Rates of Depression, Anxiety, and Stress in Collegiate Aviators

by

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ABSTRACT

The purpose of this research was to determine if students who are enrolled in a professional flight program exhibit significantly higher rates of depression, stress, and anxiety. This study compared professional flight students to non-professional flight students to determine whether professional flight students have higher rates of depression and anxiety. In addition, this study sought to determine if there were higher depression, anxiety, and stress levels in upperclassmen (juniors and seniors) than in lowerclassmen (freshman and sophomore). Finally, upperclassmen and underclassmen within professional flight programs were compared to test if upperclassmen professional flight students exhibit higher rates for depression, anxiety and stress. These groups were compared to each other by using a survey that measures depression, anxiety, and stress. There were no statistically significant results. No singular group is more or less prone to depression, anxiety, or stress.

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CHAPTER 1

INTRODUCTION

Background

College can be a turbulent time for students. For many, it is the first time they are exposed to the realities of the adult world without their support group (including parents, guardians, family, friends, and social groups like church or sports clubs). Students are embarking on a new adventure in life, many without the maturity or experience to handle this time period (Pedrelli, Nyer, Yueng, Zulauf, & Wilens, 2015). Even for those who make the transition well it can be difficult to manage every day responsibilities, academia, adulthood, new and important relationships, and much more (Pedrelli, Nyer, Yueng, et. al., 2015). This may be challenging but can become more so when mental illness is added into the equation.

More and more college students are dealing with mental illness, specifically depression and anxiety (Center of Collegiate Mental Health, 2017 & 2018). Rates are increasing dramatically, and more students are flooding in to get help, but some handle it on their own. The University of California, Berkley reported that 9% of students utilized the counseling center in 2004, but that percentage raised to 16% in 2014 (Prince, 2015). The Center of Collegiate Mental Health (CCMH), noted that anxiety and depression has had a clear growth trend over the past five years. Yet, CCMH also reported other mental health concerns rates are staying stable like mood instability, academic performance, and adjustment to new environment (Center of Collegiate Mental Health, 2018). CCMH also reported a large increase of students seeking counseling services. From Fall 2009 to

Spring 2015, counseling center numbers increased 30% to 40% while enrollment has only increased 5% (Center of Collegiate Mental Health, 2018).

This raises many questions. If college students are dealing with more stress and mental illness, what about the college students who have even more responsibility placed on their shoulders? Though there are many students who are in demanding positions and working through requirements that may increase stress, this study specifically focused on students studying to become professional pilots. Being a student is a stressful activity but studying to become a pilot has also been proven to be a high-performance activity in which elevated stress levels have become the norm (Blouin, Deaton, Richard, & Buza, 2014). Does that make professional flight students more prone to depression and anxiety?

With mental health being a sensitive subject in everyday life it is an even more volatile subject in aviation. Even a suspicion of poor mental health can ground the pilot or even cost the pilot his/her certificate (Morse & Bor, 2006). Thus, it is an important topic to research as these collegiate aviators will soon be in various flight roles across the aviation industry.

Statement of Purpose

The purpose of this study is to determine if professional flight students are at higher risk for depression and anxiety. This study compared professional flight students to non-professional flight students to determine whether professional flight students are more prone to depression and anxiety. In addition, this study will attempt to see if there are higher stress levels in upperclassmen (juniors and seniors) than in lowerclassmen (freshman and sophomore).

Research Questions

1: Are students who are enrolled in a professional flight degree program more prone to exhibit significantly higher levels of depression, anxiety, and stress?

2: Do upperclassmen students exhibit more depression, anxiety, and stress than underclassmen students?

3: Is there an interaction between enrollment and academic stage (i.e., underclassmen vs. upperclassmen) such that differences between professional flight and non-professional flight students are greater for upperclassmen than underclassmen?

CHAPTER 2

LITERATURE REVIEW

Setting the Stage

College is a transitional time for many students. Over 65% of high school students decided to enroll in higher education in 2008 (Planty, Hussar, Snyder, Provasnik, Kena, Dinkes, Kewal Ramani, & Kemp, 2008) but this number increased to 70% in 2016 (McFarland, Hussar, Wang, Wang, Rathburn, Barmer, Cataldi, Mann, Nachazel, Smith, & Ossolinski , 2018). Life after high school requires the student to learn more than what is being taught in the classroom. Students must learn independence, self-sufficiency, how to manage new tasks, along with maintaining intimate relationships to be successful (Meadows, Brown & Elder, 2006). These new factors can be stress, anxiety, and depression provoking, especially with students who have poor coping skills or are predisposed to mental illness.

The distress of college students and their subsequent mental health is not a new issue (Andrews &Wilding, 2004). Mental illness usually develops during adolescence and will present itself by age 24 (Hunt & Eisenberg, 2010). This as young adults are going through the transition between adolescence and adulthood (Mahmoud, Staten, Hall & Lennie, 2012). Most young adults, 75%, who will be diagnosed with an anxiety disorder will have their first episode by age 22 (Kessler, Amminger, Aguilar-Gaxiola, et. al., 2007).

Anxiety disorders and depression disorders are the most common mental illnesses amongst adults (National Collaborating Centre for Mental Health (UK), 2011; Center of Collegiate Mental Health, 2017 & 2018). Over 18.1% of the US population suffers from

some type of anxiety disorder (National Institute of Mental Health, 2017). Over 350 million people around the world suffer from depression (World Health Organization, 2012) and 6.7% of the US population suffers from Major Depressive Disorder (MDD) (National Institute of Mental Health, 2017). Nearly half of those diagnosed with depression are also diagnosed with an anxiety disorder (National Institute of Mental Health, 2017). Anxiety and mood disorders often co-occur (Sanderson, Di Naper, Rapee, & Barlow, 1990).

Mental illness can plague students in their everyday life causing normal things to become difficult. Untreated mental illness for students can impact academic success, productivity, incite substance abuse (ie. alcohol, drugs, etc.) as coping mechanisms, and damage social relationships (Hunt & Eisenberg, 2010). Thus, the mental health of students is important and especially vital during this transitional period in life.

Mental Health Definitions

Most commonly, mental health disorders are defined by the DSM-5 (Diagnostic and Statistical Manual of Mental Disorders, fifth edition) which was published by the American Psychiatric Association in 2013. The DSM is used by health care professionals to give an authoritative guide to diagnose individuals dealing with mental disorders (American Psychiatric Association, 2013). The DSM has been developed over time to keep up with new research and breakthroughs in the mental health community and is updated regularly.

With the array of mental health disorders, the DSM-5 allows clinicians to make reliable diagnoses, treatment recommendations, and provides additional helpful

information like research and documentation of morbidity and mortality rates (American Psychiatric Association, 2013). The DSM is recognized by the American Psychiatric Association and by a majority of the scientific community. The DSM does require clinical training to utilize and to diagnose a mental disorder (American Psychiatric Association, 2013).

Diagnostic criteria included in the DSM identify symptoms, behaviors, personality traits, syndrome combinations, cognitive functions, physical signs and durations of these to indicate whether the individual has a clinical issue compared to a normal life transition. Some mental disorders are clearly defined with clear boundaries and symptom clusters, yet over time the mental health community has realized that many mental disorders appear on a spectrum. Many disorders are closely related with shared symptoms with similar genetic and environmental factors, and neural substrates (which have been strongly established with anxiety disorders by brain imaging and animal models (American Psychiatric Association, 2013).

Though the DSM is published by the American Psychiatric Association and is commonly used, it is a living document. As a living document there are always improvements to be made and many critiques from the scientific community. Not all practitioners utilize or rely solely on the DSM but use it as a piece of their practice.

Depressive disorders.

The most common feature of depressive disorders is a sad, empty, and irritable mood. Depressive disorders also include body changes and cognitive impacts that affect the individual's ability to function.

Major Depressive Disorder (MDD) is the classic condition related to depressive disorders (American Psychological Association, 2013). MDD is characterized by discrete episodes of at least 2 weeks of clear cognitive and neurovegetative affects that impact function. These episodes may also have inter-episode remissions through the depressive period. MDD is a recurrent disorder (American Psychological Association, 2013).

Depression tends to impact the sufferer in everyday life making it difficult to complete everyday activities and even get out of bed (National Institute of Mental Health, 2017). Specifically, in academia depression can impact the student's ability to learn and retain information (National Institute of Mental Health, 2017; Prince, 2015). Difficulty concentrating, social isolation, and feeling of hopelessness are common and incredibly impactful (John Hopkins Student Assistance Program, 2019). The patient can experience feelings of guilt, worthlessness, hopelessness, hard time finding joy in previously enjoyable activities and pessimism which can impact social relationships, and more (National Institute of Mental Health, 2017). Other symptoms can be slow talking, moving, and decision making, or in extreme cases thoughts of death, suicidal ideation or even suicide attempts (National Institute of Mental Health, 2017; John Hopkins Student Assistance Program, 2019).

These symptoms tend to be common across depression sufferers, but other less common symptoms can manifest as well thus, making depression a difficult and impactful mental illness (John Hopkins Student Assistance Program, 2019). Depressive disorders differ in duration, timing and presumed etiology (American Psychological Association, 2013). Like with any health concern depression and how the symptoms manifest is individual to the person.

Anxiety disorders.

Anxiety disorders come in many forms but are mostly characterized by excessive fear and anxiety and related behavioral disturbances (American Psychological Association, 2013). Fear is defined by the DSM 5 as an emotional response to a threat that may trigger the fight or flight instinct. Anxiety is defined by the DSM as anticipation of future threat. Though these two may overlap they do differ from the types of situations that induce fear, anxiety, or avoidance and associated cognitive ideation (American Psychiatric Association, 2013). Anxiety is often stress induced and persistent over more than six months and in situations that should not normally induce fear or anxiety (American Psychiatric Association, 2013).

Most anxiety disorders are developed in childhood and can get worse as the individual ages if it is not addressed by a medical professional through treatment (American Psychiatric Association, 2013). More females are impacted by anxiety than men by a 2:1 ratio (National Institute of Mental Health, 2017).

General Anxiety Disorder (GAD) is one of the most common anxiety disorders (American Psychiatric Association, 2013). GAD is persistent and excessive anxiety and worry across various domains. These domains can include work, education, and social relationships, to name a few. GAD is also accompanied by physical symptoms that include restlessness, easily fatigued, consistently on edge, muscle tension, sleep disturbance, irritability, and difficulty concentrating (American Psychiatric Association, 2013).

Explanations to Rising Mental Illness in College-Aged Young Adults

Though mental health varies across demographics and societal factors, mental health disorders for college-aged students has been increasing in number and severity (Hunt & Eisenberg, 2010). In 2015, 274 institutions' counseling centers reported an 88% increase in severe mental illness at their campuses from the year 2000 to 2005 (Pedrelli, et. al., 2015). There are many factors that may explain these increases such as lack of social support, relationship stressors, or victimization of sexual abuse (Hunt & Eisenberg, 2010). Another explanation is the shifting values of this current generation to extrinsic values which includes materialism, individualism, unrealistic expectations, and unstable relationships (Twenge, et. al., 2010).

It is impossible, especially in mental health, to find one specific reason as to why an increasing number of students are becoming more stressed, depressed and anxious. Cultural shifts through the generations and other negative life experiences play a role, yet, there may be another factor to consider for the increases of mental health in students.

Stigma towards mental health.

