test. The *p* value of 0.00 was less than 0.05; therefore, the null

hypothesis H_0 was rejected (see Table 17). There exists evidence that there was a statistically significant difference in the level of exhaustion of ATPs that experience role conflict. Thus, the alternate hypothesis H_a was not rejected.

Table 17

Role Conflict Test Statistics for Exhaustion

Test statistic	Mean exhaustion
Mann-Whitney *U*	781.50
z	-2.93
p value (asymptotic significance, 2-tailed)	0.00

Note. Data compiled from the SPSS version 15 Mann-Whitney rank sum *U* test.

Next examined, using the Mann-Whitney rank sum *U* test, was the subscale of cynicism. The *p* value of 0.01 was less than 0.05; therefore, the null hypothesis H_0 was rejected (see Table 18). There exists evidence that there was a statistically significant difference in the level of cynicism of ATPs that experience role conflict. Thus, the alternate hypothesis H_a was not rejected.

Table 18

Role Conflict Test Statistics for Cynicism

Test statistic	Mean cynicism
Mann-Whitney *U*	841.00
z	-2.59
p value (asymptotic significance, 2-tailed)	0.07

Note. Data compiled from the SPSS version 15 Mann-Whitney rank sum *U* test.

Finally examined, using the Mann-Whitney rank sum *U* test, was the subscale of professional efficacy. The *p* value of 0.07 was greater than 0.05; therefore, the rejection of the null hypothesis H_0 was not possible (see Table 19). There exists evidence that there

was not a statistically significant difference in the level of professional efficacy of ATPs that experience role conflict. Thus, the alternate hypothesis H_a was rejected.

Table 19

Role Conflict Test Statistics for Professional Efficacy

Test statistic	Mean professional efficacy
Mann-Whitney *U*	1041.00
z	-1.80
p value (asymptotic significance, 2-tailed)	0.07

Note. Data compiled from the SPSS version 15 Mann-Whitney rank sum *U* test.

Burnout Factor Quantitative Work Overload, X_3

H_0: There is no statistically significant difference in the level of exhaustion (Y_1) of ATPs that experience quantitative work overload (X_3).

H_a: There is a statistically significant difference in the level of exhaustion (Y_1) of ATPs that experience quantitative work overload (X_3).

H_0: There is no statistically significant difference in the level of cynicism (Y_2) of ATPs that experience quantitative work overload (X_3).

H_a: There is a statistically significant difference in the level of cynicism (Y_2) of ATPs that experience quantitative work overload (X_3).

H_0: There is no statistically significant difference in the level of professional efficacy (Y_3) of ATPs that experience quantitative work overload (X_3).

H_a: There is a statistically significant difference in the level of professional efficacy (Y_3) of ATPs that experience quantitative work overload (X_3).

Statement 3 on the research survey, "I have too many duties to complete in my assigned shift," is the evaluation variable for the null and alternate hypotheses. Examined

first, using the Mann-Whitney rank sum *U* test, was the subscale of exhaustion. The *p* value of 0.00 was less than 0.05; therefore, the null hypothesis H_0 was rejected (see Table 20). There exists evidence that there was a statistically significant difference in the level of exhaustion of ATPs that experience quantitative work overload. Thus, the alternate hypothesis H_a was not rejected.

Table 20

Quantitative Work Overload Test Statistics for Exhaustion

Test statistic	Mean exhaustion
Mann-Whitney *U*	606.50
z	-3.54
p value (asymptotic significance, 2-tailed)	0.00

Note. Data compiled from the SPSS version 15 Mann-Whitney rank sum *U* test.

Next examined, using the Mann-Whitney rank sum *U* test, was the subscale of cynicism. The *p* value of 0.01 was less than 0.05; therefore, the null hypothesis H_0 was rejected (see Table 21). There exists evidence that there was a statistically significant difference in the level of cynicism of ATPs that experience quantitative work overload. Thus, the alternate hypothesis H_a was not rejected.

Table 21

Quantitative Work Overload Test Statistics for Cynicism

Test statistic	Mean cynicism
Mann-Whitney *U*	770.00
z	-2.53
p value (asymptotic significance, 2-tailed)	0.01

Note. Data compiled from the SPSS version 15 Mann-Whitney rank sum *U* test.

Finally examined, using the Mann-Whitney rank sum *U* test, was the subscale of professional efficacy. The *p* value of 0.03 was less than 0.05; therefore, the null

hypothesis H_0 was rejected (see Table 22). There exists evidence that there was a statistically significant difference in the level of professional efficacy of ATPs that experience quantitative work overload. Thus, the alternate hypothesis H_a was not rejected.

Table 22

Quantitative Work Overload Test Statistics for Professional Efficacy

Test statistic	Mean professional efficacy
Mann-Whitney *U*	910.00
z	-2.15
p value (asymptotic significance, 2-tailed)	0.03

Note. Data compiled from the SPSS version 15 Mann-Whitney rank sum *U* test.

Burnout Factor Qualitative Work Overload, X_4

H_0: There is no statistically significant difference in the level of exhaustion (Y_1) of ATPs that experience qualitative work overload (X_4).

H_a: There is a statistically significant difference in the level of exhaustion (Y_1) of ATPs that experience qualitative work overload (X_4).

H_0: There is no statistically significant difference in the level of cynicism (Y_2) of ATPs that experience qualitative work overload (X_4).

H_a: There is a statistically significant difference in the level of cynicism (Y_2) of ATPs that experience qualitative work overload (X_4).

H_0: There is no statistically significant difference in the level of professional efficacy (Y_3) of ATPs that experience qualitative work overload (X_4).

H_a: There is a statistically significant difference in the level of professional efficacy (Y_3) of ATPs that experience qualitative work overload (X_4).

Statement 4 on the research survey, "The requirements of 1 to 2 of my duties exceed my skill level," is the evaluation variable for the null and alternate hypotheses. Examined first, using the Mann-Whitney rank sum *U* test, was the subscale of exhaustion. The *p* value of 0.15 was greater than 0.05; therefore, rejection of the null hypothesis H_0 was not possible (see Table 23). There exists evidence that there was not a statistically significant difference in the level of exhaustion of ATPs that experience qualitative work overload. Thus, the alternate hypothesis H_a was rejected.

Table 23

Qualitative Work Overload Test Statistics for Exhaustion

Test statistic	Mean exhaustion
Mann-Whitney *U*	12.00
z	-14.45
p value (asymptotic significance, 2-tailed)	0.15

Note. Data compiled from the SPSS version 15 Mann-Whitney rank sum *U* test.

Next examined, using the Mann-Whitney rank sum *U* test, was the subscale of cynicism. The *p* value of 0.16 was greater than 0.05; therefore, rejection of the null hypothesis H_0 was not possible (see Table 24). There exists evidence that there was not a statistically significant difference in the level of cynicism of ATPs that experience qualitative work overload. Thus, the alternate hypothesis H_a was rejected.

Table 24

Qualitative Work Overload Test Statistics for Cynicism

Test statistic	Mean cynicism
Mann-Whitney *U*	10.50
z	0.14
p value (asymptotic significance, 2-tailed)	0.16

Note. Data compiled from the SPSS version 15 Mann-Whitney rank sum *U* test.

Finally examined, using the Mann-Whitney rank sum *U* test, was the subscale of professional efficacy. The *p* value of 0.56 was greater than 0.05; therefore, the rejection of the null hypothesis H_0 was not possible (see Table 25). There exists evidence that there was not a statistically significant difference in the level of professional efficacy of ATPs that experience qualitative work overload. Thus, the alternate hypothesis H_a was rejected.

Table 25

Qualitative Work Overload Test Statistics for Professional Efficacy

Test statistic	Mean professional efficacy
Mann-Whitney *U*	51.00
z	-0.58
p value (asymptotic significance, 2-tailed)	0.56

Note. Data compiled from the SPSS version 15 Mann-Whitney rank sum *U* test.

Burnout Factor Autonomy, X_5

H_0: There is no statistically significant difference in the level of exhaustion (Y_1) of ATPs that experience autonomy (X_5).

H_a: There is a statistically significant difference in the level of exhaustion (Y_1) of ATPs that experience autonomy (X_5).

H_0: There is no statistically significant difference in the level of cynicism (Y_2) of ATPs that experience autonomy (X_5).

H_a: There is a statistically significant difference in the level of cynicism (Y_2) of ATPs that experience autonomy (X_5).

H_0: There is no statistically significant difference in the level of professional efficacy (Y_3) of ATPs that experience autonomy (X_5).

H_a: There is a statistically significant difference in the level of professional efficacy *(Y_3)* of ATPs that experience autonomy *(X_5)*.

Statement 5 on the research survey, "I participate in the decisions about how I perform my duties (some or all of the duties)," is the evaluation variable for the null and alternate hypotheses. Examined first, using the Mann-Whitney rank sum *U* test, was the subscale of exhaustion. The *p* value of 0.52 was greater than 0.05; therefore, rejection of the null hypothesis H_0 was not possible (see Table 26). There exists evidence that there was not a statistically significant difference in the level of exhaustion of ATPs that experience autonomy. Thus, the alternate hypothesis H_a was rejected.

