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An Analysis of Telework Performance During the COVID-19 Pandemic

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THESIS

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Abstract

The COVID-19 pandemic forced many individuals to shift from an atmosphere of face-to-face work to the digital work environment known as telework. Telework is an effective mitigation tool that ensures the continuity of operations. However, maximized telework may not be effective for all individuals. Many individual, organizational, and group-level factors influence one's telework performance and this study examines four of the most influential antecedents. Using linear regression analysis, conscientiousness, overload, communication, and non-distractibility were found to be significant predictors that account for over half the variance explained in telework performance. Supported by self-regulation theories, both conscientiousness and non-distractibility contained the strongest beta coefficients, signifying the greatest impact on telework performance. These findings contribute to the telework body of literature by focusing on personal aspects that contribute to telework performance. Leaders and supervisors can use this research to revise telework policies and to train, educate, and develop their subordinates on aspects of effective self-regulation. In cases of degraded performance, employers are encouraged to counsel and withhold the option to telework from those with self-regulation issues.

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AN ANALYSIS OF TELEWORKING JOB PERFORMANCE DURING THE COVID-19 PANDEMIC

I. Introduction

General Issue

As of August 25, 2021, there have been 4.4 million deaths worldwide as a result of the COVID-19 virus with 631,906 deaths recorded in the United States (John Hopkins University and Medicine 2021). To slow the spread of the virus, mitigation measures recommended by the Centers of Disease Control and Prevention (CDC) include receiving the Food and Drug Administration (FDA) fully-approved Pfizer vaccine, 6-foot physical separation between people, the use of masks, frequent handwashing, and quarantining when any COVID-like symptoms arise (National Center for Immunization and Respiratory Diseases (NCIRD), Division of Viral Diseases 2021).

While the virus has proven to be the primary threat to public health, some secondary and tertiary effects of government lockdowns include threats to the mental health of people, the degraded economic health of nations, and a shift in business practices to adapt to a new working environment, telework.

Problem Statement

Teleworking was well established before the pandemic and the implementation of maximized and mandated telework might have changed people's opinions and behaviors associated with it. Questions arise about whether or not teleworking is effective for all individuals and whether the freedom granted from an autonomous opportunity is being abused or used productively to meet an organization's needs. Leadership is consistently faced with new challenges and maximized telework is another focus area on the forefront. Is maximized telework truly effective for all individuals?

Research Objectives

Teleworking has both advantages and disadvantages, and this thesis examines both the benefits and the risks of telework. The purpose of this thesis is to investigate telework-related constructs and the relationships between key variables. This research will help inform leadership and aid in making appropriate decisions related to telework policy. This thesis will also investigate the effect that personality has on teleworking job performance. Finally, a comparison of personalities may help to identify which jobs and types of people are most likely to succeed in a remote environment and which activities may not be suitable for remote accomplishment. Based upon the results of this study, leadership in the Garrison will be provided with key information on

characteristics of effective teleworkers, and a recommendation for future telework policy in the Garrison.

Investigative Questions

- How should telework performance be measured and assessed?
- How is an individual's telework performance related to other variables such as personality and attitude?
- Which variables are the strongest and most reliable predictors of telework performance?

Thesis Organization

The remaining chapters are organized as follows:

Chapter II provides a literature review of variables affecting job performance that attempt to answer the research questions and support the hypotheses at the end of the chapter. Definitions of the variables as well as how they relate to performance are discussed. Finally, our list of hypotheses is generated and a model of telework performance is established.

Chapter III explains the methodology of the data collection, description of the sample and population, how reliability and validity were determined for each measure, and how the variables were included or excluded in the final linear regression model.

Chapter IV presents the results of the analysis with discussions and implications associated with each outcome. A review of the hypotheses in Chapter II is compared against the results to determine which hypotheses are supported.

Chapter V concludes this thesis with a discussion of the significance of the results, recommended actions for the Peterson-Schriever Garrison leadership, and recommendations for future research.

II. Literature Review

Overview

Much research has already been done in the realm of telework. This chapter will cover the advantages and disadvantages of telework and how they relate to business continuity and the continuity of operations during a pandemic. The objective of telework as a social distancing tool during a pandemic is to mitigate mass infections and ensure public safety. The 2010 Telework Enhancement Act of 2010 set the stage for how the Federal Government's teleworking policies were established and adopted. Under the Public Law, the Office of Personnel Management (OPM) is required to submit a report to Congress annually on various aspects of the program's health. Some key areas of interest included in the report are the impact of telework on emergency readiness, energy use, recruitment and retention, performance, productivity, employee attitudes and opinions regarding telework, and the best practices in agency telework programs (111th U.S. Congress 2010).

Relevant Research

2.1 Benefits of Telework

2.1.1 Continuity of Operations

In March 2020, many states, countries, and global nations in response to the Public Health Emergency (PHE) declarations began to implement "Stay-At-Home" orders to slow the spread of COVID-19. Some businesses through their Continuity of Operations Plans (COOP) were able to resume their operations while at a physically reduced capacity, while others were forced to lay off personnel and ultimately shut down their businesses due to cascading revenue losses (Bauer et al. 2020). The ability to continue work during severe weather events, biological outbreaks, attacks, or public health emergencies is supported greatly by the advancements in technology over the past century. With the development of the internet, communication to and from different locations around the globe has made teleworking increasingly more common. The supply of information readily accessible via the internet, email, and cell phones lays the groundwork for many career fields to work from home. Successful organizations determine within their continuity plan various methods (i.e. telework) to perform the

duties and responsibilities necessary for the essential functions to operate while under a state of emergency (111th U.S. Congress 2010).

Business continuity is crucial for companies to ensure the safety of their employees, while also remaining economically competitive with zero downtime during a pandemic (Belzunegui-Eraso and Erro-Garcés 2020). While many companies might have had a continuity plan in place before the pandemic, experience with implementing full-time telework would ultimately drive the smoothness in transition during the March 2020 government-mandated lockdowns (Abulibdeh 2020). Factors such as the organizational characteristics and culture, availability of Informational Technology (IT) systems or devices, skills and training of personnel, and informational security concerns all contribute to the effectiveness of the COOP with regards to telework (Abulibdeh 2020). As a social distancing tool, successful telework implementation into a COOP will depend upon the characteristics of the work itself and the informational security of the work.

2.1.2 Reduction in Costs

Resources are limited, with funding being one of the scarcest resources. The U.S. Federal Government through its National Strategy for Real Property and Reduce the Footprint policy issued on March 25, 2015, requires branch departments and agencies to work diligently to dispose of excess real property held by the Federal Government (U.S.