Part of the generational change for current college students is the decreased stigma towards mental health. Attitudes towards receiving professional help for mental health are much more favorable in young people than in older adults (Mojtabai, 1990-2003; American Psychological Association, 2018). Thus, the reports of increasing mental health concerns in college students could be the increase of those getting help. Yet, other studies suggest that less than half of students who are suffering with a mental health disorder are receiving treatment (Zivin, Eisenberg, Gollust, & Golberstein, 2009).

If less stigma is causing more college students to reach out for help, this may be a case of increased reporting. Yet, this may also indicate more college students were/are suffering with mental illness than previously thought. If less stigma is not causing college students to reach for help, then there may be a genuine increase of students impacted by mental illness.

Most people develop mental health disorders as children but tend to not be treated until later. More commonly, it takes years for the patient to seek help, if they search for help at all (Pedrelli, et. al., 2015; Prince, 2015). More and more colleges and universities are providing counseling services and other support systems for students. Some universities are reporting a staggering increase of students now utilizing the student mental health centers (Beiter, Nash, McCrady, Rhoades, et. al., 2015).

Traditional College Students and Collegiate Aviation Students

Traditional and non-traditional college students.

Traditional college students tend to be around 18-24 years of age and enroll directly after completing high school (McFarland, et. al., 2018; Pedrelli, et. al., 2015) into a postsecondary institution. Most commonly these students take 12 credit hours or more of classes to be considered full-time students. Traditional students usually rely on their parent or guardian for financial support and may hold a part-time job to supplement the cost of living or their education, but some do not work at all (Pedrelli, et. al., 2015).

Most traditional students find stress in maintaining their academics while balancing the responsibility of adult expectations without the mastery and maturity of established adults. These adult responsibilities range from meeting demands at work,

balancing significant emotional relationships, and being living mates with those near their age that possess different realities and coping skills (Pedrelli, et. al., 2015).

Non-traditional students are older (above 24 years of age), are usually employed full-time and they have spouses or dependents (Pedrelli, et. al., 2015). These students have similar stresses that include balancing their academics with work stresses but usually have the maturity and mastery to do so. Non-traditional students may find more stress in coming back to school and adjusting to the role and expectations of being a student again. These students may have to balance family responsibilities and other demands while trying to maintain their work-life balance (Pedrelli, et. al., 2015).

Collegiate aviation students.

Aviation flight students typically maintain all these roles while also progressing through the flight portion of their degree program in addition to the classroom work. Aviation flight students usually take around 12 credit hours or more each semester, may maintain full-time or part-time jobs, while also studying for their flights and check-rides (practical tests of flight knowledge). Collegiate Aviation students can be comprised of both Traditional and Non-traditional students.

Aviation itself is an inherently stressful activity (Matthews, 2001; Martinussen & Hunter, 2010; Morse & Bor, 2006; Tefler & Biggs, 1988). The pilot's responsibilities include safely operating the aircraft, long flights, periodic check rides and more. Pilots also experience consistent low-level stress by just being on the flight deck. While flying, pilots are constantly monitoring monotonous noise and vibration from the aircraft and life-support machinery. This can result in subtle chronic tension as they listen "unconsciously" for mechanical failure indicated by sound or feel of the aircraft

(Suedfeld & Steel, 2000). Additional pilot stress can stem from the requirement that they must always maintain or improve their performance and or ratings and not reduce performance (Katz, 1997; Matthews, 2001; Salas, Driskell, & Hughes, 1996). A reduction in performance may result in increased number of errors (Martinussen & Hunter, 2010) and accident rates (Loewenthal et. al., 2010; Young, 2008) which may result in loss of job or life. Collegiate aviation students face all these stresses along with their academic and everyday life stresses.

Possible Causes of Mental Health Disorders in College Students

Though stress is a common everyday experience in life there is a point where stress can become too much. Everyone at some point in their lives encounters stress but everyone handles it differently. Coping with stress is an incredibly individual thing (Lazarus, 1991).

Higher education has developed into a much more demanding and stressful institution and not only in academics. With the rising rate of high school graduates deciding to attend college the stress of postsecondary education is becoming more widespread. As an example, in the UK, rising attendance rates and changes in academic funding is a universal reason for the increase in student distress (Andrews & Wilding, 2004).

According to results of a study conducted by Andrews & Wilding (2004), analyzing the impact of anxiety and depression on UK students' academic achievement, anxiety and depression for students could be caused by many things. As previously

addressed, there can be many reasons that may trigger anxiety and depression in students but there are also some common reasons.

The most common "trigger" for maladaptive coping skills for anxiety is relationship difficulties. Though relationship difficulties tend to be a cause for depression later in life (Andrews & Wilding, 2004) this is not so for college aged students. A possible explanation for this is due to the transient state of students' current lives. During this period of life students are constantly creating and ending relationships. Thus, students see the movement of relationships as common and thus more anxiety-inducing rather than depression inducing.

The most common reason found to "trigger" depression in students are financial issues (Andrews & Wilding, 2004). Financial issues are universal for students, as it takes more money to attend higher education than in past years and involves a considerable financial burden on the individual student and their family (Callender & Karp, 2000). With 70% of high school graduates enrolling in postsecondary education (McFarland, et. al., 2018), financial burdens on students and families are becoming all the more common (Andrews & Wilding, 2004).

Both anxiety and depression can impact daily life but, depression tends to impact academic performance more than anxiety disorders (Andrews & Wilding, 2004). Anxiety tends not to impact academic performance as the nature of anxiety can motivate students to use compensatory strategies that can increase performance effectiveness (Eyenck & Calvo, 1992). Though this sounds like it may be beneficial it often is not. This can set students up for a lifetime of stress and impact their long-term health and well-being (Stewart-Brown, et. al., 2000). While financial distress and troubles with relationships

can be the start of negative psychopathology clearly these issues do not directly cause anxiety and depression. It is maladaptive coping skills that result in these common disorders.

Mental Health in Aviation

Mental health in aviation is a fickle topic and comes with many challenges. Many who are not familiar with the industry may think that in such a regulated and precise field that mental health is not an issue. Additionally, pilots and other flight crew have a deep aversion of mental health as it can put their jobs in jeopardy thus many in the aviation industry may not reach out for help (Bor & Hubbard, 2006). Pilots who are diagnosed with a psychiatric disorder must be grounded until recovered (Morse & Bor, 2006). Finally, mental health is not a singular topic, it is diverse, on a spectrum and the complete opposite to the precise and exacting world of aviation. Mental health is rarely straightforward and is not static only changing with time. According to Bor and Hubbard (2006), there are five main sources of mental health problems in aviation employees:

(a) stresses associated with coping, safety, and survival,

(b) stress that emanates from workload, how work is organized and organizational climate (e.g. rostering, frequency of flights, jet lag, pensions and financial changes),

(c) personal problems that stem from disruption to personal relationships, which clinical research suggests should act as a buffer to work stress,

(d) ever-present concerns about loss of license as a consequence of the onset of a disqualifying medical condition,

(e) normal psychological problems that occur naturally in the everyday life of the population at large. (p. 2)

Elevated levels of stress can have significant impacts on cognitive processes and decision making. In combination, work and personal stress can impact performance (Blouin, Deaton, et. al., 2014). In a survey conducted by Sexton, Thomas, and Helmreich (2000), 74% of pilots reported that stress and fatigue do impact their performance. Additionally, 47% of pilots reported that personal problems also have an impact while flying (Sexton, Thomas, & Helmreich, 2000).

If these issues are proven in experienced pilots, there can be similar issues in student pilots. For example, student pilots handle the pressures of flight as well as their everyday lives. After graduation many flight students cannot go directly to their preferred job in the airlines as many of them are still building flight hours to reach mandatory requirements set by Federal Aviation Administration (FAA). Aviation is a cyclical industry and goes through periods of time of vast hiring to vast layoffs.

The FAA, like many other aviation authorities around the world has specific physical and mental health standards. To receive a First Class Medical (required to fly for airlines) pilots must undergo a physical and psychological evaluation (Federal Aviation Administration, 2018a). A First-Class Medical Certificate cannot be issued if the pilot has been diagnosed with any personality disorder, experienced psychosis (hallucinations, delusions, bizarre behavior), bipolar personality disorder, or substance dependence (Federal Aviation Administration, 2018c). Additionally, there are many medications that disqualify or may revoke a pilot's medical as a result of the potential side effects. Most of

the medications that treat depression and anxiety are included and can cause the pilot to be grounded (Bor & Morse, 2006).

The FAA lists all medications that pilots are and are not able to use while flying. There are two lists: Do Not Issue (DNI) and Do Not Fly (DNF). Any pilot taking any medication of the DNI list will not be issued their flight medical certificate or be able to renew their certificate (Federal Aviation Administration, 2018b). Pilots who are taking any medications on the DNF list are highly discouraged not to fly. This list tends to apply more to over the counter medications. The FAA does not allow pilots who take these medications and fly but do not bar them from obtaining their medical (Federal Aviation Administration, 2018b). Pilots are able to return to flying after the medication has been stopped and has sufficient amount of time to leave the pilot's system.

Pilots are still prone to mental health disorders and problems and are not immune to psychiatric disorders despite extensive medical screening for issuance and renewal of this medical certificate (Morse & Bor, 2006). When the pilot goes to a certified Aviation Medical Examiner (AME) the decision is up to the AME. AMEs do not diagnose or perform psychiatric exams but make the decision based on the information provided by the applicant (Federal Aviation Administration, 2018b). If the AME cannot make the decision based on the information provided by the applicant, the application will be sent to a FAA certified psychiatrist (Federal Aviation Administration, 2018b). In addition, all medical reports and records pertaining to the pilot will be reviewed by the FAA in Oklahoma City (Federal Aviation Administration, 2018b) adding substantial wait time for either approval or denial.

If the pilot's application is denied by the FAA, the pilot can either appeal to the National Transportation Safety Board (NTSB) or apply for a special issuance from the FAA (National Transportation Safety Board, 2012). Either avenue takes up a lengthy amount of time (National Transportation Safety Board, 2012), all without being able to fly and not earning an income.

Depression, even minor depression, can ground a pilot. If medication is used to treat a pilot with minor depression, bereavement depression, or situational depression the pilot will be grounded during the time the medication is taken. Only four medications have been accepted to treat depression and allow the pilot to fly, but these accepted medications are still only allowed through special issuance. Some medications used to treat depression have also been useful to treat some types of anxiety and are on the DNI list for pilot use. When the pilot is ready return to flight all DNI medications must be stopped. When the pilot is without medication for three months and can maintain sufficient mental health then the pilot can then be cleared to return to the cockpit (Federal Aviation Administration, 2018b).

Anxiety is a vague topic within the FAA. Only severe anxiety and panic disorders can ground pilots if they have been diagnosed. Only medication that is being taken to manage anxiety or have been diagnosed with severe anxiety can be cause for grounding via the FAA.

The vagueness of the FAA on mental health make it a pain point for many pilots. After physical disorders, psychological disorders, at 12.5% (Pombal, et. al., 2005), are the most common reason for pilots to lose their license (Bor & Hubbard, 2006). The loss of a

license or even a temporary hold can cause legal, social, and personal consequences, thus creating the massive distrust and stigma of mental health in the aviation industry.

These rules, regulations, and stigmas do not just apply in the airline world but apply to all pilots, including student pilots and collegiate aviators. Collegiate aviators can already be in a turbulent and transitional phase and with the added stigma and possible consequences of being diagnosed with a mental disorder and these students are much less likely to reach out for help if it is needed. Even if the student's mental health issue is transient the student can still be grounded from flight operations impacting the speed at which the student completes their education (which could spark financial issues), while also complicating intimate relationships, social groups, and more.