Table 26

Autonomy Test Statistics for Exhaustion

Test statistic	Mean exhaustion
Mann-Whitney *U*	1672.50
z	-0.65
p value (asymptotic significance, 2-tailed)	0.52

Note. Data compiled from the SPSS version 15 Mann-Whitney rank sum *U* test.

Next examined, using the Mann-Whitney rank sum *U* test, was the subscale of cynicism. The *p* value of 0.47 was greater than 0.05; therefore, rejection of the null hypothesis H_0 was not possible (see Table 27). There exists evidence that there was not a statistically significant difference in the level of cynicism of ATPs that experience autonomy. Thus, the alternate hypothesis H_a was rejected.

Table 27

Autonomy Test Statistics for Cynicism

Test statistic	Mean cynicism
Mann-Whitney *U*	1659.00
z	-0.72
p value (asymptotic significance, 2-tailed)	0.47

Note. Data compiled from the SPSS version 15 Mann-Whitney rank sum *U* test.

Finally examined, using the Mann-Whitney rank sum *U* test, was the subscale of professional efficacy. The *p* value of 0.62 was greater than 0.05; therefore, rejection of the null hypothesis H_0 was not possible (see Table 28). There exists evidence that there was not a statistically significant difference in the level of professional efficacy of ATPs that experience autonomy. Thus, the alternate hypothesis H_a was rejected.

Table 28

Autonomy Test Statistics for Professional Efficacy

Test statistic	Mean professional efficacy
Mann-Whitney *U*	1724.50
z	-0.50
p value (asymptotic significance, 2-tailed)	0.62

Note. Data compiled from the SPSS version 15 Mann-Whitney rank sum *U* test.

Burnout Factor Organizational Politics, X_6

H_0: There is no statistically significant difference in the level of exhaustion (Y_1) of ATPs that experience organizational politics (X_6).

H_a: There is a statistically significant difference in the level of exhaustion (Y_1) of ATPs that experience organizational politics (X_6).

H_0: There is no statistically significant difference in the level of cynicism (Y_2) of ATPs that experience organizational politics (X_6).

H_a: There is a statistically significant difference in the level of cynicism *(Y_2)* of ATPs that experience organizational politics *(X_6)*.

H_0: There is no statistically significant difference in the level of professional efficacy *(Y_3)* of ATPs that experience organizational politics *(X_6)*.

H_a: There is a statistically significant difference in the level of professional efficacy *(Y_3)* of ATPs that experience organizational politics *(X_6)*.

Statement 6 on the research survey, "Organizational politics interfere with some of my duties," is the evaluation variable for the null and alternate hypotheses. Examined first, using the Mann-Whitney rank sum *U* test, was the subscale of exhaustion. The *p* value of 0.00 was less than 0.05; therefore, the null hypothesis H_0 was rejected (see Table 29). There exists evidence that there was a statistically significant difference in the level of exhaustion of ATPs that experience organizational politics. Thus, the alternate hypothesis H_a was not rejected.

Table 29

Organizational Politics Test Statistics for Exhaustion

Test statistic	Mean exhaustion
Mann-Whitney *U*	1384.50
z	-3.88
p value (asymptotic significance, 2-tailed)	0.00

Note. Data compiled from the SPSS version 15 Mann-Whitney rank sum *U* test.

Next examined, using the Mann-Whitney rank sum *U* test, was the subscale of cynicism. The *p* value of 0.00 was less than 0.05; therefore, the null hypothesis H_0 was rejected (see Table 30). There exists evidence that there was a statistically significant

difference in the level of cynicism of ATPs that experience organizational politics. Thus, the alternate hypothesis H_a was not rejected.

Table 30

Organizational Politics Test Statistics for Cynicism

Test statistic	Mean cynicism
Mann-Whitney *U*	1109.00
z	-5.11
p value (asymptotic significance, 2-tailed)	0.00

Note. Data compiled from the SPSS version 15 Mann-Whitney rank sum *U* test.

Finally examined, using the Mann-Whitney rank sum *U* test, was the subscale of professional efficacy. The *p* value of 0.06 was greater than 0.05; therefore, rejection of the null hypothesis H_0 was not possible (see Table 31). There exists evidence that there was not a statistically significant difference in the level of professional efficacy of ATPs that experience organizational politics. Thus, the alternate hypothesis H_a was rejected.

Table 31

Organizational Politics Test Statistics for Professional Efficacy

Test statistic	Mean professional efficacy
Mann-Whitney *U*	1926.00
z	-1.88
p value (asymptotic significance, 2-tailed)	0.06

Note. Data compiled from the SPSS version 15 Mann-Whitney rank sum *U* test.

Burnout Factor Fair Rewards, X_7

H_0: There is no statistically significant difference in the level of exhaustion *(Y_1)* of ATPs that experience fair rewards *(X_7)*.

H_a: There is a statistically significant difference in the level of exhaustion *(Y_1)* of ATPs that experience fair rewards *(X_7)*.

H_0: There is no statistically significant difference in the level of cynicism (Y_2) of ATPs that experience fair rewards (X_7).

H_a: There is a statistically significant difference in the level of cynicism (Y_2) of ATPs that experience fair rewards (X_7).

H_0: There is no statistically significant difference in the level of professional efficacy (Y_3) of ATPs that experience fair rewards (X_7).

H_a: There is a statistically significant difference in the level of professional efficacy (Y_3) of ATPs that experience fair rewards (X_7).

Statement 7 on the research survey, "I am fairly rewarded for the effort I put into my duties (some or all of my duties)," is the evaluation variable for the null and alternate hypotheses. Examined first, using the Mann-Whitney rank sum *U* test, was the subscale of exhaustion. The *p* value of 0.02 was less than 0.05; therefore, the null hypothesis H_0 was rejected (see Table 32). There exists evidence that there was a statistically significant difference in the level of exhaustion of ATPs that experience fair rewards. Thus, the alternate hypothesis H_a was not rejected.

Table 32

Fair Rewards Test Statistics for Exhaustion

Test statistic	Mean exhaustion
Mann-Whitney *U*	1832.00
z	-2.35
p value (asymptotic significance, 2-tailed)	0.02

Note. Data compiled from the SPSS version 15 Mann-Whitney rank sum *U* test.

Next examined, using the Mann-Whitney rank sum *U* test, was the subscale of cynicism. The *p* value of 0.01 was less than 0.05; therefore, the null hypothesis H_0 was

rejected (see Table 33). There exists evidence that there was a statistically significant difference in the level of cynicism of ATPs that experience fair rewards. Thus, the alternate hypothesis H_a was not rejected.

Table 33

Fair Rewards Test Statistics for Cynicism

Test statistic	Mean cynicism
Mann-Whitney *U*	1724.50
z	-2.82
p value (asymptotic significance, 2-tailed)	0.01

Note. Data compiled from the SPSS version 15 Mann-Whitney rank sum *U* test.

Finally examined, using the Mann-Whitney rank sum *U* test, was the subscale of professional efficacy. The *p* value of 0.00 was less than 0.05; therefore, the null hypothesis H_0 was rejected (see Table 34). There exists evidence that there was a statistically significant difference in the level of professional efficacy of ATPs that experience fair rewards. Thus, the alternate hypothesis H_a was not rejected.

Table 34

Fair Rewards Test Statistics for Professional Efficacy

Test statistic	Mean professional efficacy
Mann-Whitney *U*	1851.00
z	-2.93
p value (asymptotic significance, 2-tailed)	0.00

Note. Data compiled from the SPSS version 15 Mann-Whitney rank sum *U* test.

Shown in Table 35 are the Spearman's ρ rank correlation coefficients that indicated a statistically significant (< 0.05 chance for type I error) correlation between a burnout factor and the burnout subscales. Fair rewards (X_7) and quantitative work overload (X_3) were the only burnout factors that had statistically significant correlations

with the three burnout subscales *(Y_{1-3})*. Fair rewards had a negative *weak* correlation with burnout subscales exhaustion ($\rho = -0.20$) and cynicism ($\rho = -0.24$) and a positive *weak* correlation with burnout subscale professional efficacy ($\rho = 0.25$) (Berenson et al., 2006). Quantitative work overload had a positive *fair* correlation with exhaustion ($\rho = 0.30$), a position *weak* correlation with cynicism ($\rho = 0.22$), and a negative *weak* correlation with professional efficacy ($\rho = -0.18$) (Berenson et al., 2006). The burnout factors organizational politics *(X_6)* and role conflict *(X_2)* had statistically significant correlations with exhaustion *(Y_1)* and cynicism *(Y_2)*. Organizational politics had a positive *fair* correlations with burnout subscales exhaustion ($\rho = 0.33$) and cynicism ($\rho = 0.44$) (Berenson et al., 2006). Role conflict had a positive *weak* correlation with exhaustion ($\rho = 0.25$) and positive *weak* correlation with cynicism ($\rho = 0.22$) (Berenson et al., 2006). There were not any statistically significant correlations between the burnout factors autonomy *(X_5)*, role ambiguity *(X_1)*, and qualitative work overload *(X_4)*, and the burnout subscales. The results of the Spearman's ρ rank correlation coefficient tests are consistent with the findings from the Mann-Whitney rank sum *U* tests (see Table 36).