Office of Management and Budget 2015). This will consolidate and make more efficient use of the Government's real property assets and reduce the total square footage of office space and warehouse inventory. Teleworking reduces the physical presence of workers in an office space, which is a first step toward accomplishing the Federal Government's initiative. Outside of the federal government, private businesses also capitalize on reducing leased office space by allowing the use of telework.

Naturally, teleworkers commute less. By working from home, they eliminate the commute to and from their workplace, reducing wear and tear on roadways, reducing traffic, and emitting fewer carbon emissions (Giovanis 2017). Although personal residential utility usage might increase due to a greater presence at home, the cumulative effects from less office usage, energy usage in the office, roadway wear and tear, vehicle wear and tear, and emissions outweigh the negative effect of increased residential energy use.

2.1.3 Telework Performance

Telework performance is a term that is not yet frequently seen in literature. A more common term is job performance. Job performance can be defined as the quality of an individual's work output in meeting an organization's objective. We adopt this definition and define telework performance as the quality of an individual's work output

in meeting an organization's objective from a virtual remote environment, typically one's place of living. Constructs of job performance vary author to author and are complex, with various constructs that use attitudes, behaviors, work habits, knowledge, skills, and traits in the development of measures (Carlos and Rodrigues 2016). Productivity and performance are closely related terms. According to a survey conducted by the Inspector General (IG) of the U.S. Department of Defense (DoD), 88.1% of DoD employees reported their productivity level remained the same or increased during the surge of maximized telework in March and April 2020 (Inspector General, U.S. DoD 2021). Telework has the potential to remove distractions and interruptions that might have been present in an office setting and has the potential to improve work-life balance by giving more time back to the worker (OECD 2020). Since performance may not be tracked by the amount of time of a teleworker's output but by the quality of the output, supervisors are likely to need to evaluate the end products of teleworkers more closely. Studies show overall job satisfaction and organizational commitment are outcomes associated with changes in performance (Allen et al. 2015). While simultaneously saving time and mental energy from a commute, reclaimed energy can be then be used to focus on telework (Inspector General, U.S. DoD 2021). Reviewing the literature on job performance there are many pre-existing constructs available to use, however gaps in the

literature revealed that there a not yet consistent and reliable measures specifically for a telework environment. In Chapter III, we aim to establish a new measure called telework performance using employee attitudes, behaviors, and personality traits specifically in the telework environment.

2.1.4 Autonomy

Job autonomy is defined as the extent to which an individual can determine their own pace, sequence, and methods to accomplish work tasks (Volmer et al. 2012). Autonomy has been classified as one of many job characteristics positively related to internal motivation and job satisfaction (Brief and Aldag 1975). Autonomy may increase motivation because a high level of autonomy reduces the mental strain of an employee (Muecke and Iseke 2019). "Mental strain implies a depletion of cognitive and emotional resources, which in turn reduces employees' ability to effectively perform their jobs" (Muecke and Iseke 2019). By having a more autonomous job, employees can plan and allocate their time at home more effectively to coincide with their work-life balance (Nemțeanu et al. 2021).

While not all jobs are compatible with telework, those jobs that do have a high level of autonomy and self-regulation may be the most ideal for teleworking. The more autonomous and flexible for a worker to be creative, independent, and in control of their

work allows for optimal outcomes while teleworking (Allen et al. 2015). For example, academic research allows for autonomy and flexibility of the researcher to guide their research and make choices regarding how and what they study. A study found that autonomy moderates the relationship between three dimensions of the Big Five personality traits (conscientiousness, agreeableness, and extraversion) and job performance (Barrick and Mount 1993). This suggests that personality traits influence to some degree the relationship between autonomy and job performance.

2.1.5 Job Satisfaction

One definition of job satisfaction is "…any combination of psychological, physiological and environmental circumstances that cause a person truthfully to say I am satisfied with my job" (Hoppock 1935). Telework has been shown in research to be positively correlated with job satisfaction, raising work efficiency through better work-life balance and less absenteeism (OECD 2020). Satisfied employees have positive opinions toward their work, removing the chances of withdrawal behaviors (Pushpakumari 2008).

There have been multiple surveys and studies on telework with regards to employee satisfaction. Overall, most literature finds higher overall satisfaction with teleworking. A Federal Work-Life survey in 2017 revealed that 79% of participants were

satisfied with their teleworking jobs and 68% reported their intent to stay (U.S. Office of Personnel Management 2017). "Minimizing distractions" and "maximizing productivity" were common reasons why they chose to telework (U.S. Office of Personnel Management 2017).

Prior to the pandemic, businesses would use teleworking and flexible work arrangements as a recruitment tool to attract new talent. Reasons for seeking a teleworking arrangement were: having more time for family, reduced travel and commuting time, and having more flexibility with work (Allen et al. 2015). An effect of working from home is reduced office politics and more concentration on work tasks.

2.2 Disadvantages of Telework

2.2.1 Telework Eligibility

Not all jobs are compatible with telework. Work centers such as maintenance, operations, emergency services, medical providers, food services, public works, and work with sensitive materials all require a worker to be physically present at the worksite (Inspector General, U.S. DoD 2021). As most of these career fields' work is done in person, there still exist additional duty-type tasks that could be performed from home. Administrative-type tasks such as online-based training, writing performance reports, or

other computer-based work could be done anyway where computer and internet access is available.

Information and cyber security are limiting factors to the type of work that can be performed remotely. In the DoD, only unclassified work can be performed while teleworking (Inspector General, U.S. DoD 2021). Work dealing with classified and secret materials must be performed within a sensitive compartmented information facility (SCIF) requiring personnel to physically be present and obtain the appropriate security clearance (Office of the Under Secretary of Defense for Intelligence and Security 2020). Advancements in technology and strengthening of cyber security might one day change this; however, it will be the determination of the DoD if the risk of information leakage is worth the risk of teleworking with classified materials.

2.2.2 Non-Distractibility

In this thesis, we define non-distractibility as the ability of an individual to ignore or mitigate distractions and interruptions while teleworking. Inattention, interruptions, and distractions have similar but slightly different meanings. "Interruptions are defined as interfering stimuli that require attention, such as a secondary task (e.g., phone calls), whereas distractions describe interfering irrelevant stimuli that capture attention but have to be ignored (e.g., background noise)" (Zickerick et al. 2020). Inattention can be

defined as the lack of attention. It is a precursor to disorders such as attention deficit hyperactivity disorder (ADHD) and is found to be related to limitations in working memory (Arabacı and Parris 2020). Studies of attention suggest having a limited pool of mental capacity and mental resources available at one time (Baumeister and Vohs 2004).