Mental Health and Collegiate Aviation Students

Changes in domestic, social life, and work may produce stress and other adverse reactions. Internal biological changes can also result in psychiatric disturbance (Morse & Bor, 2006). Academics and personal stresses can create large amounts of stress on the student. Discovering some of the most common "triggers" for students like relationship issues causing anxiety and financial difficulties "triggering" depression can be incredible strides to aid students. Using this knowledge regarding aviation students can allow insight into the stresses collegiate aviators face and how to support them.

One of the biggest hurdles of becoming a pilot is funding the flight time and certificates. This is particularly poignant point for collegiate aviation flight students. The expense of aviation flight programs is in addition to a standard degree tuition, as well as more time demanding. Flight costs can get well above $80,000, not including any

additional flight time the student may need or additional examinations. An international flight school estimates $75,995 for flight training from no formal training to commercial pilot ratings (ATP Flight School, 2018). These costs do not include an estimated $10,000 to cover additional flight hours, examiner fees, and other necessary pilot gear (iPad, subscription to Foreflight, headset, etc). This is all in addition to costs of living and tuition. Choosing to fly in college can result in substantial debt.

Financial issues are a common reason causing student depression, the intense costs of an aviation program may put students at high-risk to develop these mental illnesses. This is further supported by a similar study performed with graduate students in North America and their increased psychological distress in connection to their financial difficulties (Hodgsons & Simoni, 1995).

The additional stress of flight training on top of academic and personal responsibilities can be overwhelming, even with support. As students learn more about the industry they will be entering after the completion of the program they will quickly learn about the high costs of having mental illness within aviation. In a mild case of depression, the pilot could be grounded during treatment and have to tackle a mountain of paperwork on their return (Federal Aviation Administration, 2018b). In the most extreme cases the pilot's certificates can be revoked and their career ended (Federal Aviation Administration, 2018c; Morse & Bor, 2006). Thus, aviation students may be less likely to reach out for help during their time in academia, as even a diagnosis of depression or anxiety disorder while completing their degree can result in revocation of their flight certificates. This can be problematic as mental health disorders may get worse over time and these collegiate aviators will be our future pilots.

A study performed by Robertson and Ruiz (2010) surveyed collegiate aviation students currently enrolled in the flight program at Southern Illinois University Carbondale. This study concluded that students enrolled in the flight program at Carbondale found checkrides/practical tests the most stressful. Financial concerns, written exams, flight course workload, checkride scheduling, and time management followed in order (Robertson & Ruiz, 2010).

Possible Outcomes

It is possible that collegiate aviators may be at high risk for mental health disorders. Balancing social requirements, academia, financial issues, and navigating the stigma of mental health within aviation is a large order. Since aviation students are college students it is possible that these students reflect the larger student populous and have similar anxiety and depression rates and that the additional responsibilities do not furthermore impact the student.

When most people think of pilots they think of a confident and "cool" individual. Some studies even support that there are specific personality types that are drawn to being aviators. The pilot personality as studied by Fitzgibbons, Davis and, Schutte (2004) with NASA is quite common. The most common pilot profile is someone who is emotionally stable, has low anxiety, low vulnerability (being able to handle difficult situations), difficult to anger, not impulsive, and low on depression. Pilots are also very contentious, high in achievement-striding, deliberation, competence and dutifulness. Most pilots also are trusting, straightforward, and assertive which helps with crew resource management. Because of this profile and the commonality, a majority of pilots

may not have a personality that is prone to mental health problems. This could mean that collegiate aviators could have less anxiety and depression rates.

Hypotheses

Hypothesis 1: Students who are enrolled in a professional flight degree program exhibit significantly higher levels of depression, anxiety, and stress than those students not enrolled in a professional flight degree program. Hypothesis 2: Upperclassmen students exhibit more depression, anxiety, and stress than underclassmen students. Hypothesis 3: An interaction between upper/underclassmen and the professional flight enrollment such that the degree of difference on measures of psychopathy between students enrolled in a professional flight program and those not enrolled differs between underclassmen and upperclassmen.

CHAPTER 3

FRAMEWORK & METHODOLOGY

Participants

A total of 252 responses were collected. A majority identified as male with 144 participants, followed by those who identified as female at 78 participants. There was one participant who selected "other" as their gender identity. There were 137 students who were not enrolled in a professional flight program and 87 who were enrolled in an aviation program. Respondents were a mix of class standings, with the highest number of juniors. This included 23 freshmen, 33 sophomores, 93 juniors, 59 seniors, and 15 graduate students.

Definitions

For clarity and understanding, the following words are defined as follows:

- Professional Flight: A student enrolled at a university in a professional flight program. This program is a 4-year bachelor's program with the goal of graduating with a bachelor's degree and necessary flight certificates to obtain a full-time job as a pilot. These students can be a mix of traditional students and non-traditional students. These students handle the roles and responsibility of student and pilot.
- Non-Professional Flight Student: A non-professional flight student is a student that only incurs academic responsibility at a university. These responsibilities include attending courses, completing coursework, and participating in academic requirements like projects, internships, or other for academic credit programs. No additional academic responsibilities are required.

To determine if a student is a professional flight student or a non-professional flight student, the survey contains questions pertaining to degree program, and direct questioning as to whether the student is currently enrolled in a professional flight program or if they are presently undergoing flight lessons or flight training with the goal of obtaining an FAA flight certificate.

To assess the rates at which students are experiencing stress, anxiety or depression the Depression Anxiety Stress Scales (DASS) was used. In an attempt to not lose the participant's interest, the DASS-21 was used for brevity.

Research Materials

The survey was developed in Microsoft Word for hard copies and Qualtrics for online access. The survey was disseminated during class time and was accessible via a URL. The purpose of this study was to determine and compare the rates of depression, anxiety, and stress from professional flight students and non-professional flight students. The survey was disseminated during class time after approval from professors, administered on social media (Facebook), and released to University Aviation Association (UAA) members via email.

Prior to the start of the survey, participants completed a consent form. The consent form consisted of notifying the participant of the purpose of the study. The participant was also informed that all responses are anonymous and only generic demographic information would be collected. An additional statement noted that due to the nature of the study that if the participant experienced any discomfort or distress the participant could stop the survey at any time.

If the participant felt that they needed to discuss with someone feelings brought up by the survey, the contact information and office location of the university counseling office was provided. Any questions about the survey could be directed to the researcher with a provided email address. If the participant agreed to these terms and selected "Yes, I consent" they gave consent for their results to be used in the study. The consent letter is available in Appendix A.

Demographic Questions

The following variables were collected:

To differentiate between traditional and non-traditional students, basic demographic information was collected.

a. Age
b. Class Standing (freshmen, sophomore, junior, senior, or graduate student)
c. Transfer student or First-Time-Freshmen
d. Gender
e. Relationship Status
f. Children
g. Currently or prior service in the U.S. Armed Forces

To determine if the participant was enrolled as a professional flight Student or as a non-professional flight student the following information was collected.

a. Current degree program
b. Estimated date of graduation
c. Enrolled in a professional flight program
d. Currently taking flight lessons to pursue any FAA flight certificate

DASS-21

To investigate the anxiety, depression, and stress rates of collegiate aviators at ASU, both general population (non-professional flight Students) ASU students and professional flight students were surveyed. Anxiety and mood disorders often co-occur (Sanderson, Di Nader, Rapee, & Barlow, 1990) thus the selection of the DASS. Both groups will take the Depression Anxiety Stress Scales (DASS) created by Lovibond and Lovibond in 1995.

The DASS is not to be used as a diagnostic instrument but as a way to measure distress (Osman, Wong, Bagge, Freedenthal, Gutierrez, & Lozano, 2012). There are two variations of the DASS. The original DASS used 42 questions on a four-point scale, 0 indicating “does not apply to me” and 3 indicating “applies to me very much”. The second DASS is the abbreviated version which has 21 questions, 7 items comprise the three scales (depression, stress, and anxiety) with the same four-point scale. The higher the scores on any of the scales, the more frequent the symptomology.

The reliability of DASS has been confirmed by Antony, Cox, Enns, Bieling and Swinson in a 1998 study. The DASS measures features specific to depression, anxiety, and stress. The three sections DASS- D (depression), DASS-S (stress), DASS-A (anxiety) see to specific conditions within the DASS. The DASS is a reliable valid method in both clinical and non-clinical groups (Antony, et. al., 1998).

This study will utilize the DASS-21 for brevity. DASS-21, has fewer items, a cleaner factor structure and a smaller inter-factor correlation. For the purpose of this study the DASS-21 is shorter for students to take, encompasses all of the mental

disorders pertinent to the study, and can be compared to previous studies. Survey can be found in Appendix B.

To better analyze the data the DASS-21 is separated into three scoring sets, one each for depression, anxiety and stress. Each response was set on a four-point rating scale: 0 being Never, 1 Sometimes, 2 Often, and 3 Almost Always. Data analysis was completed by using statistical package R Studio. Survey data was entered into a spreadsheet and imported into R Studio. This study utilized a two-way mixed factor ANOVA to analyze the data comparing the survey results of professional flight students and non-professional flight students and the survey results comparing of lowerclassmen and upperclassmen.

Procedure

Survey data was collected after the research proposal was approved by the Institutional Review Board (IRB) and approval by this researcher's thesis committee. The survey was collected by using Qualtrics software.

Classes were selected based on the students in the course. These classes included courses that were taken by students outside of the aviation program. This mix of students allowed for a better snapshot of the mental health of the student population.

A copy of the survey was distributed to any student over the age of 18 who was willing to participate in the study. The survey was available via paper copies and via a link on that class's online platform. There was no compensation or class credit available for this study.

Students were asked to complete the survey to the best of their ability. No student was required to complete the survey and may stop and void their submission at any time. In the case that the student was currently experiencing any type of distress the contact and physical address of the Counseling Center is provided.

Assumptions

The following assumptions were made in this study:

- Participants are representative of the entire population of students enrolled in a professional flight program
- Participants are able to accurately describe if they are dealing with symptoms of anxiety, depression, or stress via the instrument of the survey.
- Participants answered truthfully and in the best of their ability.
- Students who are enrolled as professional flight students are pilots.

Limitations

In the interest of feasibility, this study did not seek to address many issues.

- In order to determine if a student is suffering from depression, anxiety, or stress the DASS-21 survey was used. No other assessment of mental health was utilized.
- Participants are limited to the confines of the DASS-21 survey and the added demographics. There was no additional way for participants to address opinion or other feelings outside the statements of the DASS-21.
- This study did not attempt to diagnose mental illness or force students to seek help.
- This study did not attempt to determine what the largest stressors are for professional flight students and non-professional flight students.

- This study did not attempt to create solutions for depression/anxiety/stress experienced in the student population.

CHAPTER 4

RESULTS

All results of this survey are detailed below. Responses collected through the survey are discussed first and statistical analysis of the data is discussed second.

Data and Analysis

Though there were 252 responses recorded only 224 were usable. There were 28 results that were removed from the data due to incompletion. Some respondents stopped more than half way through the survey and others only started the survey before stopping. This left 224 usable results with 137 non-professional flight and 87 professional flight respondents.

On questions in the survey that asked the respondent to type in their degree program and flight hours some respondents chose to continue without adding a response. The researcher was able to determine whether the respondent was enrolled in a professional flight program due to a later question in the survey which all participants responded.