Table 35

Statistically Significant Correlation Data between Burnout Factors and Burnout Subscales

Environment dimension / Burnout factor	Burnout Subscale		
	EX	CY	PE
	ρ	ρ	ρ
Organizational factor			
Organizational politics	0.33**	0.44**	
Fair rewards	-0.20*	-0.24**	0.25**
Situational factor			
Quantitative work overload	0.30**	0.22*	-0.18*
Role conflict	0.25**	0.22*	
Autonomy			
Role ambiguity			
Individual factor			
Qualitative work overload			

Note. Data compiled from the SPSS version 15 Spearman's ρ rank correlation coefficient tests.
*$p < 0.05$. Correlation is significant at the 0.05 level (two-tailed).
**$p < 0.01$. Correlation is significant at the 0.01 level (two-tailed).
EX = exhaustion; CY = cynicism; PE = professional efficacy.

Table 36

Mann-Whitney Rank Sum U Test p Values for Each Burnout Factor

	Burnout Subscales		
Burnout factor	Exhaustion	Cynicism	Professional efficacy
Role ambiguity	0.60	0.36	0.47
Role conflict	0.00**	0.01*	0.07
Quantitative work overload	0.00**	0.01*	0.03*
Qualitative work overload	0.15	0.16	0.56
Autonomy	0.52	0.47	0.62
Organizational politics	0.00**	0.00**	0.06
Fair rewards	0.02*	0.00**	0.00**

Note. Compiled from the SPSS version 15 Mann-Whitney rank sum *U* tests.
*$p < 0.05$. Statistically significant at the 0.05 level (two-tailed).
**$p < 0.01$. Statistically significant at the 0.01 level (two-tailed).

Summary

Documented research on burnout in the human service industry and numerous other professions is extensive (Lee & Ashforth, 1996; Schaufeli & Enzmann, 1998). However, current literature lacks information pertaining to burnout in the Part 121 ATP profession. Previous research and established models such as those documented by Maslach et al. (1996), supported the assumption that burnout was an artifact of the Part 121 ATP profession. Exhaustion is a dimension of the burnout syndrome (Maslach & Jackson, 1981) and exhibits a high correlation with fatigue (Enzmann et al., 1998). Since fatigue is a significant factor in aviation (Powell et al., 2007), the existence of burnout in the Part 121 ATP profession was reasonable. For this study, examined was the relationship between Part 121 ATPs and burnout. Calculated from MBI-GS data, were mean scores for each burnout subscale: (a) exhaustion, (b) cynicism, and (c) professional

efficacy. The research survey was used to facilitate the gathering of burnout factor data. The demographic questionnaire was used to obtain information about the participants.

Hypothesized to be indicative of Part 121 ATP burnout were environment dimensions (i.e., burnout factors (X_{1-7})). The burnout factors for this study were (a) role ambiguity, (b) role conflict, (c) quantitative work overload, (d) qualitative work overload, (e) autonomy, (f) organizational politics, and (g) fair rewards. The dependent measures for this study were the burnout subscales (Y_{1-3}): (a) exhaustion, (b) cynicism, and (c) professional efficacy. The results of the Spearman's ρ rank correlation coefficient tests (see Table 35) were consistent with the findings from the Mann-Whitney rank sum *U* tests (see Table 36).

Research Question

Research question, "To what extent, if any, is there a significant relationship between the Part 121 ATP environment dimensions and burnout subscales" was the basis for the analysis of a seven level burnout factor. Organizational factors organizational politics, and fair rewards, situational factors quantitative work overload, role conflict, autonomy, and role ambiguity, and individual factor qualitative work overload were analyzed using data obtained from the MBI-GS and the research survey. The analytical results (see Table 35) indicated that the fair rewards (X_7) and quantitative work overload (X_3) burnout factors were the only environment dimensions to exhibit statistically significant correlations with all three burnout subscales (Y_{1-3}). Fair rewards had a negative *weak* correlations with exhaustion ($\rho = -0.20$) and cynicism ($\rho = -0.24$) and positive *weak* correlation with professional efficacy ($\rho = 0.25$) (Berenson et al., 2006). Quantitative work overload had a positive *fair* correlation with exhaustion ($\rho = 0.30$), a

position *weak* correlation with cynicism ($\rho = 0.22$), and a negative *weak* correlation with professional efficacy ($\rho = -0.18$) (Berenson et al., 2006). The burnout factors organizational politics (X_6) and role conflict (X_2) had statistically significant correlations with exhaustion (Y_1) and cynicism (Y_2). Organizational politics had positive *fair* correlations with exhaustion ($\rho = 0.33$) and cynicism ($\rho = 0.44$) (Berenson et al., 2006). Role conflict had a positive *weak* correlation with exhaustion ($\rho = 0.25$) and a positive *weak* correlation with cynicism ($\rho = 0.22$) (Berenson et al., 2006). This finding is indicative of the development of cynicism by employees in order to distance themselves from exhausting job demands (Maslach & Jackson, 1981; Maslach et al., 2001). In addition, the energy the worker uses to develop the cynical behavior draws from the worker's energy available for doing work (Mashlach et al., 1996). There was not a statistically significant correlation with individual factor, qualitative work overload (X_4) and the burnout subscales (Y_{1-3}). This finding is consistent with burnout literature that states, antecedents to burnout tend to be situational factors rather than individual factors (Cherniss, 1995; Maslach & Schaufeli, 1993).

Validity, Reliability, Methodological Assumptions, and Limitations

Researchers demonstrated that the MBI-GS instrument had good reliability and validity across industries other than human service-oriented industries (Advani et al., 2005; Jackson, Turner, & Brief, 1987; Leiter & Schaufeli, 1996). The Cronbach's alpha coefficient calculated internal consistency, thus determining the reliability of the MBI-GS instrument as applied in this research study. The alpha coefficient values were consistent with accepted values considered to confirm statistically sufficient reliability for each burnout subscale.

The MBI-GS is the leading measure of burnout of occupations other than human service-oriented industries and education (Maslach et al., 1996) and is consistent across "nations, organizations, and occupational groups" (Maslach et al., 1996, p. 26). Affirmation is maintained of the applicably of the MBI-GS based on the results from the reliability tests. Calculated from the mean scores for each subscale, the Cronbach's alpha coefficient was used to measure the internal consistency and determined the reliability of the MBI-GS instrument as applied in this research study.

The Cronbach's alpha coefficient values were consistent with values accepted to confirm statistically sufficient reliability for each subscale (Leiter & Schaufeli, 1996). The minimum alpha coefficient values (see Table 7) determined reliability for exhaustion, cynicism, and professional efficacy subscales as 0.83, 0.83, and 0.70, respectively (Leiter & Schaufeli, 1996). Since the validity and reliability were sufficient for this study, the identified assumptions and limitations had minimal impact on the findings.

CHAPTER 5: SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

The burnout phenomenon is a serious and well-documented syndrome. In the context of aviation, one negative consequence, decreased work performance, can lead to devastating and potentially fatal results. The current air transport industry environment and the evidence of fatigue at the Part 121 ATP level necessitated a study to examine the relationship between Part 121 ATPs and burnout. The problem is a lack of relationship evidence between Part 121 ATP environment dimensions and burnout subscales. The purpose of this study was to provide the aviation industry with Part 121 ATP environment dimension data that might indicate burnout factors. These data might enable the aviation industry to focus on detection and prevention of burnout and continue to support and promote a safe air transport industry.

Presented in chapter 1 are the problem and the purpose of this research study. The Part 121 environment dimensions (burnout factors) examined were (a) role ambiguity, (b) role conflict, (c) quantitative work overload, (d) qualitative work overload, (e) autonomy, (f) organizational politics, and (g) fair rewards. The dependent measures were the three dimensions of the burnout syndrome: (a) exhaustion, (b) cynicism, and (c) professional efficacy, as described by Maslach et al. (1996).

Indicated in chapter 2, the interest in burnout has increased dramatically since the 1970s, as the understanding of its significant negative impact on employees has developed (Halbesleben & Buckley, 2004). Members of the American Institute of Stress reported that stress and burnout cost American businesses an estimated $300 billion per year (Halbesleben et al., 2006; Osburn & Mumford, 2006). However, there has been

minimal research dedicated to designing methods to intervene or prevent burnout (Halbesleben & Buckley, 2004).

Maslach (1982) defined burnout as "a syndrome of emotional exhaustion, depersonalization, and reduced personal accomplishment that can occur among individuals who do 'people work' of some kind" (p. 63). The development of an instrument to measure burnout, the MBI, occurred in 1986 (Maslach et al., 1996). The MBI, predicated on the three components of this syndrome, is a widely accepted model (Maslach & Jackson, 1986). Of the three dimensions of MBI, emotional exhaustion relates most strongly to possible causes and consequences of burnout (Schaufeli & Enzmann, 1998).