Distractions and interruptions at home or in the office environment have the potential to impact performance. Parents have been noted in the literature to be the most distracted while teleworking (Zhang et al. 2020). While juggling both work roles with parent roles, providing childcare as a part of a telework agreement is typically discouraged in most instances due to the nature of taking away attention from telework. However, when schools involuntarily closed in March 2020 along with childcare centers, parents were forced to adapt to their student learners working from home. Parents were faced with assisting and aiding their children with their work and well-being, ultimately taking on a teaching and caregiving role while simultaneously performing their teleworking job duties.

Aside from children, there are numerous other ways to become distracted or interrupted while teleworking. Phone notifications, a micromanaging supervisor, household chores, household hobbies, use of the internet/social media, outside noise or

solicitors, and people who live in the same household (spouse, family, roommates) all have the potential to distract a teleworker.

Self-discipline and internal motivation to stay focused are key attributes in the most successful teleworkers (Allen et al. 2015). Training in such areas as goal setting, schedule planning, and self-discipline will be discussed as opportunities for reducing distractions and improving teleworking job performance. Studies on attention have shown that distractions have a negative relationship with task performance (Sanders and Baron 1975).

2.2.3 Degraded Communication

Communication is the process of how people create meaning of the world psychologically, socially, and culturally (Betteke van Ruler 2018). There are many modes of communication such as written, verbal, non-verbal, and visual. While physically separated from coworkers and supervisors, a threat to teleworkers is ineffective communication with others. When face-to-face meetings are replaced with email or virtual meetings, social cues, body language, and other non-verbal forms of communication are degraded. In emails, the tone of a message cannot be directly understood and often can be misinterpreted. While teleworking, instantaneous feedback may not available. The knowledge transfer of workers with each other has the potential

to be degraded as well, as office and sidebar conversations no longer exist, leading to less knowledge and experience shared with individuals (Colquitt et al. 2019). Many studies have shown a strong positive relationship that good communication has on performance (Arling 2004) and vice versa (Betteke van Ruler 2018).

2.2.4 Social Isolation and Stress

There are many psychological threats to teleworkers, especially those with little or no experience with teleworking. Depending on one's personality type, telework itself might not be suitable for all people (Golden et al. 2008). The social isolation and lack of social connectedness that comes with teleworking is a threat that could influence feelings of loneliness and being disconnected from others (Bentley et al. 2016). Humans are social creatures and the increased time working alone could trigger a feeling of lost connectedness with others. Between extroverted and introverted personalities, extroverts exhibit the more socially active traits and may find the lack of social connection while teleworking unbearable. To relieve the feeling of social isolation, it is important for all teleworkers, coworkers, and supervisors to make an effort to consistently reach out and communicate with one another while teleworking to reduce or eliminate the sense of disconnectedness (Bentley et al. 2016). While there is a coming-together effect with social connectedness after major catastrophes (September 2011 terrorist attacks,

Hurricane Katrina), the COVID-19 pandemic was at a disadvantage due to social isolation and social distancing enforced by many governments (Reger et al. 2020).

Even in an office setting, workplace stress is a frequent threat to the mental health of workers (Fink 2016). As such, stress is a widely researched subject in literature. Severe impacts of overstressed and overburdened individuals are precursors to mental health disorders with consequences of mental health breakdowns and suicidal ideations (Crasta et al. 2020). At any point in time, there could be a wide range of triggers, internal or external, that can affect one's perceived stress level. It is highly personalized and the severity of the stress is determined by the individual's personality traits (Colquitt et al. 2019). There is not a fit-all formula or model that could be applied to a single individual's life which makes research in stress very complex and highly variable.

Acute Stress is of limited duration, such as giving a public speech or taking a timed exam (Calvo and Gutiérrez-García 2016). While short bouts of acute stress may be beneficial to increase productivity, prolonged stress (chronic stress), can have detrimental effects on health (Kop and Kupper 2016). Chronic fatigue and burnout can occur if stress is allowed to accumulate. At this point, much research has been done into the cognitive deterioration of the brain while subject to both acute and chronic stress. Some implications included depression, obesity, bulimia, addiction, and motivational

dysfunction (Carroll et al. 2016). Psychological disorders like Post Traumatic Stress Syndrome (PTSD) are developed following a traumatic stressor such as rape, motor vehicle accident, war, abuse, or domestic violence (Nursey and Phelps 2016). Other effects from stress include anxiety, fear, and depression which have links to more severe mental health diseases such as Schizophrenia (Fink 2016).

Every year the American Psychological Association publishes an annual report on what is stressing Americans. In 2020, 3,409 adults residing in the U.S. aged 18 and older were surveyed online about stressors they have faced during the pandemic. Parents on average reported more stress than non-parents, with 70% saying that family responsibilities are were a significant source of stress (American Psychological Association (2020). Parents reported having more stress than non-parents with 63% of parents saying the coronavirus pandemic made the 2019-2020 school year extremely stressful (American Psychological Association 2020). According to a statement by the United States Air Force Chief of Staff, General Charles Brown with regards to parents teleworking, "You're trying to telework, you have school-aged kids, and now you're also a homeschool teacher. To me, that is a stressor. That's a challenge Airman are dealing with and we've got to be sensitive to that as senior leadership level, as do all levels of our leadership. You have certain humans that are trying to balance their family as well as

they're getting their education for their children. At the same time, they're trying to support getting the mission done" (Maucione 2021).

When schools closed in March 2020, parents were tasked with the additional role of ensuring their child's education remained uninterrupted. What this meant was increased attention and presence at home towards their child's learning. At the same time, parents may or may not have had the duel-hatted responsibility of also teleworking in their primary occupational field.

Another source of stress in the 2020 Stress in America report was that of the 2020 Election. Nearly 68% of adults reported increased stress due to the then-upcoming elections (American Psychological Association 2020). Political campaigns, advertisements, and political attacks against the other side add fuel for debates and arguments. On January 6, 2021, the nation watched in awe as an insurrection and surge of the U.S. Capitol occurred. Nearly 65% of adults said that the current amount of uncertainty in the nation caused them significant stress (American Psychological Association 2020). Restrictions like social distancing, quarantine, mask-wearing, and mandated teleworking were uncontrollable by the individual in the reported stressors.