Demographics

The following questions focused on the demographics of the participants. Some of these questions are generic demographics such as gender, age, and class standing, other questions were more tailored toward the aviation community.

Question 1: *Degree Program*

The respondents were asked to write in their degree program. Some respondents wrote in their university or type of degree (ie: Bachelors, Masters, PhD) and others did not fill this question out at all. Non-professional flight degree programs ranged from

Business Administration, Elementary Education, Human Systems Engineering and other technology or engineering based programs. There were many respondents who were enrolled in an aviation program but were not enrolled in a professional pilot concentration. This question was mostly designed to be a clarification question to question 10 which will be discussed later on.

Question 2: *Estimated Date of Graduation*

This question is a complementary question to question 3. Students were asked to indicate their estimated date of graduation. Some students specified year and semester, but others only indicated the year. Thus, for simplicity the students were sorted into graduation year. This is indicated in the chart below. There were some outliers, which included dates like: 2018, 2023. There were also typos (ie. 2029, 2919 202, and 2015) along with two "No responses" that were removed from this question. With anonymity there was no way to contact respondents for clarification.

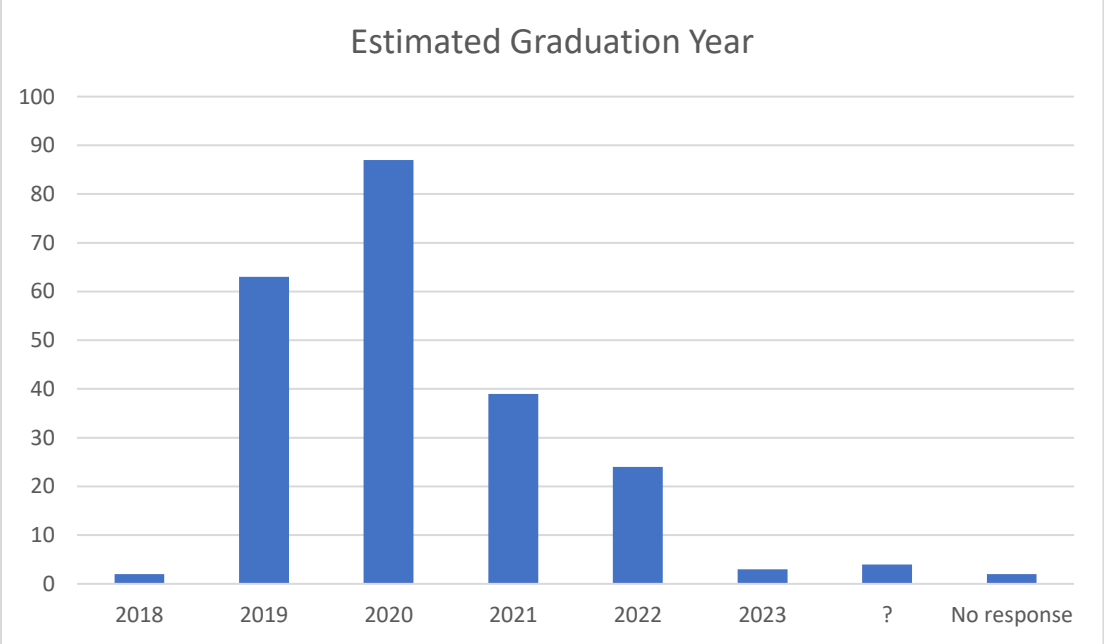

Figure 1. Number of participants and their indicated estimated graduation year. N= 224.

Question 3: *Class Standing*

Participants were asked to indicate what class standing they were at during the time of the survey. Participants were given the option of Freshman, Sophomore, Junior, Senior and Graduate Student. All but one participant responded to this question. Out of the 224 responses there were 23 freshmen, 33 sophomores, 93 juniors, 59 seniors, and 15 graduate students. The majority of participants are juniors at a rate of 41.5%.

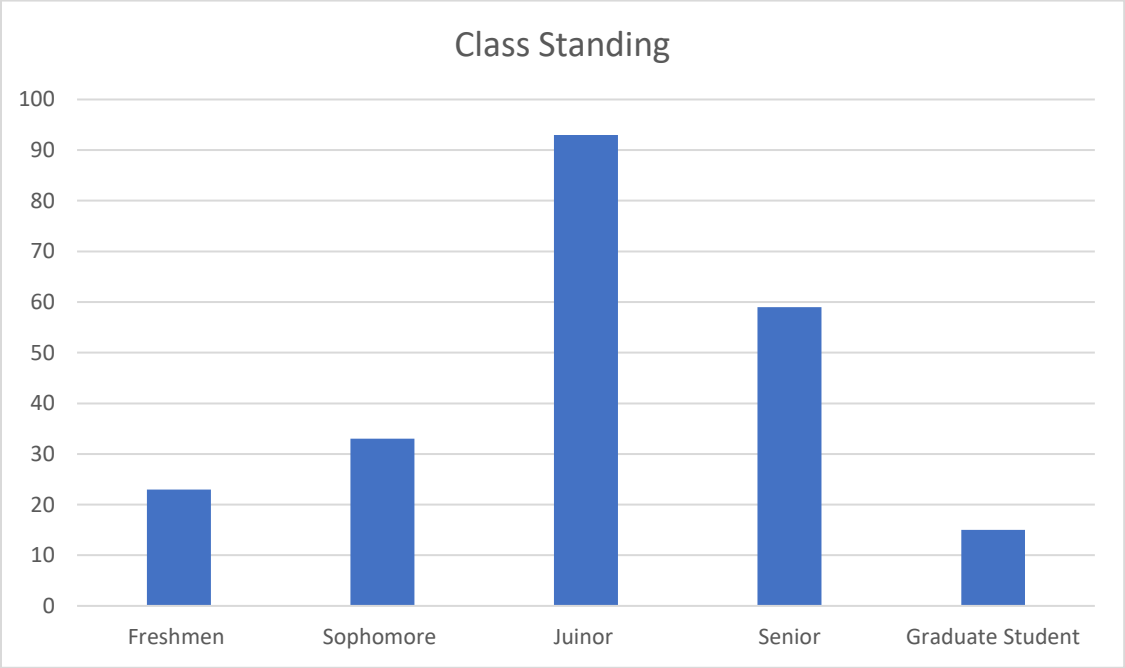

Figure 2. Class Standing. N= 223.

Question 4: *Are you a transfer student?*

Participants were asked to indicate via a Yes/No question if they were a transfer student from a community college or other university. All but one participant responded. Out of the 224 respondents 61 responded “Yes”, 162 responded “No”, and 1 declined to reply.

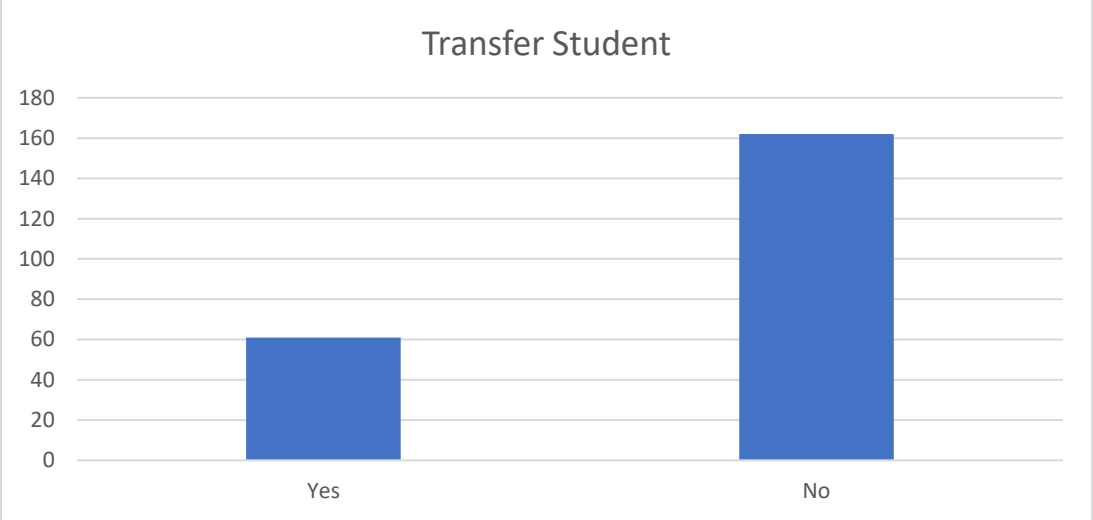

Figure 3. Transfer student. N=223.

Question 5: *Gender*

Participants were then asked to indicate their gender. Three options were given: Male, Female and Other. Out of the 224 respondents 144 were male, 78 female and one Other. Out of the 87 professional flight, the majority of students are male at 74.4%. Those who are enrolled in a professional flight program 64 were male and 22 were female. One respondent did not indicate a response.

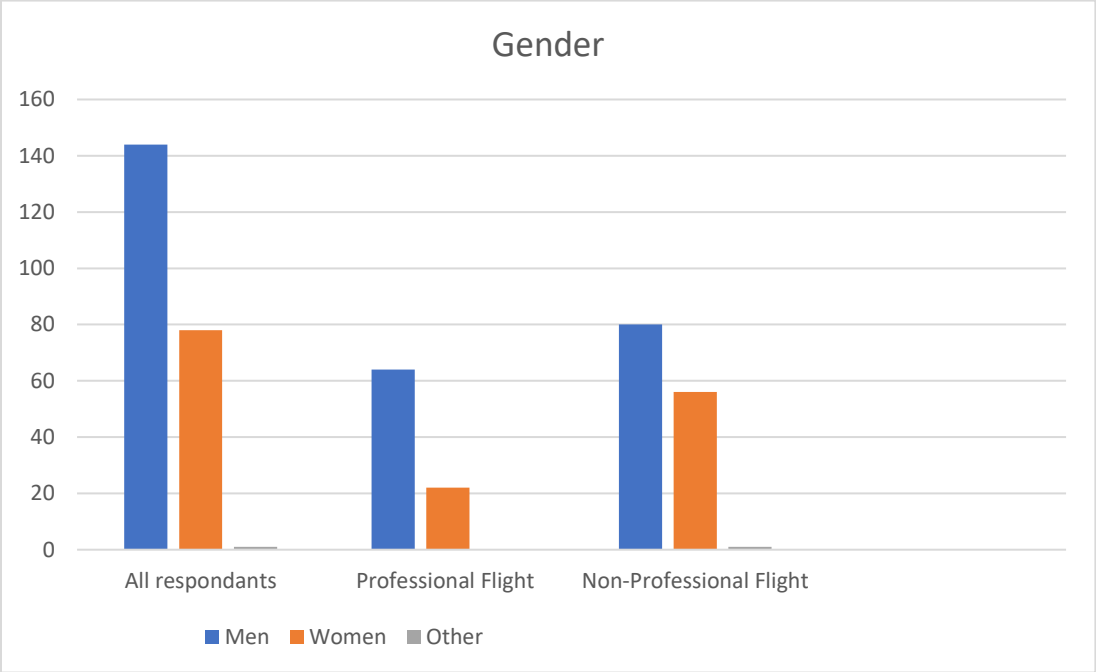

Figure 4. Number of all respondents and their indicated gender. N= 223. Number of professional flight students and their recorded gender. N= 87.

Question 6: *Age*

There was a fairly large variety of ages. The minimum age was 18 and the maximum was 54. The average of the participants was 22.4 years old. All participants responded to this question.