Many studies have shown that work-related stressors such as role conflict, role ambiguity, and work overload are predictors of job burnout (Bacharach et al., 1991). Burnout may result if a significant difference between the individual and these job areas prevails. This mismatch is the foundation for the Job Demands-Resources (JD-R) model of burnout (Demerouti et al., 2001). Broad categories of antecedents of burnout are either situational factors or organizational factors and individual factors.

The literature review also indicated researchers consider exhaustion the main quality of burnout (Maslach et al., 2001). Exhaustion reflects the stress aspect of burnout and manifests in job demands such as workload and time pressures. Fatigue exhibits a high correlation with exhaustion (Enzmann et al., 1998). Additionally, fatigue has the potential to influence airline pilot performance significantly (Powell et al., 2007).

Presented in chapter 3 were a restatement of the research problem, the research question, and the hypotheses. The primary research instrument was the MBI-GS. Data

collected included demographic information and data from the administration of the research survey. The methodology for this analytical process utilized the averaged responses from the MGI-GS survey for each subscale. Evaluation of response data for each subscale occurred separately. Evaluation of Part 121 burnout factors $(X_{1\text{-}7})$, (a) role ambiguity, (b) role conflict, (c) quantitative workload, (d) qualitative workload, (e) autonomy, (f) organizational politics, and (g) fair rewards included a separate entry for each dependent measure (i.e., burnout subscale (Y_j)). The intent was not to establish a causal relationship between the variables, but to determine if a statistically significant correlation existed between the burnout factors and burnout subscales.

The MBI-GS is the leading measure of burnout in occupations other than those in the human services industries and education (Maslach et al., 1996). Burnout is consistent across "nations, organizations, and occupational groups" (Maslach et al., 1996, p. 26). The assumption was that the MBI-GS was applicable to Part 121 ATPs. A self-report methodology facilitated the collection of the data needed to measure the independent and dependent variables. The accuracy of the collected data was dependent upon the participants' honest responses to the researcher's survey questions, the MBI-GS, or demographics. Therefore, the quality of the data reflected the ethics and values of each participant. This study was initiated following the approval granted by Northcentral University's Institutional Review Board.

Presented in chapter 4 were the findings of the study. The analyses indicated that burnout factors quantitative work overload and fair rewards exhibited statistically significant correlations to all three dimensions of the burnout syndrome. Organizational politics and role conflict had statistically significant correlations with the exhaustion and

cynicism subscales. The hypothesized burnout factors qualitative work overload, role ambiguity, and autonomy did not have statistically significant correlations with the burnout syndrome dimensions.

This final chapter, chapter 5, begins with an overview of the study. To follow is a synopsis of each chapter in the study. Chapter 5 also includes a summary of the study findings, potential conclusions stemming from the data analyses, and recommendations for further research.

Summary

For this study, data compiled from 138 study participants were analyzed. The MBI-GS was shown to have good validity and reliability as applied in this research study. Findings from the Mann-Whitney rank sum *U* test analyses of the hypotheses statements indicated a rejection of the null hypothesis for 10 of the 21 possible burnout factor (X_{1-7}) and burnout subscale (Y_{1-3}) combinations. Therefore, there were statistically significant differences between the mean scores for the burnout subscales from ATPs that experience a particular burnout factor and the mean scores for the burnout subscales from ATPs that did not experience a particular burnout factor. For burnout factor role conflict (X_2), rejection of the null hypothesis for the exhaustion (Y_1) and cynicism (Y_2) subscales occurred. For quantitative work overload (X_3), rejection of the null hypothesis for all burnout subscales, exhaustion (Y_1), cynicism (Y_2), and professional efficacy (Y_3) occurred. For burnout factor organizational politics (X_6), rejection of the null hypothesis for the exhaustion (Y_1) and cynicism (Y_2) subscales occurred. For burnout factor fair rewards (X_7), rejection of the null hypothesis for all burnout subscales, exhaustion (Y_1), cynicism (Y_2), and professional efficacy (Y_3), occurred.

Findings from Spearman's ρ correlational coefficient analyses showed there were statistically significant correlations for both burnout factors, role conflict (X_2) and organizational politics (X_6) between both burnout subscales, exhaustion (Y_1) and cynicism (Y_2). Findings also indicated there were statistically significant correlations for both burnout factors, quantitative work overload (X_3) and fair rewards (X_7) between each burnout subscale (Y_{1-3}), exhaustion, cynicism, and professional efficacy. Spearman's ρ correlational coefficient analytical findings were consistent with the Mann-Whitney rank sum *U* test analytical results.

The findings from the Mann-Whitney rank sum *U* tests provided information about the relationship between ATPs and burnout. Specifically, the data obtained from the Mann-Whitney *U* tests pertained to the antecedents of burnout. Previously stated in chapter 2, according to Leiter and Maslach (2005), there are six primary sources of burnout: (a) work overload, (b) lack of control, (c) insufficient reward, (d) role conflict, (e) breakdown of community, and (f) unfairness in the system. The findings showed that burnout factors, quantitative work overload and fair rewards were indicators of burnout. The findings from the Spearman's ρ rank correlation tests provided information about the relationship between ATPs and burnout that pertained to the correlation between each burnout factor with each burnout subscale. The Spearman's ρ correlation coefficient also provided data pertaining to the strength (extent) and direction of the correlation. Combined, the findings from the Mann-Whitney rank sum *U* tests and the Spearman's ρ rank correlation tests were used to answer the research question of this quantitative study.

The assumption was the MBI-GS was applicable to Part 121 ATPs. This assumption was supported by the findings, which were consisted with the literature. Since

the results of the analyses were consistent with the MBI-GS model, the assumption that each participant responded to each survey question and statement honestly is valid. However, since the data obtained for the study were not exhaustive, the results and subsequent conclusions only represented 1% or less of the total population. Thus, the findings could be different for a larger sample size. The financial constraints represented a limitation. If the financial constraints were removed, the quantity of data collected could be increased. This increase in data collected could also affect the findings of the study.

Meaning, Significance, and Contribution

Findings indicated that the organizational factor of fair rewards and the situational factor of quantitative work overload are Part 121 environment dimensions correlated with all dimensions of the burnout syndrome. Maslach et al. (2001) stated that exhaustion is the main quality of burnout. According to Maslach et al.:

> Although exhaustion reflects the stress dimension of burnout, it fails to capture the critical aspects of the relationship people have with their work. Exhaustion is not something that is simply experienced – rather, it prompts actions to distance oneself emotionally and cognitively from one's work, presumably as a way to cope with the work overload....Distancing is such an immediate reaction to exhaustion that a strong relationship from exhaustion to cynicism (depersonalization) is found consistently in burnout research, across a wide range of organizational and occupational settings. (p. 403)

The findings were consistent with previous research documented by Maslach et al. (1996): "Cynicism is expected to be positively correlated with Exhaustion and negatively correlated with Professional Efficacy" (p. 22). Thus, salary reductions and increased workload might indicate burnout. According to Bakker et al. (2005), high job demands combined with low job resources such as financial compensation produce the

highest levels of burnout. Evidence indicates that the individual factor of qualitative work overload was not a statistically significant factor of burnout in ATPs. According to Cedoline (1982), requirements that exceed an individual's skills constitute qualitative work overload. Study participants indicate job requirements did not exceed their skills. This finding is consistent with the research literature. If the individual's skill set closely matches the job demands, the individual may work more smoothly within organizationally defined goals, thus avoiding burnout (Lee & Ashforth, 1996).

Literary evidence lacked burnout information pertaining to the aviation industry, in particular the Part 121 ATP profession. Current attitudes of Part 121 ATPs regarding their jobs and contracts, management, and contract goals are at the lowest point since the late 1980s (Comstock, 2005). Study findings should assist the air transport industry to understand the effects, due to workload and compensation, on Part 121 ATPs, thus supporting and promoting a safer air transport industry.

Conclusions

"The core of burnout is constituted by exhaustion and cynicism" (Schaufeli & Bakker, 2004, p. 305). The findings of the study indicated that quantitative work overload and fair rewards are Part 121 ATPs environment dimensions correlated with the all dimensions of the burnout syndrome. A heavy workload is a consistently identified antecedent of burnout (Bakker et al., 2004). Lee and Ashforth (1996) and Cordes and Dougherty (1993) documented a correlation between work overload and exhaustion.