One final influence that has caused many people to stress is the COVID-19 death count (American Psychological Association 2020). The devastating loss of life has given

immense stress, trauma, depression, and sadness to the victims of family and friends left behind. Those left behind have to cope with the loss and grieve, while simultaneously combating other ongoing stressors of the pandemic. A study in Japan shows that suicide rates in October 2020 increased for men and increased in November 2020 for women compared to previous year rates (Sakamoto et al. 2021).

In concluding the review of stress, we define telework stress as any stressor reported while teleworking. Each individual perceives stress uniquely, and many studies have shown that stress is negatively related to many outcomes, including job performance (Hassanzadeh et al. 2017; Hourani et al. 2006; Pflanz and Ogle 2006).

2.2.5 Overload

There are various definitions of overload that vary depending on the type of overload, including role overload, cognitive overload, information overload, social overload, and work overload (Schmitt et al. 2021). For this thesis we say that overload refers to one's workload, however, we will continue to use the term "overload" for the remainder of the paper. Overload can be defined as a high amount of work demands that exceed an individual's ability, time, and resources to deal with them all. Workload can be an extremely subjective measure that varies across individual perceptions. "As the cognitive capacities and skills of individuals vary, the workload demands imposed by a given task

may be excessive for some people but not for others" (Proctor and Van Zandt 2018). As each individual has a unique set of skills and experiences, perceived stress and workload fluctuate from person to person. Regardless of individuality, overload, burnout, and stress have shown negative correlations with performance and have been studied extensively in the literature (Maslach and Leiter 2016). Individual personality differences have also been studied that link overload, engagement, and personality. In one study, the individual difference in a person's engagement reflected "…multiple aspects of the operator's cognition of the task, including challenge appraisal and choosing to employ task-focused coping rather than avoidance" (Matthews and Campbell 2009). What this means is that personality factors may also play a role in the transactional process of perceiving effort and overload.

2.3. Personality: Big 5

Research into personality plays an important role in understanding how an individual will think, behave, and respond to emotions, as well as which types of personalities perform well in a telework environment. The difference between personality and ability is that personality defines what people are like vs ability defines what people can do (Colquitt et al. 2019). There are many personality measures, tests, and profiles in the research literature; however, this thesis focuses on the Big 5. The Big 5 personality traits that make up an individual's personality profile are Agreeableness, Conscientiousness, Extraversion, Neuroticism, and Openness to Experience (Goldberg 1992). An individual may have any combination of these traits; however, an individual will always have a score for each. The five traits are discussed in further detail in the coming paragraphs.

2.3.1 Agreeableness

Agreeableness can be defined as the extent to which individuals value cooperation, social harmony, honesty, decency, and trustworthiness (Ali 2019). Adjectives such as warm, kind, cooperative, sympathetic, helpful are typically used to describe someone agreeable (Goldberg 1992).

One study found a strong relationship between agreeableness and favorable attitudes toward telework (Clark et al. 2012). This suggests that individuals may be more agreeable to telecommuting and might find it to offer greater flexibility. Agreeable individuals have qualities that can be adapted toward telework, including being helpful, cooperative, and less competitive (Clark et al. 2012) and also have the foundations of being able to trust others, an important characteristic for virtual work (Elshaw 2010).

A separate, longitudinal study found that as people age, they tend to become more agreeable over time (Roberts et al. 2006). This may suggest that the more experienced people become with personal relationships the higher their agreeableness score becomes.

Another study found that when combined with high conscientiousness, high agreeableness correlated to higher job performance (Witt et al. 2002). These studies suggest that situation-specific, combining personality traits might better predict job performance vs using a single trait to predict performance.

2.3.2 Conscientiousness

Conscientiousness can be defined as the extent to which individuals plan, possess the quality of persistence, and are achievement-oriented (Ali 2019). Over time, a longitudinal study found people increase their level of conscientiousness as they age

(Roberts et al. 2006). Several studies have labeled conscientiousness as the most important of the Big 5 traits with regards to job performance (Barrick and Mount 1991; Witt 2002; Witt et al. 2002). Adjectives like dependable, organized, reliable, ambitious, hardworking, and persevering describe the conscientiousness trait and also closely with an individual who self-regulates effectively (Clark et al. 2012). Conscientious employees have been found to prioritize accomplishment striving, which "reflects an individual's intention to accomplish tasks and is characterized by a high task orientation" (Barrick et al. 2003). The connection between self-regulation theory, conscientiousness, and telework will be discussed in an upcoming paragraph.

Conscientiousness has also been shown to be correlated with job satisfaction (Smith et al. 2018) and positive attitudes toward telework (Clark et al. 2012) As seen previously, job satisfaction has a positive relationship with job performance (OECD 2020), possibly showing a mediation role between conscientiousness and job performance.

2.3.3 Extraversion

Extraversion can be defined as "the extent to which individuals engage with the external world and experience enthusiasm and other positive emotions" (Ali 2019). Extraverted personalities are energetic, talkative, bold, active, assertive, and adventurous

(Goldberg 1992). As the telework environment is socially distant from others, extroverts might suffer more than introverts due to social isolation and feelings of loneliness. Unlike agreeableness and conscientiousness, the previous longitudinal study found that extraversion stays relatively the same throughout a person's lifetime (Roberts et al. 2006).

Another study found a relationship between extraversion and burnout in a telework environment whereas no relationship was found with introversion and burnout (Meymandpour and Bagheri 2017). In yet another study of salesmen, extraversion was found to be positively correlated with job performance (Barrick et al. 2003). As telework requires less face-to-face interaction, extraversion may not play as vital a role in performance as with sales. A final study in the literature found that extroversion did not have positive or negative effects on attitudes toward telework (Clark et al. 2012). Situation dependent, we can see that the literature has conflicting outcomes when extraversion is used as a predictor.

2.3.4 Neuroticism

Neuroticism can be defined as "the extent to which individuals experience negative feelings and their tendency to emotionally overreact" (Ali 2019). Neuroticism is closely associated with adjectives such as nervous, moody, emotional, insecure, jealous,

and unstable (Goldberg 1992). As such, employers typically want to see an individual with a low neuroticism score. A reverse-coded, low neuroticism score will display traits such as calm, steady, and emotionally secure, and is commonly labeled in literature as emotional stability.

As people age, a study found they tend to become less-neurotic over time (Roberts et al. 2006). As less-neuroticism is associated with emotional stability, this suggests that experience and time may play a role in learning how to handle and cope with one's emotions. Contrary to their prediction, the authors of a separate study found that neuroticism was positively related to attitudes toward telework (Clark et al. 2012). The result of this study indicates that more neurotic individuals had more positive attitudes toward telework than emotionally stable individuals.