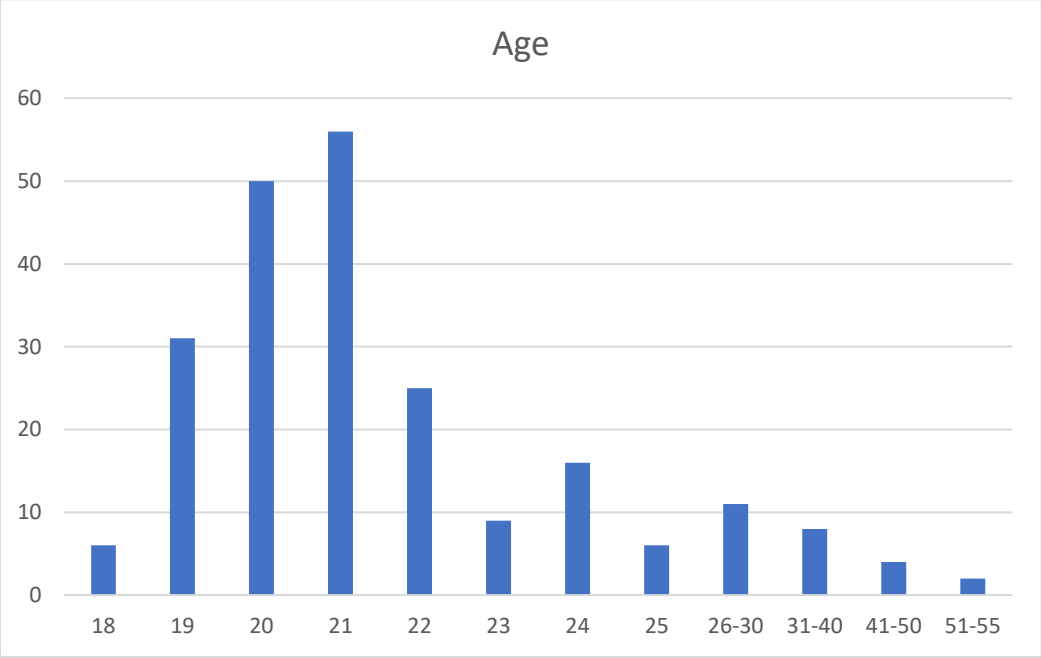

Figure 5. Recorded age of the participants broken up into single years and then grouped into 4-year and 9-year groups. N= 224.

Question 7: *Have you or are you currently serving in the US Armed Forces?*

Participants were asked if they had or are currently serving in the US Armed Forces. Participants were able to select yes or no. Out of 224 respondents 16 responded "yes" to having or are currently serving. A majority of respondents, at 207, indicated "No", that they had not served or are currently serving. Only one respondent failed to answer the question.

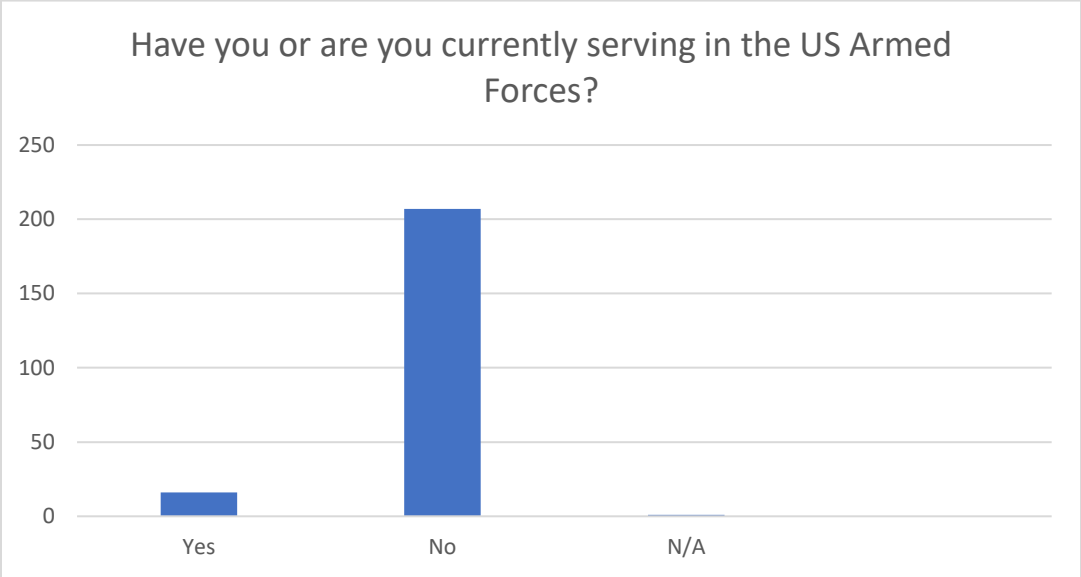

Figure 6. Number of participants that indicated whether or not they have served in the US Armed Forces. N= 223.

Question 8: *Relationship Status*

Participants were asked to indicate their relationship status. Options included: Never Married, Separated, Divorce, Widowed, and Married. Out of the 223 respondents all participants responded to this question. Exactly 210 respondents indicated that they have Never Married, 2 are Separated, 3 are divorced, and 9 are Married. No respondents indicated being widowed.

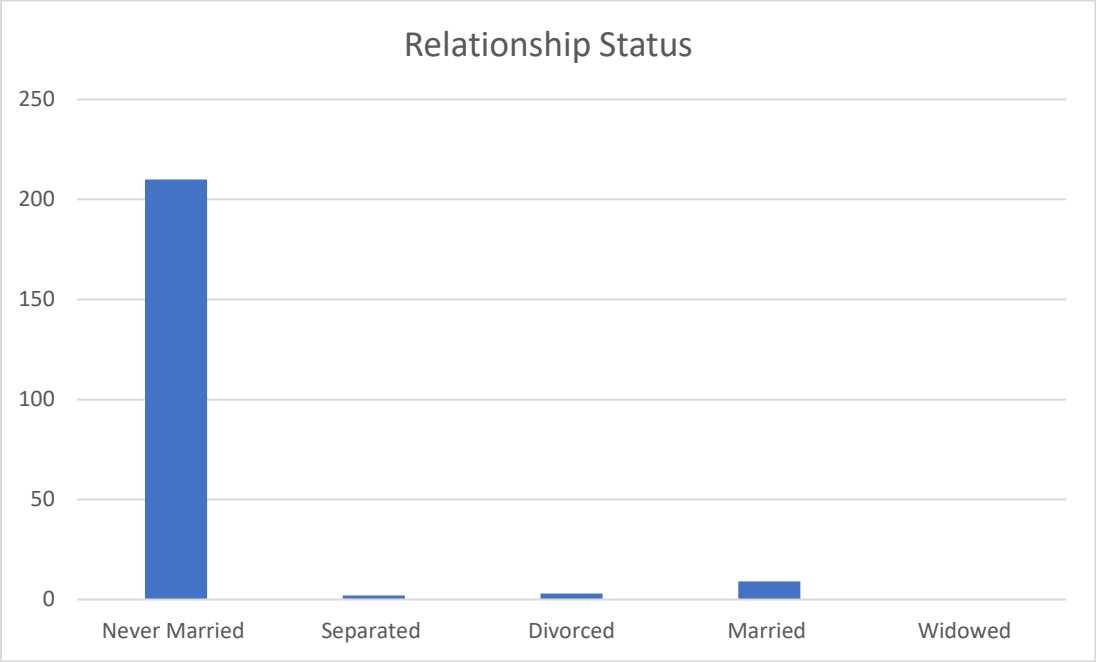

Figure 7. Relationship status of respondents. N=224

Question 9: *Do you have any children?*

Respondents were asked to respond to a Yes or No question to determine if they have children. All respondents answered the question. Out of 224 respondents 9 responded “Yes” to having children and 215 responded “No” they do not have children. This resulted in 4% of respondents having children.

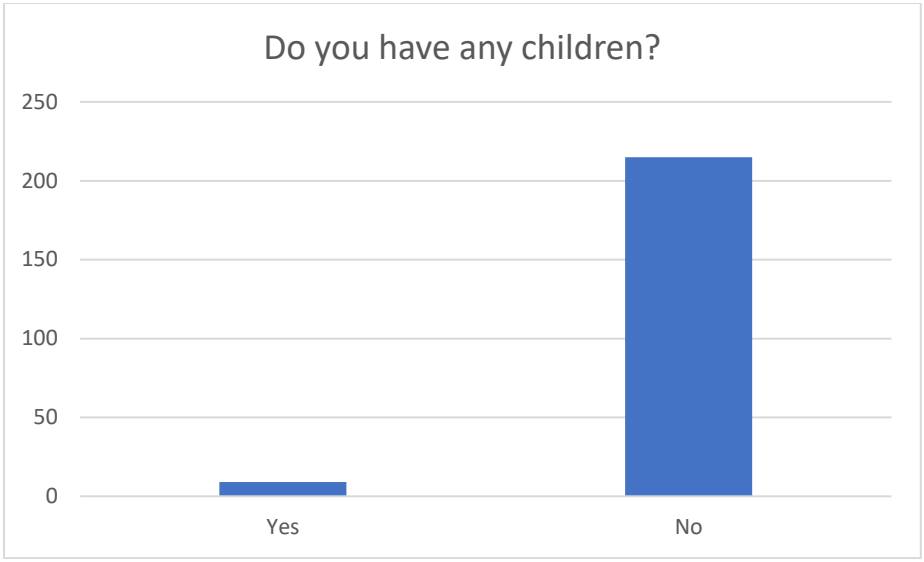

Figure 8. Number of respondents who do and do not have children. N=224.

Question 10: *Are you enrolled in a Professional Flight Degree Program?*

Out of 224 respondents 87 identified themselves as being enrolled in a professional flight program. Of these, 137 indicated they were not enrolled in a professional flight program. This means that 38.8% of respondents are collegiate aviators.

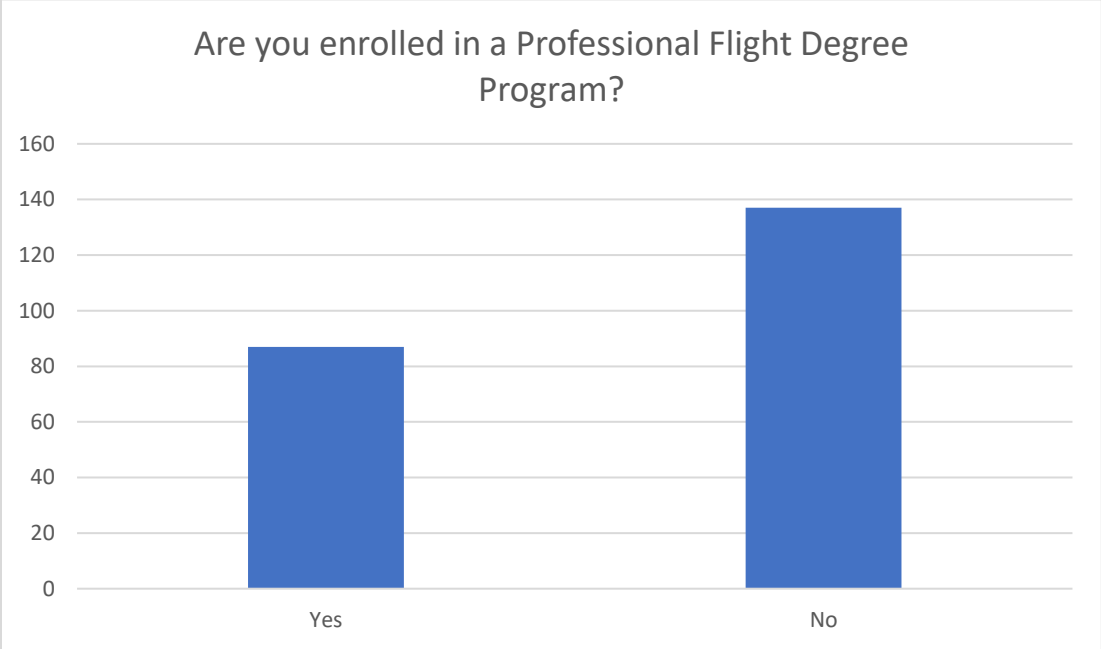

Figure 9. Number of respondents that indicated whether or not they were enrolled in a Professional Flight program.