Fair rewards was an indicator of burnout in Part 121 ATPs. Inadequate compensation and lack of supervisory support, which underlie this factor, correlated with all three dimensions of burnout (Maslach et al., 2001). The 9/11 tragedy had an

immediate and profound effect on the job-related views of air carrier pilots. The pilots came to the defense of their industry and to their respective companies. Toward the end of 2001, there was a noticeable surge of support for management (Comstock, 2005). Pilots largely accepted economic concessions. However, current attitudes of Part 121 ATPs regarding their jobs and contracts, management, and contract goals are at the lowest point since the late 1980s (Comstock, 2005). There is a widespread disdain for airline management due to the belief that management is unable to execute a viable business plan (Comstock, 2005). Such negative sentiments toward management exist for those who have negotiated concessions with major air carriers, regional air carriers, traditional low-cost carriers, and among pilots at cargo companies, some of which are not economically distressed. Pilots viewed the request for economic relief by some air carriers as greed rather than necessity (Comstock, 2005). Findings in this study confirmed these pilots' cynical behavior.

According to Gay and Airasian (2003), "Relationship studies attempt to gain insight into variables that are related to complex variables" (p. 316). The analyses that were conducted provided data that supported the underlining premise of relationship studies as defined by Gay and Airasian. The data obtained also served to answer the research question. Thus, the objective of this study was achieved by examining the relationship between Part 121 ATP environment dimensions and burnout subscales. Part 121 ATP environment dimension data that may indicate burnout factors was also obtained.

Finally, the combined impact of the statistically significant correlation of quantitative work overload and fair rewards with all three dimensions of burnout was

notable. Studies on the interaction between job demands and job resources have demonstrated that these factors account for a unique proportion of the variance in exhaustion and cynicism (Bakker et al., 2003). Results also showed that the highest levels of fatigue and demoralization occurred when high job demands coincided with low job resources.

Recommendations

The hypothesized burnout factor correlates of qualitative work overload, role ambiguity, and autonomy did not indicate a statistically significant correlation with any of the dimensions of burnout. However, this finding is important. Qualitative work overload is a stressor that occurs when job requirements exceed the individual's skill level (Sanders et al., 1995). The data indicated that the pilots participating in the research study possessed the skills required to fulfill their duties. Indeed, these pilots are qualified to operate the aircraft.

With the advent of enhanced technologies, the introduction of the glass cockpit, and new air traffic control processes and instrumentation (for example, the precision runway monitoring system), there may be latent job demands that need further exploration. In addition, several individual demographic or personality factors also contribute to burnout. Kalbers and Fogarty (2005) stated that locus of control, a construct developed by J. B. Rotter in the 1960s, can be invoked to ascertain if an individual believes he or she has command (internal locus of control) of the course of his or her life or that life is controlled by events outside of the individual's control (external locus of control). According to Clarke (1995), researchers asserted that external locus of control is the most important antecedent of the three dimensions of the burnout syndrome.

Subsequently, individuals not in control of their life are more vulnerable to stress (Clarke, 1995).

Pilots have control of the aircraft. Control of the aircraft parallels internal locus of control. However, management provides immediate external control and the federal government maintains the ultimate (external) control of the air transportation industry. The comprehensive structure of the air transport industry parallels the external locus of control model. Understanding the effects the organizational structure of the air transportation industry might have on pilots suggests the need for further analysis.

Role ambiguity, which occurs when there is a lack of adequate information to perform one's duties, is another burnout factor that did not have a statistically significant correlation with the burnout dimensions. This situational factor implies an individual is not able to perform his or her duties well if adequate information is not available (Maslach et al., 2001). However, this does not consider unforeseen circumstances or low probability events, which are unique to aviation and are conducive to a dynamic environment such as the air transportation industry. The third potential burnout factor correlate that did not indicate a statistically significant correlation with the burnout subscales is autonomy. Fundamentally, each pilot is in control of the decision-making process, yet pressure from management to maintain schedules and not deviate from original flight plans may affect a pilot's ability to make appropriate or proper decisions. Follow-up research should include an extensive and well-developed interview process with Part 121 ATPs.

Because the literature does not indicate a strong correlation between individual factors and burnout, demographic and individual factors received minimal consideration

in this research study. However, continued research should consider demographic factors, and individual factors such as, a person's ability to cope, his or her personality, and perceived potential stressors as discussed by Maslach et al. (2001). These individual factors could be developed and derived from focus group discussions.

This study did not consider the training of the ATPs. In particular, would the type and extent of training affect whether an ATP experiences burnout? Furthermore, this study did not consider whether an ATP was currently in the military or had been in the military. Military experience might affect ATP burnout. Training and military experience are two important demographics that should be explored.

The burnout factors considered in this study were drawn from literature pertaining predominately to the health care industry. The burnout factors were based on known antecedents of burnout for workers within the health care industry. Continued research should also include literature that is related to the aviation industry. Burnout factors should also be derived from ATP experiences within the aviation industry.

Even though there has been extensive research of fatigue and fatigue is a significant factor in aviation, an understanding of the relationship between working conditions and fatigue is lacking. Fatigue is an antecedent to burnout. Investing in research to study the relationship between working conditions and fatigue would benefit each air carrier and the air transport industry.

Predicated on the study findings, continued exploration and research of burnout in Part 121 ATPS should occur. In particular, a regression analysis of demographic data and the burnout subscales. An analysis of potential predictive burnout factors should also be

conducted. A predictive study would compliment the correlational study and provide a comprehensive relationship analysis of Part 21 ATPs and burnout.

The relationship between Part 121 ATPs and burnout is not well understood. Since safety is paramount, continued research of ATP burnout is desired. The benefactors of continued research of burnout in Part 121 ATPs are numerous including, pilots, air carriers, air travelers, international stakeholders, and the research community alike.

REFERENCES

Adams, J. S. (1965). Inequity in social exchange. In L. Berkowitz (Ed.), *Advances in experimental social psychology* (pp. 267-299). New York: Academic Press.

Advani, J. Y., Jagdale, S. C., Garg, A. K., & Kumar, R. (2005). Antecedents and consequences of 'burnout' in services personnel: A case of Indian software professionals. *South Asian Journal of Management, 12*(3), 21-34.

American Psychiatric Association. (2005). *DSM Library*. Retrieved December 7, 2007, from http://www.appi.org/dsm.cfx

Ariznaverreta, C., Cardinali, D. P., Villanúa, M. A., Granados, B., Martín, M., Chiesa, J. J., et al. (2002, May). Circadian rhythms in airline pilots submitted to long-haul transmeridian flights. *Aviation Space & Environmental Medicine, 73*, 445–455.

Bacharach, S. B., Bamberger, P., & Conley, S. (1991, January). Work-home conflict among nurses and engineers: Mediating the impact of role stress on burnout and satisfaction at work. *Journal of Organizational Behavior, 12*, 39-53.

Bainbridge, L. (1983, November). Ironies of automation. *Automatica, 19,* 775-779.

Bakker, A. B., Demerouti, E., & Euwema, M. C. (2005, April). Job resources buffer the impact of job demands on burnout. *Journal of Occupational Health Psychology, 10*, 170-180.

Bakker, A. B., Demerouti, E., & Verbeke, W. (2004). Using the job demands-resources model to predict burnout and performance. *Human Resource Management, 43*(1), 83-104.

Bakker, A. B., Demerouti, E., de Boer, E., Schaufeli, W. B. (2003, December). Job demands and job resources as predictors of absence duration and frequency. *Journal of Vocational Behavior, 62*, 341–356.

Bankit, P. (Ed.). (2004). *Part 121 flight operations manual.* Daytona Beach, FL: Embry-Riddle Aeronautical University.

Barnett, R. C., Brennan, R. T., & Gareis, K. C. (1999, July). A closer look at the measurement of burnout. *Journal of Applied Biobehavioral Research, 4*, 65-78.

Beehr, T. A., & Newman, J. E. (1978, December). Job stress, employee health and organizational effectiveness: A facet analysis, model, and literature review. *Personnel Psychology, 31*, 665-699.

Bennett, S. A. (2003). Flight crew stress and fatigue in low-cost commercial air operations—an appraisal. *International Journal Risk Assessment and Management, 4*, 207-231.

Berenson, M. L., Levine, D. M., & Krehbiel, T. C. (2006). *Basic business statistics: Concepts and applications* (10th ed.). Chicago: Prentice Hall.

Bor, R., Field, G., & Scragg, P. (2002, September). The mental health of pilots: An overview. *Counseling Psychology Quarterly, 15*, 239-256.

Bourgeois-Bougrine, S., Carbon, P., Gounelle, C., Mollard, R., Coblentz, A., & Speyer, J. J. (1999). Fatigue in aviation: Point of view of French pilots. In *Proceeding of the 10th International Symposium of Aviation Psychology,* 867-872. Columbus: The Ohio State University.

Butcher, J. N. (2002, March). Assessing pilots with 'the wrong stuff': A call for research on emotional health factors in commercial aviators. *International Journal of Selection and Assessment, 10*, 168-184.

Cedoline, A. J. (1982). *Job burnout in public education: Symptoms, Causes and Survival Skills.* New York: Teachers College Press, Columbia University.

Cherniss, C. (1980). *Professional burnout in human service organizations*. New York: Praeger.

Cherniss, C. (1995). *Beyond burnout: Helping teachers, nurses, therapists, and lawyers recover from stress and disillusionment.* New York: Routledge.