2.3.5 Openness to Experience

Openness to Experience can be defined as the "extent to which individuals exhibit intellectual curiosity, self-awareness, and individualism/non-conformance" (Ali 2019) Adjectives that describe openness to experience include: curious, imaginative, creative, complex, refined, and sophisticated (Goldberg 1992). A study found openness to experience had the strongest relationship with innovativeness compared to the other Big Five traits (Ali 2019). Innovative jobs that require brainstorming and independent or

group thinking have close ties to openness. Another study found that openness to experience was positively correlated with job satisfaction (Smith et al. 2018). As we have seen in previous sections, job satisfaction has also been shown in studies to be positively related to job performance, thereby suggesting that openness to experience might mediate the relationship between job satisfaction and job performance.

2.4 Work-Life Balance and Work-Family Border Theory

Work-life balance can be defined as the ability to accomplish goals set in both work and personal life and to achieve satisfaction in all life domains (Bulger 2014). Studies have shown positive correlations between work-life balance and telework performance (Campo et al. 2021; OECD 2020). Telework has the potential for a teleworker to improve their work-life balance by spending more time at home, as both domains are collocated in the same environment. However, an imbalance could occur if the individual allows family and life-oriented tasks to interfere with their work at home. Work-to-family conflict can lead to negative work performance due to the time, energy, and behaviors invested in completing work responsibilities often competing with family responsibilities (Chandler 2021). The Work-Family Border theory explains why conflict exists between the two domains and provides a framework to encourage a better balance between work and family life (Clark 2000). The theory suggests that organizations can

alter domains and borders to increase work-life balance (Clark 2000)**.** The theory also emphasizes the need to create clear borders or boundaries between the worker and their cohabitants. In the previous example of providing childcare while teleworking, the teleworker crosses the work-family border causes an imbalance or a work-family conflict.

2.5 Self-Regulation Theory

Self-regulation is defined as "the ability to change oneself and exert control over one's inner processes (Baumeister and Vohs 2004). Self-regulation theory has been studied extensively with various authors and adaptations to self-regulation theories. The general idea of the theories is that there are factors of self-regulation that individuals can consciously use to control their thoughts, behaviors, and emotions to reach their desired goals.

Teleworking requires a high level of self-regulation in an environment independent of supervision. A study analyzing the self-control strategies reported by teleworkers found that situation modification and cognitive modification affect one's self-reported telework performance (Troll et al. 2021). By altering the physical environment (removing distractions) and somatic conditions (e.g. "Dressing up for work) along with altering their cognitive mindset by goal setting, planning, and scheduling the participants of the study reported increased telework performance (Troll et al. 2021).

Without self-regulatory habits, a loss of control and the emergence of withdrawal-type behaviors could occur with teleworkers. Procrastination and poor time management have negative outcomes with effective telework job performance (Griffiths 2003). One method of preventing these types of behaviors from influencing telework performance is within the telework agreements. If employees have any history of absenteeism, supervisors are encouraged to withhold the option to telework from that worker (Office of Personnel Management 2011).

Hypotheses

Table 1 List of Hypotheses

H1	Agreeableness is positively related to telework performance
H2	Conscientiousness is positively related to telework performance
H3	Extraversion is negatively related to telework performance
H4	Neuroticism is negatively related to telework performance
H5	Openness to experience is positively related to telework performance
H6	Autonomy is positively related to telework performance
H7	Communication is positively related to telework performance
H8	Non-distractibility is positively related to telework performance
H9	Overload is negatively related to telework performance
H10	Telework stress is negatively related to telework performance
H11	The number of children who reside with teleworker is negatively related to telework performance
H12	Work-life balance mediates the relationship between agreeableness and telework performance
H13	Motivation mediates the relationship between agreeableness and telework performance
H14	Motivation mediates the relationship between openness and telework performance
H15	Communication mediates the relationship between extraversion and telework stress
H16	Time management mediates the relationship between conscientiousness and telework performance
H17	Non-distractibility mediates the relationship between neuroticism and telework performance
H18	Telework stress mediates the relationship between neuroticism and telework performance
H19	Telework stress mediates the relationship between communication and telework performance
H20	Non-distractibility mediates the relationship between conscientiousness and telework performance

Model of Telework Performance

As identified in this chapter many variables contribute to telework performance. Our model uses a framework comprised of Big 5 personality traits, autonomy, communication, work-life balance, motivation, time management, non-distractibility, overload, and telework stress. We predict, based on previous literature review findings, that the Big 5 personality traits mediate the relationship between the independent variables and telework performance. If no mediation exists, then we predict that the Big 5 personality traits are either positively or negatively related to telework performance as mentioned in the Hypotheses in the previous paragraph. Our model of telework performance can be seen in Figure 1.