Question 11: *How many flight hours PER WEEK do you have?*

Respondents who replied “Yes” to the previous question were asked how many flight hours they have per week. All collegiate aviators answered this question. Hours ranged from 0 to 30 hours per week, those tended to be outliers. The most common amount of flight hours were 5 to 6 hours and 8 to 9 hours per week.

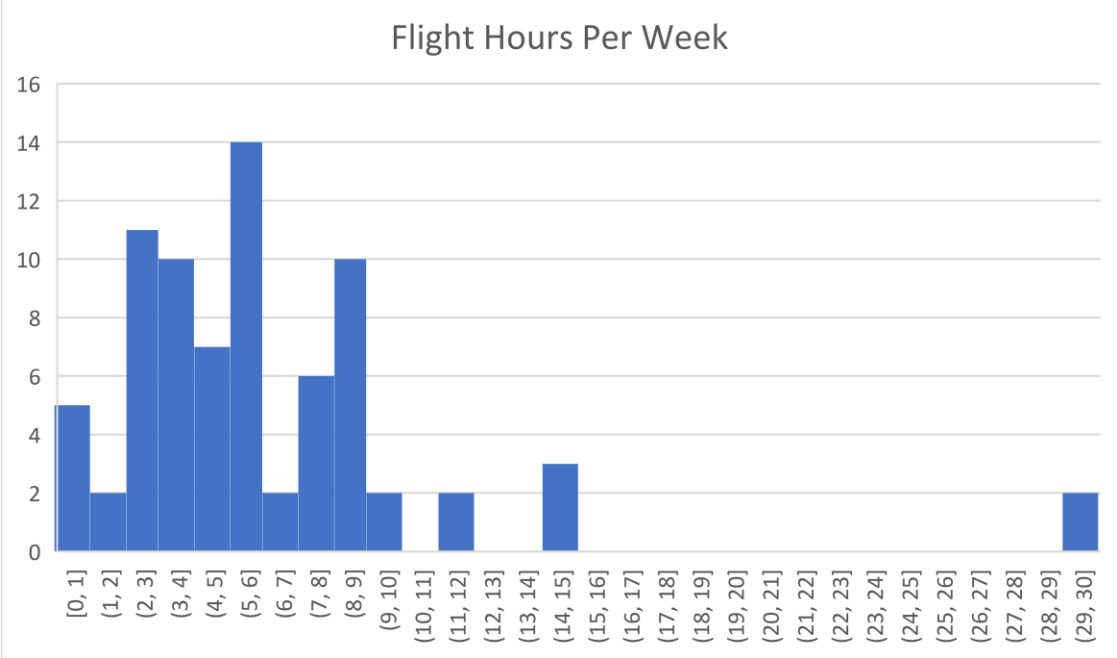

Figure 10. Number of flight hours participants who are student pilots have per week broken up into to 5-hour groups. N=87.

Question 12: *What flight certificates/ratings do you have?*

Those participants who answered "Yes" to be enrolled in a professional flight program were also asked to answer this question. Respondents were asked to select their flight ratings from a list which included: Private Pilot, Commercial, Instrument, Multi-engine, CFI, and CFI-I. Respondents had the ability to choose multiple ratings. Of the 87 professional flight participants 73 answered this question. The most common rating was a Private Pilot License at 64 respondents. Only two respondents indicated that they had CFI-I rating, 8 indicated CFI rating, 16 Multi-engine rating, 39 Instrument rating, and 22 commercial rating.

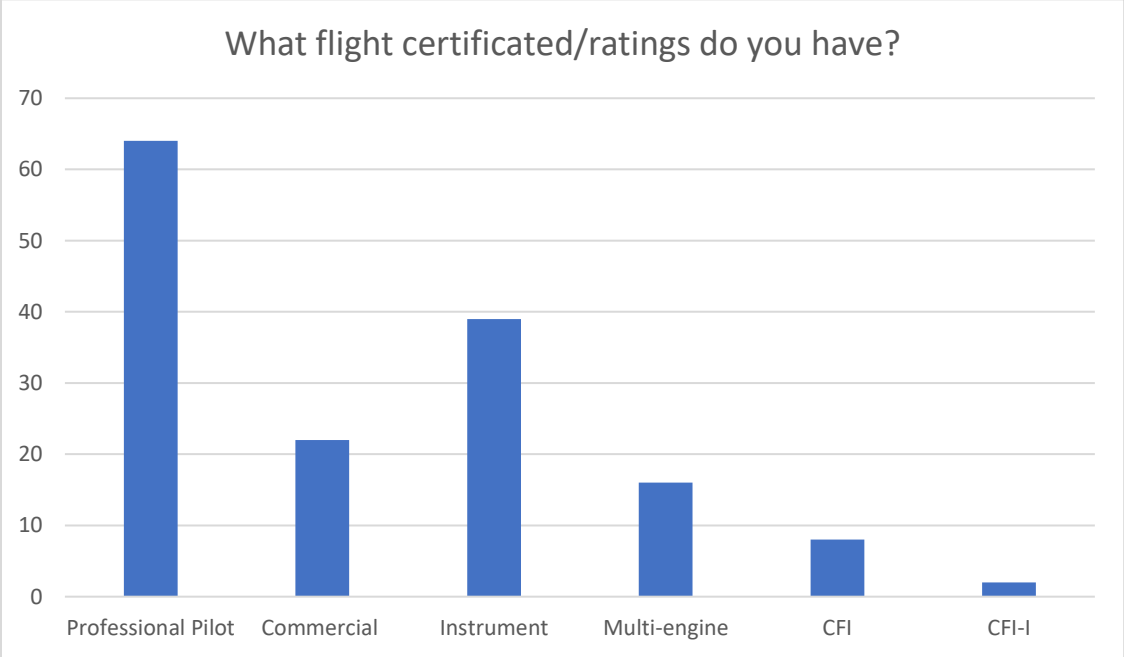

Figure 11. Amount of Professional Flight respondents and their recorded flight certifications/ratings. N=73 participants, N=151 data points.

Question 13: *How many total flight hours do you have?*

Out of 87 professional flight respondents 84 answered this question. Hours ranged from as low as 0 to 540 hours. With the average being 191.5 hours.

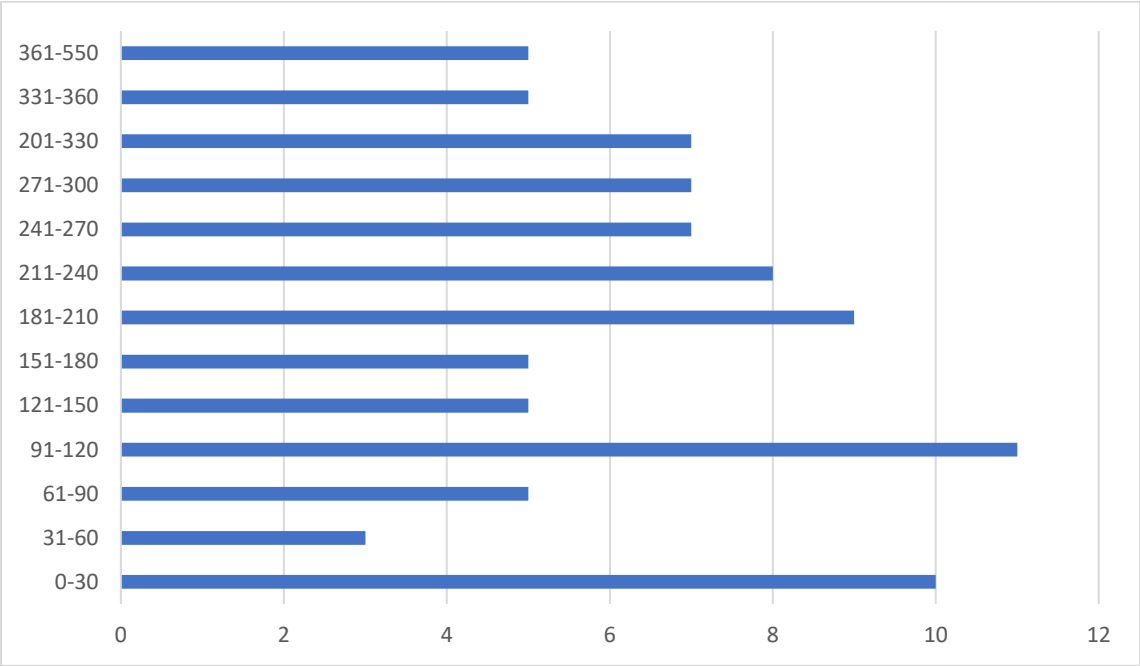

Figure 12. Number of Professional Flight respondents and their recorded flight hours in increments of 30. N=84.

Question 14: *Are you a pilot (ie. Hold any FAA airman certificate or rating)?*

Though all respondents answered this question this question was directed to those not enrolled in a professional flight program. Some students are still pilots without an enrollment into a 4-year degree program tailored to flight. Out of 224 respondents 222 recorded an answer. The majority of respondents, at 134, recorded “No”, while 88 indicated “Yes”.

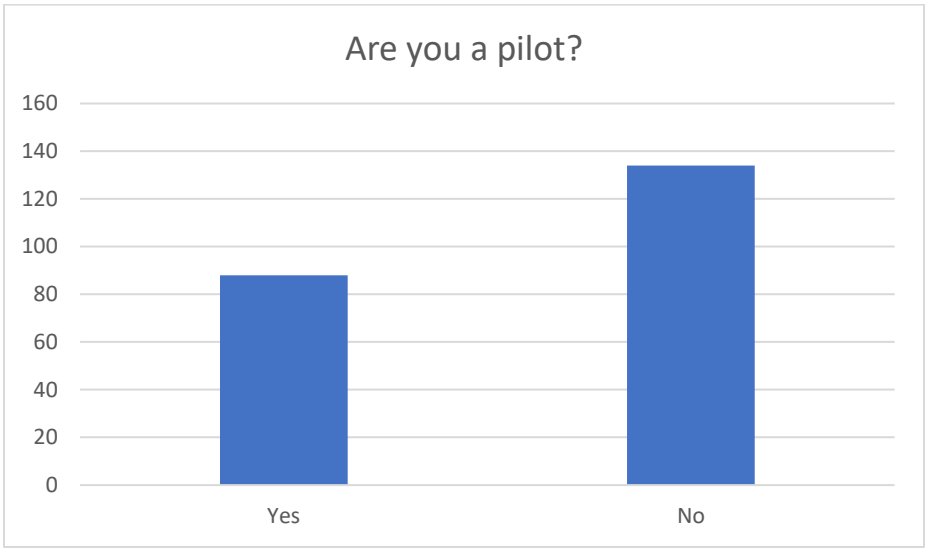

Figure 13. Number of respondents who responded whether if they are or are not a pilot. N=222.