Clarke, D. (1995). Vulnerability to stress as a function of age, sex, locus of control, hardiness and Type A personality. *Social Behavior and Personality: An International Journal, 23*, 285-286.

Cohen, S., & Wills, T. A. (1985, September). Stress, social support, and the buffering hypothesis. *Psychological Bulletin, 98*, 310-357.

Comstock, P. (2005, June). *Work-related views of flight attendants and pilots since 9/11.* Paper presented to the Airline Industry Council of the Labor and Employment Relations Association, Washington, DC.

Constas, M. (1992). Qualitative analysis as a public event: The documentation of category development procedures. *American Educational Journal, 29, 253-266.*

Cook, S. L. S. (2006). Explaining burnout: A mixed method investigation of information technology workers. *ProQuest Information and Learning Company* (UMI No: 3229507). Retrieved June 21, 2007, from http://www.drjimmirabella.com

Corcoran, K. (1995). Measuring burnout: An updated reliability and convergent validity study. In R. Crandell & P. L. Perrewe (Eds.), *Occupational stress: A handbook* (pp. 263-268). Washington, DC: Taylor & Francis.

Cordes, C. L., & Dougherty, T. W. (1993, October). A review and an integration of research on job burnout. *Academy of Management Review, 18*, 621-656.

De Dreu, C. K. W., Van Dierendonck, D., & Dijkstra, M. T. M. (2004). Conflict at work and individual well-being. *International Journal of Conflict Management, 15*, 6-26.

Demerouti, E., Bakker, A. B., Schaufeli, W. B., & Nachreiner, F. (2001, June). The job demands-resources model of burnout. *Journal of Applied Psychology, 86*, 499-512.

Dignam, J. T., Barrera, M., Jr., & West, S. G. (1986, April). Occupational stress, social support, and burnout among correctional officers. *American Journal of Community Psychology, 14*, 177-193.

Dignam, J. T., & West, S. G. (1988, October). Social support in the workplace: Tests of six theoretical models. *American Journal of Community Psychology, 16,* 701-224.

Enzmann, D., Schaufeli, W. B., Janssen, P., & Rozeman, A. (1998, December). Dimensionality and validity of the burnout measure. *Journal of Occupational and Organizational Psychology, 71,* 331-351.

Farber, B. A. (1983). *Stress and burnout in the human service profession.* New York: Pergamon Press.

Farber, R. S. (2000, May/June). Mothers with disabilities: In their own voice. *American Journal of Occupational Therapy, 54* 260-268.

Federal Aviation Administration. (2007, June 5). Air carrier oversight. In *Air transportation oversight system topics*. Retrieved on December 17, 2007, from http://www.faa.gov/safety/programs_initiatives/oversight/atos/oversight/

Ferris, G. R., & Kacmar, K. M. (1992, March). Perceptions of organizational politics. *Journal of Management, 18*, 93-116.

Fong, K., & Kleiner, B. H. (2004). New development concerning the effect of work overload on employees. *Management Research News, 27*(4/5), 9-16.

Freudenberger, H. J. (1974). Staff burnout. *Journal of Social Issues, 30*(1), 159-165.

Gaines, J., & Jermier, J. M. (1983, December). Emotional exhaustion in a high-stress organization. *Academy of Management Journal, 26*, 567-586.

Gander, P. H., Gregory, K. B., Graeber, R. C., Connell, L. J., Miller, D. L., & Rosekind, M. R. (1998a, September). Flight crew fatigue V: Long-haul air transport operations. *Aviation, Space, and Environmental Medicine, 69*, B37-B48.

Gander, P. H., Gregory, K. B., Graeber, R. C., Connell, L. J., Miller, D. L., & Rosekind, M. R. (1998b, September). Flight crew fatigue II: Short-haul fixed-wing air transport operations. *Aviation, Space, and Environmental Medicine, 69*, B8-B15.

Gay, L. R., & Airasian, P. (2003). *Educational research: Competencies for analysis and applications* (7th ed.). Upper Saddle River, NJ: Pearson Education.

George, D., & Mallery, P. (2007). *SPSS for Windows step-by-step: A simple guide and reference, 15.0 update* (8th ed.). Boston: Pearson Education.

Gill, A. S., Flaschner, A. B., & Shachar, M. (2006). Mitigating stress and burnout by implementing transformational-leadership. *International Journal of Contemporary Hospitality Management, 18*, 469-481.

Golembiewski, R. T., Boudreau, R. A., Munzenrider, R. F., & Luo, H. (1996). *Global burnout: A worldwide pandemic explored by the Phase Model.* Greenwich, CT: JAI Press.

Gryskiewicz, N., & Buttner, E. H. (1992, Autumn). Testing the robustness of the progressive phase burnout model for a sample of entrepreneurs. *Educational and Psychological Measurement, 52,* 747-751.

Halbesleben, J. R. B., & Buckley, M. R. (2004, December). Burnout in organizational life. *The Journal of Management, 30*, 859-879.

Halbesleben, J. R. B., Osburn, H. K., & Mumford, M. D. (2006, June). Action research as a burnout intervention: Reducing burnout in the federal fire service. *The Journal of Applied Behavioral Science, 42*, 244-266.

Hardy, D. J., & Parasuraman, R. (1997, December). Cognition and flight performance in older pilots. *Journal of Experimental Psychology: Applied, 3*, 313-348.

Harris, W. C., Sachau, D., Harris, S. C., & Allen, R. (2001). The relationship between working conditions and commercial pilot fatigue development. *Proceedings from the Human Factors and Ergonomics Society 45th Annual Meeting, Santa Monica, CA, 45*(2), 185-189.

Houkes, I., Janssen, P. M. P, De Jonge, J., & Bakker, A. B. (2003, December). Specific determinants of intrinsic work motivation, emotional exhaustion and turnover intention: A multi-sample longitudinal study. *Journal of Occupational and Organizational Psychology, 76*, 427-450.

Jackson, C., & Earl, L. (2006, June). Prevalence of fatigue among commercial pilots. *Occupational Medicine, 56*, 263-268.

Jackson, S. E., Turner, J. A., & Brief, A. P. (1987, October). Correlates of burnout among public service lawyers. *Journal of Organizational Behavior, 8*, 339-349.

Kalbers, L. P., & Fogarty, T. J. (2005, Spring). Antecedents to internal auditor burnout. *Journal of Managerial Issues, 17*, 101-119.

Kane, R. M. (2003). *Air transportation* (14th ed.). Dubuque, IA: Kendall/Hunt.

Kantowitz, B. H., & Casper, P. A. (1988). Human workload in aviation. In E. L. Wiener and D. C. Nagel (Eds.). *Human factors in aviation.* San Diego: Academic Press.

Kulnert, K., & Vance, R. (1992). Job insecurity and moderation of the relationship between job insecurity and employer. In J. Quick, L. Murphy, & J. Hurrell (Eds.), *Stress and well-being at work.* Washington, DC: American Psychological Association.

Lee, R. T., & Ashforth, B. E. (1990, December). On the meaning of Maslach's three dimensions of burnout. *Journal of Applied Psychology, 75*, 743-747.

Lee, R. T., & Ashforth, B. E. (1996, April). A meta-analytic examination of the correlates of the three dimensions of burnout. *Journal of Applied Psychology, 81*, 123-133.

Lee, R. T., & Ashforth, B. E. (1997, November). Burnout as a process: A commentary on Cordes, Dougherty, and Blum. *Journal of Organizational Behavior, 18*, 703-708.

Leedy, P. D., & Ormrod, J. E. (2005). *Practical research: Planning and design* (8th ed.). NJ: Prentice-Hall.

Leiter, M. P. (1991, March). Coping patterns as predictors of burnout: The function of control and escapist coping patterns. *Journal of Organizational Behavior, 12*, 123-144.

Leiter, M. P., Clark, D., & Durup, J. (1994). Distinct models of burnout and commitment among men and women in the military. *Journal of Applied Behavioral Science, 30*(1), 63–82.

Leiter, M. P., & Maslach, C. (1988, October). The impact of interpersonal environment on burnout and organizational commitment. *Journal of Organizational Behavior, 9*, 297-308.

Leiter, M. P., & Maslach, C. (2001, Summer). Burnout and quality in a sped-up world. *The Journal for Quality and Participation, 24*, 48-51.

Leiter, M. P., & Maslach, C. (2005). *Banishing burnout: Six strategies for improving your relationship with work.* San Francisco: Jossey-Bass.

Leiter, M. P., & Schaufeli, W. B. (1996). Consistency of the burnout construct across occupations. *Anxiety, Stress & Coping: An International Journal, 9,* 229-243.

Levert, T., Lucas, M., & Ortlepp, K. (2000). Burnout in psychiatric nurses: Contributions of the work environment and a sense of coherence. *South African Journal of Psychology, 30*(2), 36-43.

Luzzo, D., & Ward, B. (1995, December). The relative contributions of self-efficacy and locus of control to the production of vocational congruence. *Journal of Career Development, 21*, 307-318.