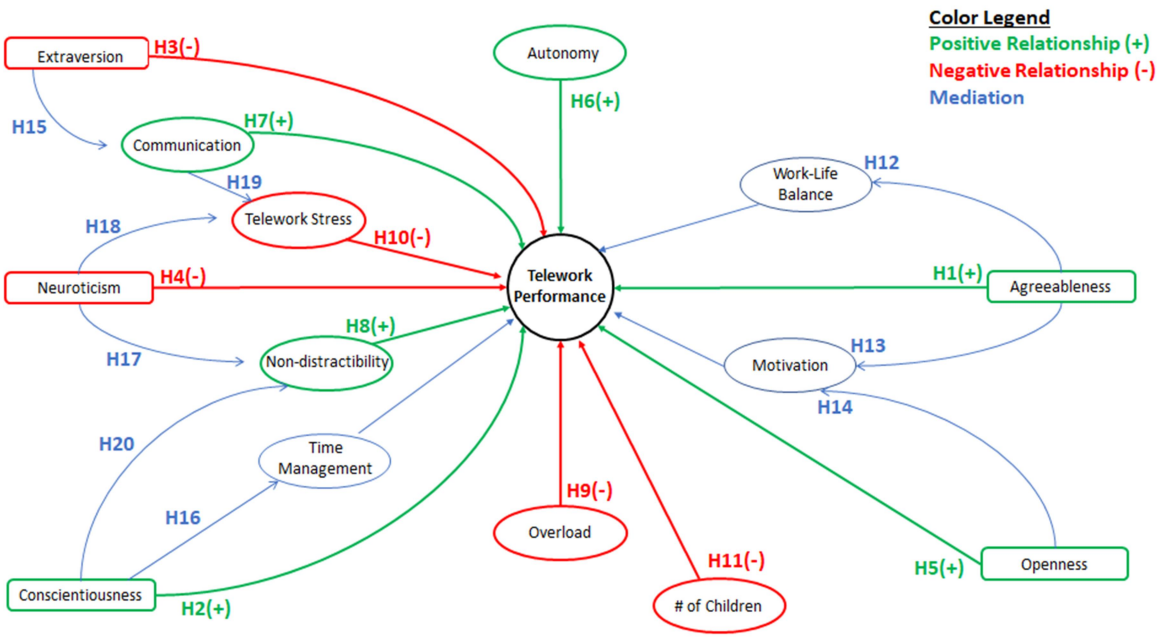

Figure 1 Model of Telework Performance

III. Methodology

Chapter Overview

The purpose of this chapter is to provide the methodology of the data collection, data processing, and data analysis. Sample size and sample characteristics are discussed and how each survey measure was created from our list of survey questions. This chapter also covers how reliability was tested for each of the variables measured. Finally a description of how the regression analysis was performed to justify our model and determine the relationships between each independent variable and the dependent variable of telework performance.

Sample and Power

The survey was sent to the Peterson/Schriever Garrison from December 15, 2021 through January 15, 2022 using the survey platform surveymonkey.com. The survey consists of 65 questions consisting of Likert scale questions and open responses. The full survey can be found in *Appendix A – Telework Survey of Peterson & Schriever AFB Personnel.* The total population of the Garrison is 8,326 which comprises of Regular Air Force & Space Force, Reserve Air Force & Space Force, and Civilian personnel. 390 responses were collected in total. 231 respondents reported they are currently not

teleworking, and 159 respondents reported that they currently telework 1 or more days per week. Finally, 41 of the 159 teleworkers reported being in a supervisor role. Power is determined using the methods researched in "A Power Primer" (Cohen 1992). Depending on the effect size of the variable in question (small, medium, or large), the required sample sizes are provided in Cohen's *Table 2: N for Small, Medium, and Large ES at Power = .80 for a = .01, .05, and .10* using a user-defined alpha confidence level of 0.01, 0.05, or 0.10 (Cohen 1992). Since our regression model uses a confidence level of 0.05, we would need a minimum of 107 observations to test a medium effect, and 50 observations to test a large effect. Our sample of 159 teleworkers surpasses this and therefore we have enough power to reduce the likelihood of Type II errors. Type II errors refer to the false-negative concept of not showing a relationship when in reality there truly is.

Measure Development

Telework Performance

Telework performance is the dependent variable and main outcome of this study. Exploratory factor analysis was used to determine the most influential factors that construct telework performance given our set of survey questions. Through the rotation of and the formation of principal components, the number of factors is determined by the number of principal components with eigenvalues greater than 1, as seen in Table 2. A scree plot shown in Figure 2 displays how many factors are present dependent upon where the elbow of the curve bends. Finally, questions are suppressed in the SPSS

software if the factor loading is less than 0.4, indicating that the question has little to no relation to the factor being analyzed. Our final measure of telework performance is created using the questions with the highest factor loading in

Table 3. To determine whether these questions are reliable, we use a Cronbach Alpha reliability score reported in Table 38 in *Appendix B – Tables of Reliability.*

Table 2 Telework Performance Factor Analysis: Eigenvalue by Principal Component

Total Variance Explained

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	3.739	53.410	53.410	3.739	53.410	53.410
2	.910	12.993	66.404			
3	.693	9.900	76.303			
4	.571	8.157	84.460			
5	.512	7.310	91.770			
6	.350	4.999	96.769			
7	.226	3.231	100.000			

Extraction Method: Principal Component Analysis.

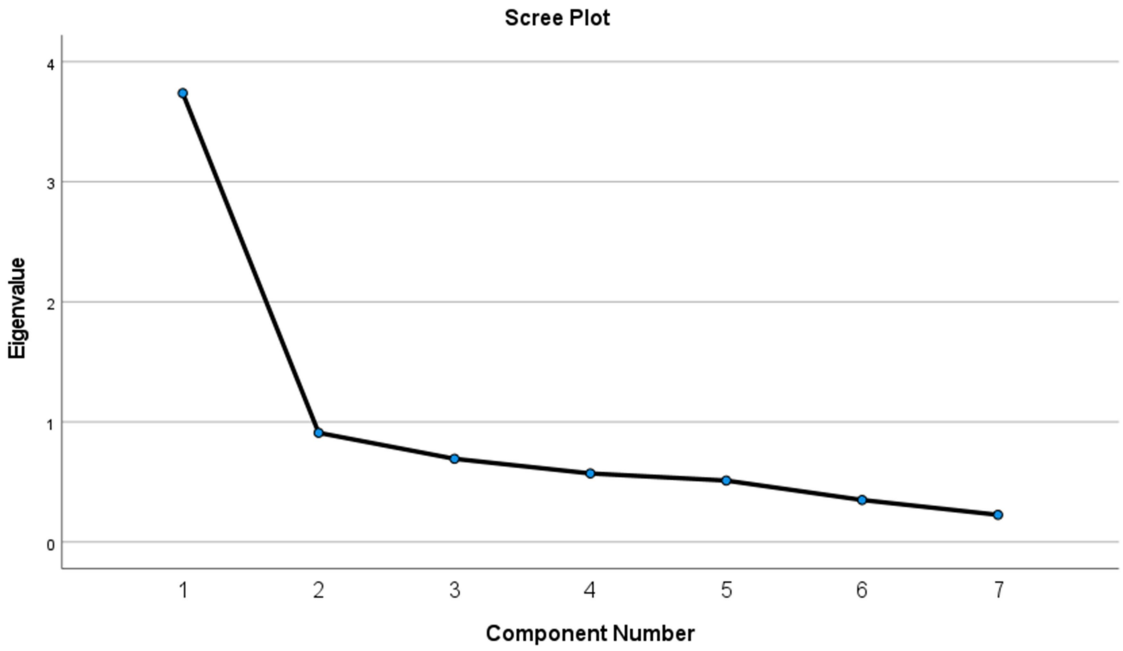

Figure 2 Scree Plot for Telework Performance Factor Analysis

Table 3 Telework Performance Factor Analysis: Factor Loading

Component Matrix[a]

	Factor Loading
How confident are you in your capability to successfully complete your work requirements while teleworking?	.735
How satisfied are you with your overall work-life balance while teleworking?	.638
While teleworking, how would you rate your level of motivation to complete your work?	.835
While teleworking, how easily distracted are you?	.635
While teleworking, how effective would you rate your time management?	.788
How would you rate your overall teleworking effectiveness with regards to your job performance?	.832
How often do you procrastinate while teleworking?	.614

Extraction Method: Principal Component Analysis.

a. 1 components extracted.