Question 15: *If you are not enrolled in a Professional Flight major, are you currently taking flight lessons with an FBO or any other type of flight training program?*

Out of 224 participants 201 answered this question. The majority of responses, at 173, indicated “No” and 28 indicated “Yes”. Though there are 28 recorded “Yes” many of the students that are currently enrolled in a professional flight program did indicate “Yes” on this question.

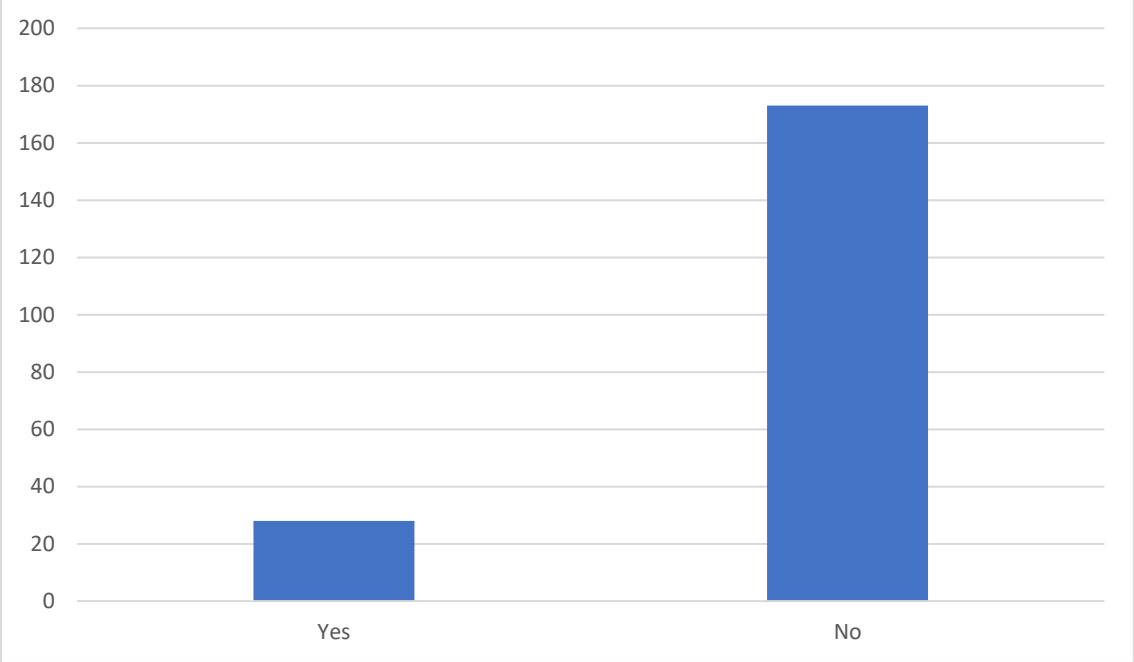

Figure 14. Number of respondents that indicated if they were pursuing flight training but not enrolled in a Professional Flight program. N= 201.

DASS-21 Results

Scores on the multi-item scale for each of the three dependent variables were computed for participants who completed responses to all seven items in the respective scale. Some respondents left some questions blank but answered other questions. This resulted in the loss of 4 participants on the depression scale, 2 subjects on the anxiety scale, and 8 subjects on the stress scale. Subsequent scores for each subtest of Depression, Anxiety, and Stress were calculated.

Summary of Demographics

There was a total number of 224 participants, ranging from ages 18 to 54 years old, with a mean age of 22.42 years and a standard deviation of 5.237. The majority of participants were under the age of 30 (93.3%). The frequency distribution for five categorical variables on which the data's demographics characteristics are presented in Table 1.

Table 1

Frequency Distributions of Demographic Characteristics of the Sample

Demographic Characteristic	Category	Frequency	Percent
Class	Freshman	23	10.3
	Sophomore	33	14.7
	Junior	93	41.5
	Senior	59	26.3
	Graduate Student	15	6.7
	Subtotal	223	99.6
	Missing	1	0.4
	Total	224	100
Under/Upper Class	Underclassman	57	25.4
	Upperclassman	167	74.6
	Total	224	100
Gender	Male	144	64.3
	Female	78	34.8
	Other	1	0.4
	Subtotal	223	99.6
	Missing	1	0.4
	Total	224	100
Military Service	Yes	16	7.1
	No	207	92.4
	Subtotal	223	99.6
	Missing	1	0.4
	Total	224	100
Professional Flight Student	Yes	87	38.8
	No	137	61.2
Marital Status	Never Married	210	93.8
	Separated	2	0.9

Demographic Characteristic	Category	Frequency	Percent
	Divorced	3	1.3
	Married	9	4
	Total	224	100

The distributions reveal that the participants mainly consisted of upperclassmen (74.6%) and males at (64.6%). The majority of respondents were non-professional flight students (61.2%). A large majority of participants were single and had never been married (93.8%) and with a similar degree (92.8%) of participants had no current or prior military service.

Psychometric Performance of Dependent Variable Scales

Though the DASS-21 is an established scale and may have exhibited adequate psychometric characteristics in development and in other research studies, its performance with new samples and data may vary quite widely. Particularly with respect to a multi-item scale's internal consistency reliability, if a scale's reliability and performance with the new sample falls below acceptable limit the confidence in the results of its use in the testing hypothesis may be lost. Thus, it is appropriate and important to address the level of internal consistency reliability that such multi-item scales in the data obtained for this particular study.

To address the internal consistency reliability Cronbach's alpha coefficient was run for each of the three scales measuring this study's dependent variables (depression, anxiety, and stress). This assessment is reported in Table 2.

Table 2

Sample-Specific Internal Consistency Reliability Coefficients for the DASS-21

Scale	Cronbach's Alpha	N of Items
Depression	.906	7
Anxiety	.820	7
Stress	.844	7

All three scales revealed alpha coefficients above .80 which was regarded as a sufficient level of internal consistency reliability for this study.

Depression, Anxiety, and Stress

Table 3 depicts descriptive statistics for the dependent variables depression, anxiety, and stress by the categories of the independent variables (upperclassmen, underclassmen).

Table 3

Descriptive Statistics for Depression, Anxiety, and Stress by Professional Flight Program and Under- vs. Upper-classman

Dependent Variable		Professional Flight Program?						Total
		Yes			No			
		Underclass	Upperclass	Total	Underclass	Upperclass	Total	
Depression	N	35	50	85	19	116	135	220
	Mean	4.78	5.48	5.18	5.05	5.58	5.51	5.38
	SD	3.83	5.12	4.61	4.94	4.95	4.93	4.80
Anxiety	N	37	49	86	19	117	136	222
	Mean	3.86	4.88	4.45	5.26	5.20	5.21	4.91
	SD	3.22	4.62	3.49	4.26	4.18	4.17	3.93
Stress	N	37	47	84	19	113	132	216
	Mean	6.43	7.58	7.09	6.57	6.72	6.71	6.85
	SD	4.11	4.62	4.42	3.83	4.15	4.09	4.22

The three hypotheses were tested using a two-way ANOVA specifying professional flight enrollment and under/upperclassman status as the factors for the three dependent variables (depression, anxiety, and stress). To test for compliance with the ANOVA assumption of normality, the residual error terms for each analysis were tested for normality using the Shapiro-Wilk test. Results of this test are shown in Table 4.

Table 4

Results of Normality Tests of the Residual Error Terms of the ANOVAs of Each Dependent Variable

	Shapiro-Wilk		
Error Term	Statistic	df	p
Residual for Depression	.892	212	<.001
Residual for Anxiety	.934	212	<.001
Residual for Stress	.970	212	<.001

The Shapiro-Wilk statistic test is very sensitive to sample size. For sample sizes over 60 it is conventional to use the value of the statistic (W) itself as the basis for judging departures from normality. The most common rule used is .90. The residuals for the dependent variables exceeded .90 substantially in two cases and were under .90 by .008 in the one case, it can be concluded that the error terms exhibited have no problematic departure from normality.

Another assumption within ANOVA is homogeneity of variance. This assumption was tested using the Levene test for all three ANOVAs. In all three cases the p-values of the Lavene test were .09 or higher, indicating that there was no violation of the homogeneity assumption. All hypotheses were tested using the results of the same three ANOVAs. The details of these tests are shown in Tables 5, 6, and 7.

Table 5

Results of ANOVA of Depression by Professional Flight Program and Under-/Upperclass Status

Source	*df*	Mean Square	*F*	*p*	Partial Eta Squared
Prof. Flight Program	1	1.967	.021	.885	.000
Under/Upper Classman	1	48.366	.515	.474	.002
Prof. Flight Program * Under/Upper Classman	1	1.118	.012	.913	.000
Error	216	93.987			

R Squared = .003 (Adjusted R Squared = -.010)

Table 6

Results of ANOVA of Anxiety by Professional Flight Program and Under-/Upperclass Status

Source	*df*	Mean Square	*F*	*p*	Partial Eta Squared
Prof. Flight Program	1	87.289	1.340	.248	.006
Under/Upper Classman	1	65.048	.998	.319	.005
Prof. Flight Program * Under/Upper Classman	1	32.628	.501	.480	.002
Error	218	65.149			

R Squared = .016 (Adjusted R Squared = .003)

Table 7

Results of ANOVA of Stress by Professional Flight Program and Under-/Upperclass Status

Source	*df*	Mean Square	*F*	*p*	Partial Eta Squared
Prof. Flight Program	1	11.030	.146	.703	.001
Under/Upper Classman	1	50.053	.663	.417	.003
Prof. Flight Program * Under/Upper Classman	1	90.966	1.204	.274	.006
Error	212	75.526			

R Squared = .012 (Adjusted R Squared = -.002)

Hypothesis 1 proposed that students enrolled in a professional flight program would have significantly higher levels of depression, anxiety, and stress than non-professional flight students. The results for the professional flight enrollment factor was not significant in the ANOVAs for all three dependent variables. Thus, it can be concluded that the null of hypothesis 1 is retained. This study provides no evidence that supports the existence of higher levels of depression, anxiety, and stress among professional flight students compared to non-professional flight students.

Hypothesis 2 proposed that upperclassmen would exhibit significantly higher levels of depression, anxiety and stress than underclassmen. The results for under/upperclassman status factor was nonsignificant in the ANOVAs for all three dependent variables. Thus, it can be concluded that the null of hypothesis 2 is retained. This study provides no evidence that supports the existence of higher levels of depression, anxiety, or stress among upperclassmen compared to underclassmen.

Hypothesis 3 proposed that there is an interaction between upper/underclassmen and the professional flight enrollment with depression, anxiety, and stress. The results for the under/upperclassmen status against professional flight enrollment interaction was nonsignificant in the ANOVAs for all three dependent variables. Thus, it is concluded that the null hypothesis for hypothesis 3 is not retained. This study provides no evidence that those upperclassmen and underclassmen enrolled in a professional flight program have any degrees of difference in depression, anxiety and stress between students enrolled in a professional flight program and those not enrolled.