Mann, M. B. (1999, August 3). *Hearing on pilot fatigue before the Aviation Subcommittee of the Committee on Transportation and Infrastructure United States House of Representatives.* Retrieved on December 17, 2007, from http://human-factors.arc.nasa.gov/

Maslach, C. (1982). *Burnout: The cost of caring.* Englewood Cliffs, NJ: Prentice-Hall.

Maslach, C. (2003, October). Job burnout: New directions in research and intervention. *Current Directions in Psychological Science, 12*, 189-192.

Maslach, C., & Jackson, S. E. (1981, April). The measurement of experienced burnout. *Journal of Occupational Behavior, 2,* 99-113.

Maslach, C., & Jackson, S. E. (1982, January). After-effects of job-related stress: Families as victims. *Journal of Occupational Behavior, 3*, 63-77.

Maslach, C., & Jackson, S. E. (1985, June). The role of sex and family variables in burnout. *Sex Roles, 12,* 837-851.

Maslach, C., & Jackson, S. E. (1986). *Maslach burnout inventory manual* (2nd ed.). Palo Alto, CA: Consulting Psychologists Press.

Maslach, C., Jackson, S. E., & Leiter, M. P. (1996). *Maslach burnout inventory manual* (3rd ed.). Palo Alto, CA: Consulting Psychologists Press.

Maslach, C., & Leiter, M. P. (1997). *The truth about burnout.* San Francisco: Jossey-Bass.

Maslach, C., & Schaufeli, W. B. (1993). Historical and conceptual development of burnout. In W. Schaufeli, C. Maslach, & T. Marek (Eds.), *Professional burnout: Recent developments in theory and research* (pp. 1-16). Philadelphia Taylor and Francis.

Maslach, C., Schaufeli, W. B., & Leiter, M. P. (2001, February). Job burnout. *Annual Review of Psychology, 52*, 397-422.

Micklevitz, S. A. (2001, July/August). Professional burnout. *Illinois Periodicals Online*. Retrieved September 1, 2007, from http://www.lib.niu.edu/ipo/2001/ip010725.html

Miller, K. I., Ellis, B. H., Zook, E. G., & Lyles, J. S. (1990, June). An integrated model of communication, stress, and burnout in the workplace. *Communication Research, 17*, 300-326.

Moore, J. E. (1997). A causal attribution approach to work exhaustion: The relationship of causal locus, controllability, and stability to job-related attitudes and turnover intention of the work-exhausted employee. *Dissertation Abstracts International, 58* (08). (UMI No. 9805426)

Nardi, P. (2003). *Doing survey research: A guide to quantitative methods.* Pearson Education.

National Archives and Records Administration [NARA]. (2007, January). *Code of federal regulations.* Retrieved June 16, 2007, from the Federal Aviation Administration Web site: http://www.faa.gov

National Archives and Records Administration [NARA]. (2008, August). *Code of federal regulations.* Retrieved August 27, 2008, from http://www.gpoaccess.gov/index.html

National Transportation Safety Board [NTSB]. (1982, January). *Aircraft accident report: Air Florida, Inc., Boeing 737-222, N62AF, collision with 14th street bridge, near Washington National Airport, Washington, DC, January 13, 1982* (NTSB No. AAR-82-8). Retrieved October 30, 2007, from http://amelia.db.erau.edu/gen/ntsbaar.htm

National Transportation Safety Board [NTSB]. (1994, May). *Aircraft accident report: Uncontrolled collision with terrain American International Airways flight 808 Douglas DC-8-61, N814CK U.S. Naval Air Station Guantanamo Bay, Cuba, August 4, 1993* (NTIS No. PB94-910406). Retrieved October 30, 2007, from http://amelia.db.erau.edu/gen/ntsbaar.htm

National Transportation Safety Board [NTSB]. (2001, October). *Aircraft accident report: Runway overrun during landing American Airlines flight 1420 McDonnell Douglas MD-82, N215AA Little Rock, Arkansas, June 1, 1999* (NTIS No. PB2001-910402). Retrieved October 30, 2007, from http://amelia.db.erau.edu/gen/ntsbaar.htm

National Transportation Safety Board [NTSB]. (2002, December). *Aircraft accident report: Loss of control and impact with Pacific Ocean Alaska Airlines flight 261 McDonnell Douglas MD-83, N963AS about 2.7 miles north of Anacapa Island, California, January 31, 2000* (NTIS No. PB2002-910401). Retrieved November 1, 2007, from http://www.ntsb.gov/publictn

Parasuraman, R., & Mouloua, M. (1996). *Automation and human performance: Theory and applications.* Mahwah, NJ: Lawrence Erlbaum.

Parker, C. P., Dipboye, R. L., & Jackson, S. L. (1995, October). Perceptions of organizational politics: An investigation of antecedents and consequences. *Journal of Management, 21*, 891-912.

Pennebaker, J. W. (1982). *The Psychology of Physical Symptoms*. New York: Springer-Verlag.

Pfennig, B., & Hüsch, M. (1994). *Determinanten und Korrelate des Burnout-Syndroms: Eine meta-analytische Betrachtung* [Determinants and correlates of the burnout syndrome: A meta-analytic approach]. Master's thesis, Freie Universität Berlin, Psychologisches Institut, Germany.

Pines, A. M. (1993). Burnout: Existential perspectives. In W. B. Schaufeli, C. Maslach, & T. Marek (Eds.), *Professional burnout: Recent developments in theory and research* (pp. 33-52). Washington, DC: Taylor & Francis.

Pines, A. M. (2004, January). Adult attachment styles and their relationship to burnout: A preliminary, cross-cultural investigation. *Work and Stress, 18*, 66-80.

Pines, A. M., Aronson, E., & Kafry, D. (1981). *Burnout: From tedium to personal growth*. New York: The Free Press.

Powell, D. M. C., Spencer, M. B., Holland, D., Broadbent, E., & Petrie, K. J. (2007, July). Pilot fatigue in short-haul operations: Effects of number of sectors, duty length, and time of day. *Aviation, Space, & Environment Medicine, 78,* 698-701.

Quick, J. C., Quick, J. D., Nelson, D. L., & Hurrell, J. J., Jr. (1997). *Preventive stress management in organizations* (Rev. ed.). Washington, DC: American Psychology Association.

Rafaeli, A., & Worline, M. (2001, March). Individual emotions in work organizations. *Social Science Information, 40*, 95-123.

Riolli, L., & Savicki, V. (2003, August). Optimism and coping as moderators of the relation between work resources and burnout in information service workers. *International Journal of Stress Management, 10*, 235-252.

Rizzo, J. R., House, R. J., & Lirtzman, S. I. (1970). Role conflict and ambiguity in complex organizations. *Administrative Science Quarterly, 15*, 150-163.

Rosekind, M. R., Gregory, K. B., Miller, D. L., Co, E. L., Lebacqz, J. V., & Brenner, M. (1996). Crew fatigue factors in the Guantanamo Bay aviation accident. *Sleep Research, 25*, 571.

Sanders, J. C., Fulks, D. L., & Knoblett, J. K. (1995). Stress and stress management in public accounting. *The CPA Journal, 65*(8), 46-49.

Sarter, N. B., & Woods, D. D. (1994, January). Pilot interaction with cockpit automation II: An experimental study of pilots' model and awareness of the flight management system. *International Journal of Aviation Psychology, 4,* 1-28.

Schaufeli, W. B., & Bakker, A. B. (2004, May). Job demands, job resources, and their relationship with burnout and engagement: A multi-sample study. *Journal of Organizational Behavior, 25*, 293-315.

Schaufeli, W. B., & Enzmann, D. (1998). *The burnout companion to study & practice: A critical analysis*. London: Taylor & Francis.

Schaufeli, W. B., Enzmann, D., & Girault, N. (1993). Measurement of burnout: A review. In W. B. Schaufeli, C. Maslach, & T. Marek (Eds.), *Professional burnout: Recent developments in theory and research* (pp. 199-215). Philadelphia: Taylor & Francis.

Schutte, N., Toppinen, S., Kalimo, R., & Schaufeli, W. B.(2000, March). The factorial validity of the Maslach Burnout Inventory-General Survey (MBI-GS) across occupational groups and nations. *Journal of Occupational and Organizational Psychology, 73*, 53-66.

Shirom, A. (1989). Burnout in organizations. In C. L. Cooper & I. Robertson (Eds.), *International review of industrial and organizational psychology* (pp. 25-48). New York: Wiley.

SPSS. (2007). Retrieved December 7, 2007, from http://spss.com/corpinfo/history.htm

Westbrook, L. (1994). Qualitative research methods: A review of maor stages, data analysis techniques, and quality controls. *Library and Information Science Research, 16,* 241-254.

Wiener, E. L. (1988). Cockpit automation. In E. L. Wiener & D. C. Nagel (Eds.), *Human factors in aviation* (pp. 433-461). San Diego, CA: Academic Press.