Table 3 is the final solution after removing questions that did not fit the general theme of telework performance. Also, questions with factor loadings below 0.4 were removed.

Autonomy

We use a pre-existing measure of autonomy defined in the Job Characteristics Inventory (Sims, H. P., Szilagyi, A. D., & Keller, R. T. 1976). There are six questions the author uses to create a measure of autonomy. These can be viewed in Appendix A – Telework Survey of Peterson & Schriever AFB Personnel Q54-Q60. We tested the reliability of this measure and report the Cronbach alpha in

Table 34 in *Appendix B – Tables of Reliability*.

Big 5 Personality Traits

There are five personality traits in the Big 5 inventory: agreeableness, conscientiousness, extraversion, neuroticism, and openness to experience (Goldberg 1992). Each trait has a list of 10 adjectives that make up each component. Table 33 lists each of these adjectives and whether the reverse-coding of the question is necessary to create the measure. For example calm is the opposite of what neuroticism represents, therefore we would reverse-code calm to ensure the variable is accurately represented. In our survey, we mistakenly omitted envious from the neuroticism set of questions and only had 9 questions comprising of the measure.

Communication

We use two questions from our survey to develop a measure of communication: How satisfied are you with the communication between you and your supervisor while teleworking? How satisfied are you with the communication from leadership above your supervisor while teleworking? Although we only have two questions comprising of communication, the reliability is still significant at 0.782 as seen in Table 35 in *Appendix B – Tables of Reliability*.

Overload

Overload was measured using a pre-existing list of survey questions developed by (Caplan et al. 1980). In this measure, there are 11 questions determined by a 5-point Likert scale. See Appendix A – Telework Survey of Peterson & Schriever AFB Personnel Q44 through Q54 for the overload questions included in this measure. Q48 and Q52 were removed. Q52 is a question regarding time management, and we found that Q48: (While teleworking, I have a great deal of time to think and contemplate) lowered reliability if included in the measure. The final questions included and reliability can be seen in

Table 37.

Telework Stress

We develop a telework stress measure using Q43 in our survey: *What has been your biggest stressor while teleworking?* As this is an open response question, we coded the responses into a binary response of 0 for no reported stress, or 1 for any type of stress reported while teleworking, regardless of perceived strength. We assume that if the respondents answered, they reported what stressed them the most since we ask what their biggest stressor was while teleworking. This is a single-question measure and had we been approved by the Air Force Survey Office to add more questions, we would have improved the reliability of this measure. However, the Air Force Survey Office's objective is to ensure surveys are actionable and limit survey length to reduce survey fatigue of Airmen and Air Force employees.

Non-distractibility

Distractibility in the telework environment was a variable of interest when researching telework performance. As such, we developed a set of 7 questions asking how distracting one's boss, phone notifications, people non-work related, pets, noise, hobbies, and chores were while teleworking. A reliability score of 0.812 is reported in

Table 36, along with the associated questions. The questions were reversed coded to switch the measure from one of distractibility to non-distractibility.

Reliability

The reliability of the variables was tested using Cronbach's alpha (Cronbach 1951). The Cronbach's alpha measures how consistent a measure is based upon its calculated alpha score. The scores range from 0 to 1, with 1 being the most consistent and reliable. Caution is to be used as increasing the number of items can artificially inflate a Cronbach alpha. The number of survey items and item interrelatedness affects the value of the alpha with acceptable values ranging from 0.7 to 0.95 (Tavakol and Dennick 2011). Tables of the reliability of each measure can be found in *Appendix B – Tables of* Reliability.

Multiple Linear Regression

Multiple linear regressions are used in this thesis to test relationships between the independent variables and the dependent variable of telework performance. Step-wise regression is used to understand the changes in unexplained variance (R^2) with relation to each added variable. Tests for normality and constant variances are performed for the regression model, however, independence is not tested due to the fact our survey data is

cross-sectional and not a time series. Finally, mediation effects of select variables are tested using linear regression as discussed in the next paragraph.

Mediation Effects

Mediation in this thesis is tested using the four-step method used by (Frazier et al. 2004). First, linear regression is performed to show that there is a significant relationship between the predictor and the outcome variables. In the next step, linear regression is again performed to show that the predictor is significantly related to the mediator variable. A third linear regression is performed to show that the mediator is significantly related to the outcome variable. Finally, the fourth step determines the strength of the mediation and whether the mediator partially or fully mediates the relationship between the predictor and the outcome variable. This is done by comparing the Beta weights of step 1 and step 3. If the Beta weight of step 1 is smaller than step 3, and both step 1 and step 3 both show significance, then the mediator partially mediates the relationship between the predictor and the outcome variables. If the Beta weight of step 1 is smaller than step 3, but step 3 no longer shows significance, then the mediator fully mediates the relationship between the predictor variable and the outcome variable.

IV. Analysis and Results

Chapter Overview

This chapter reports the results of the analysis with discussions and implications associated with each outcome. Hypotheses in Chapter I are compared against the results to determine which hypotheses are supported vs unsupported. A revised telework performance model is presented using the supported hypotheses.

Descriptive Statistics

We first report descriptive statistics of the sample. Histograms of age, gender, telework frequency, telework experience before the pandemic, telework preference, and all the independent variables are provided to give a visual representation of how the participants responded as a sample. Visually, independent variables with similar distributions overall tended to have higher correlational relationships when used in linear regression models. A comprehensive list of correlations can be found in *Appendix C –* .