Comparing the averages of the scores to the scoring rubric of the DASS-21 shows that the average of respondents had a normal to mild ranking of depression, anxiety, and stress. Table 8 shows these results. Table 9 shows the scoring rubric for the DASS-21

Table 8

Score Averages for Depression, Anxiety, and Stress by Professional Flight

Professional Flight	*Average Score*	Rank	Non-Professional Flight	*Average Score*	Rank	Total
Stress	7.09	Normal	Stress	6.71	Normal	6.85
Anxiety	4.45	Mild	Anxiety	5.21	Mild	4.91
Depression	5.18	Mild	Depression	5.51	Mild	5.38

Table 9

DASS-21 Scoring Rubric

	Depression	Anxiety	Stress
Normal	0-4	0-3	0-7
Mild	5-6	4-5	8-9
Moderate	7-10	6-7	10-12
Severe	11-13	8-9	19-16
Extremely Severe	14+	10+	17+

Overall, the average scores show that both groups, professional flight and non-professional flight are both in the mild to normal categories for depression, anxiety, and stress.

CHAPTER 5

DISCUSSION

The purpose of this research was to determine if students who are enrolled in a professional flight program are at higher risk for depression, stress, and anxiety than non-professional flight students. Additionally, to assess if there are higher depression, anxiety, and stress levels in upperclassmen (juniors and seniors) than in underclassmen (freshman and sophomore). In addition, upperclassmen and underclassmen within professional flight programs were compared. These groups were compared to each other by using a survey that measures depression, anxiety, and stress.

Significant Results

There were no significant results found in this study. Overall, it seems as if students who are enrolled in a professional flight program were just as prone to depression, anxiety, and stress as those students who are not enrolled in a professional flight program. Additionally, upperclassmen were not more prone to depression, anxiety, or stress compared to underclassmen. An identical result was found when comparing upperclassmen and lowerclassmen enrolled in a professional flight program.

A possible explanation for these results is that professional flight students are just that, students. Though they incur more academic obligations than non-professional flight students there are equal opportunities for non-professional flight students to have equal amounts of responsibilities and additional requirements.

Additionally, as addressed previously, those who are drawn to becoming pilots may have a “pilot personality”. This personality or at least some personality traits may

mean those who are attracted to becoming a pilot may be more resilient and less likely to develop depression, anxiety, or high levels of stress.

Implications

Though there were no significant differences in this study there are still some important take-aways. Based on this study, no specific group was more prone to depression, anxiety, or stress than another group. Yet, all these students still need to have access to and given education about mental health and counseling or mental health services available to them. Student mental health is still a national issue as various organizations report yearly increases in depression, anxiety, and stress in the collegiate world. These students are still in need of help and resources.

Student pilots still need to be educated about the impacts that mental health can have on them and their careers. Knowing the signs of common mental health disorders may help them in aiding themselves or others. Positive coping methods and stress relief is an important topic to cover for all students, but especially with those who are enrolled in a professional flight program as their jobs can be at risk.

Conclusion

Based on the data compiled and analyzed in this study it can be concluded that professional flight students do not exhibit higher statistical levels of depression, anxiety, and stress compared to non-professional flight students. Additionally, there was no statistical difference between upperclassmen and underclassmen in terms of depression, anxiety, and stress. Thus, neither group is inherently more stressed than the other. Finally, in the analysis of upperclassmen and underclassmen within a professional flight program produced no significant statistical results.

Overall, this study has shown that there are no specific groups within a professional flight program that are more likely to exhibit high statistical levels of depression, anxiety, or stress. This can conclude that students enrolled in a professional flight program are not more or less stressed than those not enrolled in a flight program.

Limitations, Future Studies, & Lessons Learned

This survey was disseminated through University Aviation Association email, classroom visits, and emails to students. A large number of prospective participants had access to the survey, yet this study only collected data for 3 weeks. Thus, a longer collection window could have been advantageous to collect more responses from a more diverse sample pool. If this study is repeated in the future this researcher would like to accrue a larger sample size by using two methods. First, by leaving the survey open for a longer period thus giving more opportunity for students to participate. Second, by reaching out individually to various universities that have professional flight programs. The current state of mental health in students is reported by many organizations but having a larger and more diverse professional flight sample will allow for more accurate comparison.

Additionally, this researcher would ask more clear and defined questions. For example, when students were asked “If you are not enrolled in a professional flight major, are you currently taking flight lessons with an FBO or any other type of flight training program?” This was quite confusing. It is fairly common for flight students to maintain progressing through their flight training while during pauses in the academic year like summer and winter breaks. Thus, this question may have been interpreted in a different way than originally intended, as many participants who indicated they were

enrolled in a flight program answered “Yes” to this question. This could have also been addressed by showing this question to only those participants who answered that they were not enrolled in a professional flight program.

No other assessments of mental health were used in this study. Assessment and analysis of depression and anxiety and stress was places solely on the DASS-21. Participants were also confined to the statements provided by the DASS-21. No other comment or ability to express additional feelings or opinions were provided. Participants were also trusted to accurately assess and document their present mental health condition. Future studies may find interest in repeating this study with a different instrument as different result may come of that, especially one more tailored to aviation.

This study did not attempt to diagnose depression, anxiety, or stress disorders. The study was purely investigative with no attempt to identify specific stressors for students or propose solutions for depression, anxiety, and stress for students, professional flight or non-professional flight.

Future studies may find interest in addressing the above limitations. Additionally, these studies should obtain a larger and more diverse sample size of professional flight and non-professional flight students at universities across the United States. A larger sample will be more helpful in deciphering the overall state of professional flight students and their mental health.

Other studies should also take into account other student responsibilities in and outside of the classroom for example, employment status, involvement in student organizations, class credit load, home environment, etc. Both professional flight and non-professional flight students have the equal opportunity to incur additional responsibilities

in and outside of the classroom. An analysis of pilot personality at the collegiate level may also be a point of interest to future studies. Addressing these limitations may add to a better understanding of professional flight students and what is needed to support them.

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APPENDIX A

CONSENT FORM

Ira A. Fulton Schools of Engineering
Arizona State University

I am a graduate student under the direction of Professor Mary Niemczyk and Professor Nancy Cooke in the Graduate College within Fulton Schools of Engineering at Arizona State University. I am conducting a research study to aid in determining if collegiate aviation students are more prone to stress, anxiety, or depression.

I am inviting your participation, which will involve the completion of the following survey. The survey should take around 5 to 8 minutes of your time. You have the right not to answer any question, and to stop participation at any time.

Your participation in this study is voluntary. If you choose not to participate or to withdraw from the study at any time, there will be no penalty, this survey will not impact your grade or standing at the university. You must be 18 years or older and enrolled at Arizona State University to participate in this study. There is no specific degree program necessary to participate in this study.

There are no foreseeable risks to your participation. Some minor discomfort may be experienced due to the nature of the questions, should you experience any discomfort or distress and you feel the need to talk to someone please contact ASU Counseling Services in Academic Building Suite 92 on the Polytechnic Campus. They can be contacted at 480-727-1255. Additional Counseling Services are available at all ASU Campuses.

Your responses will be anonymous. The results of this study will be used in a report, presentation, and publication but your name or any identifying demographics will not be used. Information will only be used for research purposes and will only be shared in the aggregate form.

If you have any questions concerning the research study, please contact the research team member Destry Jacobs at dsjacobs@asu.edu or the professor overseeing the study, Mary Niemczyk at Mary.Niemczyk@asu.edu

If you have any questions about your rights as a subject/participant in this research, or if you feel you have been placed at risk, you can contact the Chair of the Human Subjects Institutional Review Board, through the ASU Office of Research Integrity and Assurance, at (480) 965-6788. If you select "Yes, I do consent" you are consenting to have your anonymous response used in this survey. Please indicate below if you wish to be part of the study.

_____ Yes, I do Consent

APPENDIX B

COMPLETE SURVEY

Q2 **Please be advised:** All responses to this survey are ANONYMOUS. There will be no way to identify you. These results will be used strictly for research purposes.Please fill out the questions below to the best of your ability. If at any time you do not wish to answer a question or wish to discontinue taking the survey you have the right to do so. Thank you for your time.

Q3 Degree Program

_____

Q4 Estimated date of graduation (Semester, Year):

_____

Q5 Class Standing

- ○ Freshman (1)
- ○ Sophomore (2)
- ○ Junior (3)
- ○ Senior (4)
- ○ Graduate Student (5)

Q6 Are you a transfer student?

- ○ Yes (1)
- ○ No (2)

Q7 Gender

- ○ Male (1)
- ○ Female (2)
- ○ Other (3)

Q8 Age

_____

Q9 Have you or are you currently serving in the US Armed Forces?

- ○ Yes (1)
- ○ No (2)

Q10 Relationship Status

- ○ Never Married (1)
- ○ Separated (2)
- ○ Divorced (3)
- ○ Widowed (4)
- ○ Married (5)

Q11 Do you have any children?

- ○ Yes (1)
- ○ No (2)

Q12 Are you enrolled in a Professional Flight degree program?

- ○ Yes (1)
- ○ No (2)

Skip To: Q13 If Are you enrolled in a Professional Flight degree program? = Yes

Skip To: Q16 If Are you enrolled in a Professional Flight degree program? = No

Q13 How many flight hours PER WEEK do you have?

_____

Q14 What flight certificates/ratings do you have?

- ☐ Private Pilot (27)
- ☐ Commercial (28)
- ☐ Instrument (29)
- ☐ Multi-engine (30)
- ☐ CFI (31)
- ☐ CFI-I (32)

Q15 How many total flight hours do you have?

_____

Q16 Are you a pilot (ie: hold any FAA airman certificate or rating)?

- Yes (1)
- No (2)

Q17 If you are not enrolled in a Professional Flight major, are you currently taking flight lessons with an FBO or any other type of flight training program?

- Yes (1)
- No (2)

68 Please read each statement and circle a number 0, 1, 2 or 3 which indicates how much the statement applied to you over the past week. There are no right or wrong answers. Do not spend too much time on any statement.

The rating scale is as follows:
0 Did not apply to me at all
1 Applied to me to some degree, or some of the time
2 Applied to me to a considerable degree or a good part of the time
3 Applied to me very much or most of the time

	Never	Sometimes	Often	Almost Always
1. I found it hard to wind down	0	1	2	3
2. I was aware of dryness of my mouth	0	1	2	3
3. I couldn't seem to experience any positive feeling at all	0	1	2	3
4. I experienced breathing difficulty (e.g. excessively rapid breathing, breathlessness in the absence of physical exertion)	0	1	2	3
5. I found it difficult to work up the initiative to do things	0	1	2	3
6. I tended to over-react to situations	0	1	2	3
7. I experienced trembling (e.g. in the hands)	0	1	2	3
8. I felt that I was using a lot of nervous energy	0	1	2	3
9. I was worried about situations in which I might panic and make a fool of myself	0	1	2	3
10. I felt that I had nothing to look forward to	0	1	2	3
11. I found myself getting agitated	0	1	2	3
12. I found it difficult to relax	0	1	2	3
13. I felt down-hearted and blue	0	1	2	3
14. I was intolerant of anything that kept me from getting on with what I was doing	0	1	2	3
15. I felt I was close to panic	0	1	2	3
16. I was unable to become enthusiastic about anything	0	1	2	3
17. I felt I wasn't worth much as a person	0	1	2	3
18. I felt that I was rather touchy	0	1	2	3

19. I was aware of the action of my heart in the absence of physical exertion (e.g. sense of heart rate increase, heart missing a beat)	0	1	2	3
20. I felt scared without any good reason	0	1	2	3
21. I felt that life was meaningless	0	1	2	3