World Health Organization (2007). *ICD Library*. Retrieved December 7, 2007, from http //www.who.int/classifications/icd/en/

Zeier, H., Brauchli, P., & Joller-Jemelka, H. I. (1996, February). Effects of work demands on immunoglobulin A and cortisol in air traffic controllers. *Biological Psychology, 42,* 413-423.

APPENDIXES

Appendix A

Cover Letter

Burnout in Part 121 Air Transport Pilots:
A Qualitative and Quantitative Investigative Analysis

Dear Sir or Madam:

My name is Lisa Marie Kearney (researcher) and I am a doctoral candidate in the School of Business and Technology Management at Northcentral University, Prescott Valley, Arizona. I am seeking pilots, on a volunteer basis, to participate in my doctoral research dissertation. I am investigating potential predictors of burnout in Part 121 Air Transport Pilots. Your input is extremely valuable to this study and the air transport industry.

I have enclosed four forms to be filled out. It should only require 10-15 minutes total time. The directions are provided on each form. Your responses are strictly confidential and anonymous, as you will not provide your name. The completed forms are the property of the researcher and will be kept in a locked container. The return envelopes will be destroyed upon receipt. The completed forms will be destroyed by the researcher upon completion of the doctoral program.

Your participation is voluntary and you may end your participation at any time without penalty. If you choose to participate, please completely fill out all forms and return to the researcher using the self-addressed stamped envelope. Please return the completed forms no later than_____.

I would greatly appreciate your participation. If you have any questions or concerns please contact the researcher: Lisa Marie Kearney, 510-205-9430.

Appendix B

Informed Consent Form

Dear Sir or Madam:

You are being asked to participate in a doctoral research study. If you agree to participate, please read the informed consent information below and complete the acknowledgement section at the end. Please complete the attached survey forms and return them with this form to the researcher. A self-addressed and stamped envelope is enclosed.

Subject of Study: Burnout in Part 121 Air Transport Pilots.

Purpose: You are being asked to participate voluntarily in this research study concerning Burnout of Part 121 Air Transport Pilots. The attached surveys solicit your opinion only, and no further contact of any nature will be made.

Participation Requirements: Your participation requires approximately 10 to 15 minutes to complete the attached surveys. You will receive no further requests from the researcher.

Procedures: Please complete the Acknowledgment section at the bottom of this form and then the attached surveys, per the instructions provided within each survey. Please return all documents to the researcher. A self-addressed stamped envelope has been provided for this purpose.

Potential Risks/Discomfort: No known personal risk or discomfort is involved by your participation in this study.

Potential Benefits of this Research: There are no direct benefits to participants of this study, and no incentive is offered for participation. However, the objective of the research is to provide scholarly research information to the aviation industry. The findings may provide valuable insight pertaining to burnout and Part 121 Air Transport Pilots.

Anonymity /Confidentiality: The data collected by this survey are strictly confidential and will not be used for any other purpose. All results will be presented in aggregate statistical format, and individual participants will not be distinguished in any way.

Right to Withdraw: Participation in this survey is completely voluntary. If for any reason you believe this survey presents a personal conflict of interest or approaches sensitive personal issues, or if you do not feel qualified to participate, you may withdraw at any time by simply discarding this material.

Contact Point for Questions: Please direct any questions to Lisa Marie Kearney, 3609 Palm Avenue, Manhattan Beach, CA 90266; telephone (510) 205-9430; or e-mail lisa@kearneyaerospace.com.

Request for Results of Statistical Data: If you would like a copy of the statistical results of this study, please use the above contact point, and a copy will be provided to the address you specify.

Acknowledgement: I have read and understand the above conditions of my participation in this study. My signature below indicates my acceptance of voluntary participation in this study.

Participant's Name: _____	Researcher's Name: Lisa Marie Kearney Affiliation: Doctoral Candidate, Northcentral University
Signature _____	Signature _____
Date _____	Date _____

Appendix C

Demographic Questionnaire

Please answer the following demographic questions.

1. Gender

____ Male ____ Female

2. Age range

____29 or younger ____30-39 ____40-49 ____50-59 ____60 and older

3. Your current position:

____Captain ____First officer ____Second officer

Other please specify _____

4. Total flight hours in current position: _____

5. Type of air carrier:

____Major ____Regional ____Non-Part 121 operation

6. Total flight hours for all air carriers: _____

7. Number of years flying for a Part 121 air carrier: _____

8. Total flight hours for current air carrier: _____

9. Highest level of education:

____Doctorate Degree
____Master's Degree
____Bachelor's Degree
____Associate's Degree
____High School Diploma
____other

Appendix D

Research Survey

Please answer the following seven questions by circling the appropriate number.

1. My duties are prioritized, for me.

How often:	0	1	2	3	4	5	6
	Never	A few times a year or less	Once a month or less	A few times a month	Once a week	A few times a week	Every day

2. I receive ambiguous instructions about what I should be doing with my on-duty time.

How often:	0	1	2	3	4	5	6
	Never	A few times a year or less	Once a month or less	A few times a month	Once a week	A few times a week	Every day

3. I have too many duties to complete in my assigned shift.

How often:	0	1	2	3	4	5	6
	Never	A few times a year or less	Once a month or less	A few times a month	Once a week	A few times a week	Every day

4. The requirements of 1 to 2 of my duties exceed my skill level.

How often:	0	1	2	3	4	5	6
	Never	A few times a year or less	Once a month or less	A few times a month	Once a week	A few times a week	Every day

5. I participate in the decisions about how I perform my duties (some or all of the duties).

How often:	0	1	2	3	4	5	6
	Never	A few times a year or less	Once a month or less	A few times a month	Once a week	A few times a week	Every day

6. Organizational politics interfere with some of my duties.

How often:	0	1	2	3	4	5	6
	Never	A few times a year or less	Once a month or less	A few times a month	Once a week	A few times a week	Every day

7. I am fairly rewarded for the effort I put into my duties (some or all of my duties).

How often:	0	1	2	3	4	5	6
	Never	A few times a year or less	Once a month or less	A few times a month	Once a week	A few times a week	Every day

Appendix E

Maslach Burnout Inventory-General Survey

Please answer the following fifteen questions by circling the appropriate number.

1. I feel emotionally drained from my work.

How often:	0	1	2	3	4	5	6
	Never	A few times a year or less	Once a month or less	A few times a month	Once a week	A few times a week	Every day

2. I feel used up at the end of the workday.

How often:	0	1	2	3	4	5	6
	Never	A few times a year or less	Once a month or less	A few times a month	Once a week	A few times a week	Every day

3. I feel tired when I get up in the morning and have to face another day on the job.

How often:	0	1	2	3	4	5	6
	Never	A few times a year or less	Once a month or less	A few times a month	Once a week	A few times a week	Every day

4. Working all day is really a strain for me.

How often:	0	1	2	3	4	5	6
	Never	A few times a year or less	Once a month or less	A few times a month	Once a week	A few times a week	Every day

5. I can effectively solve the problems that arise in my work.

How often:	0	1	2	3	4	5	6
	Never	A few times a year or less	Once a month or less	A few times a month	Once a week	A few times a week	Every day

6. I feel burned out from my work.

How often:	0	1	2	3	4	5	6
	Never	A few times a year or less	Once a month or less	A few times a month	Once a week	A few times a week	Every day

7. I feel I am making an effective contribution to what this organization does.

How often:	0	1	2	3	4	5	6
	Never	A few times a year or less	Once a month or less	A few times a month	Once a week	A few times a week	Every day

8. I have become less interested in my work since I started this job.

How often:	0	1	2	3	4	5	6
	Never	A few times a year or less	Once a month or less	A few times a month	Once a week	A few times a week	Every day

9. I have become less enthusiastic about my work.

How often:	0	1	2	3	4	5	6
	Never	A few times a year or less	Once a month or less	A few times a month	Once a week	A few times a week	Every day

10. In my opinion, I am good at my job.

How often:	0	1	2	3	4	5	6
	Never	A few times a year or less	Once a month or less	A few times a month	Once a week	A few times a week	Every day

11. I feel exhilarated when I accomplish something at work.

How often:	0	1	2	3	4	5	6
	Never	A few times a year or less	Once a month or less	A few times a month	Once a week	A few times a week	Every day

12. I have accomplished many worthwhile things in this job.

How often:	0	1	2	3	4	5	6
	Never	A few times a year or less	Once a month or less	A few times a month	Once a week	A few times a week	Every day

13. I doubt the significance of my work.

How often:	0	1	2	3	4	5	6
	Never	A few times a year or less	Once a month or less	A few times a month	Once a week	A few times a week	Every day

14. I have become more cynical about whether my work contributes anything.

How often:	0	1	2	3	4	5	6
	Never	A few times a year or less	Once a month or less	A few times a month	Once a week	A few times a week	Every day

15. At my work, I feel confident that I am effective at getting things done.

How often:	0	1	2	3	4	5	6
	Never	A few times a year or less	Once a month or less	A few times a month	Once a week	A few times a week	Every day

Note. Maslach et al. (1996) developed the MGI-GS.