Table 4 Descriptive Statistics

Descriptive Statistics					Skewness		Kurtosis	
	N	Mean	Std. Deviation	Variance	Statistic	Std. Error	Statistic	Std. Error
TELEWORK_PERFORMANCE	134	4.477	0.389	0.151	-0.804	0.209	0.772	0.416
AGREEABLENESS	136	4.365	0.465	0.216	-0.639	0.208	-0.348	0.413
CONSCIENTIOUSNESS	133	4.352	0.443	0.196	-1.291	0.210	3.794	0.417
EXTRAVERSION	134	3.543	0.633	0.401	-0.078	0.209	0.032	0.416
NEUROTICISM	137	1.984	0.543	0.295	0.360	0.207	-0.103	0.411
OPENNESS_TO_EXPERIENCE	133	3.546	0.476	0.226	-0.192	0.210	-0.200	0.417
AUTONOMY	144	4.034	0.663	0.440	-0.553	0.202	-0.094	0.401
COMMUNICATION	150	4.307	0.785	0.617	-1.276	0.198	1.748	0.394
NONDISTRACTIBILITY	148	4.579	0.470	0.221	-1.733	0.199	4.008	0.396
OVERLOAD	147	2.964	0.436	0.190	-0.205	0.200	-0.001	0.397
TELEWORK_STRESS	135	0.681	0.468	0.219	-0.788	0.209	-1.400	0.414

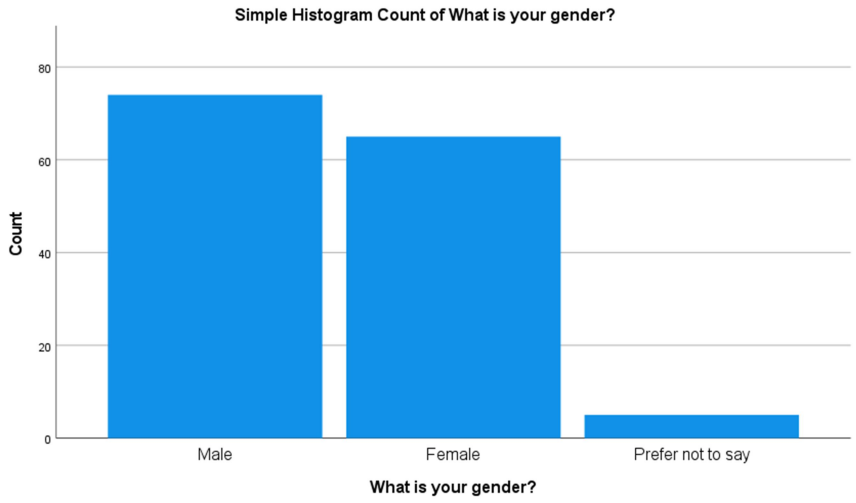

Figure 3 Histogram of Gender (Teleworkers)

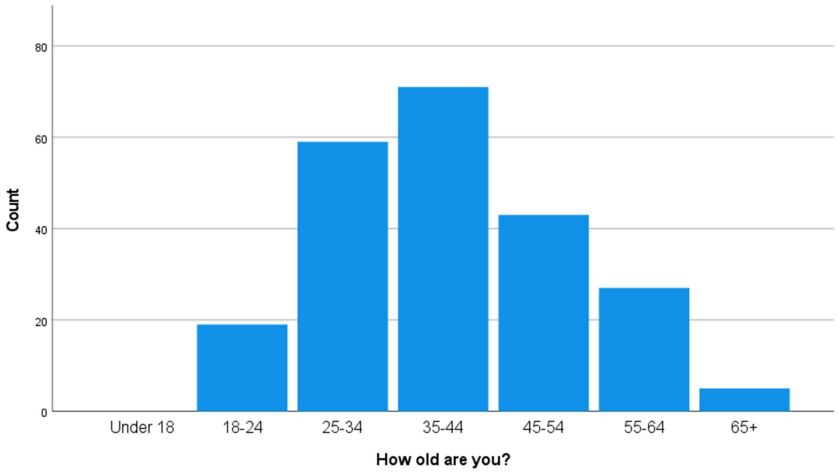

Figure 4 Histogram of Age (Teleworkers)

Figure 4 shows a relatively normal distribution of age, separated by the ‘20s, ‘30s, ‘40s, ‘50s, and ‘60s.

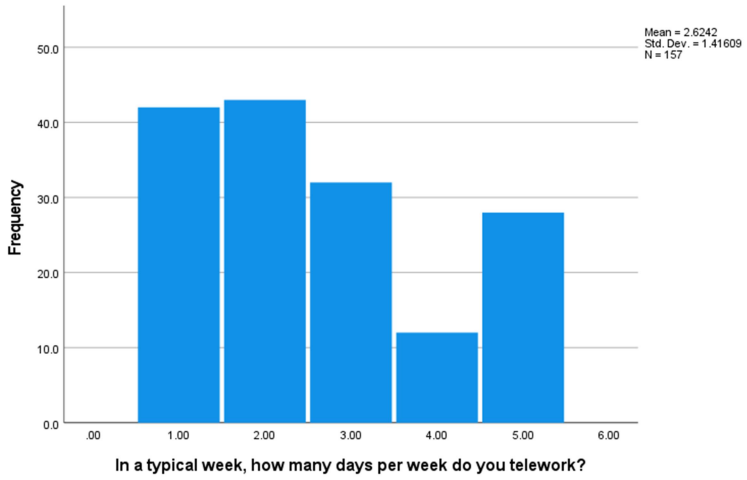

Figure 5 Histogram of Telework Frequency (Teleworkers)

An interesting result is that a majority of teleworkers reported working only 1 or 2 days as seen in Figure 5. This may have some impact on the work-life balance. This question did not clarify whether an entire day or part of the day was spent teleworking, it counts part-time telework as a day of telework.

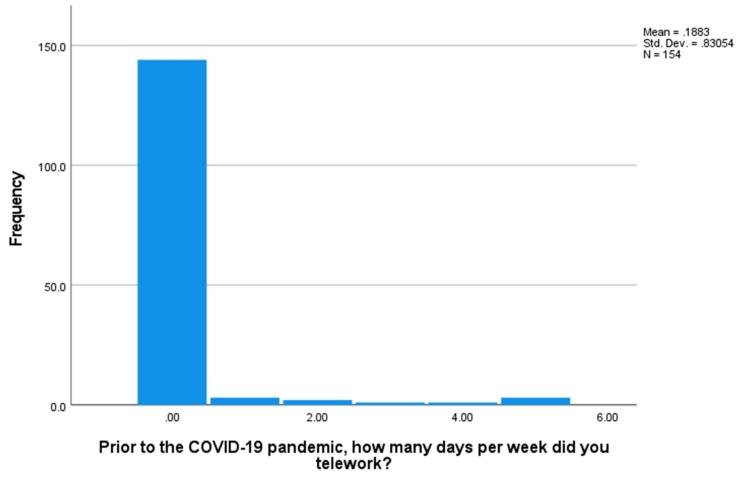

Figure 6 Histogram of Pre-COVID Telework Experience (Teleworkers)

The histogram of Pre-COVID Telework Experience in Figure 6 is an interesting demographic because it shows a huge majority of teleworkers had no experience with teleworking before the pandemic started. Although our data collection occurred about two years after the start of the pandemic, the amount of experience with telework has the potential to impact performance.

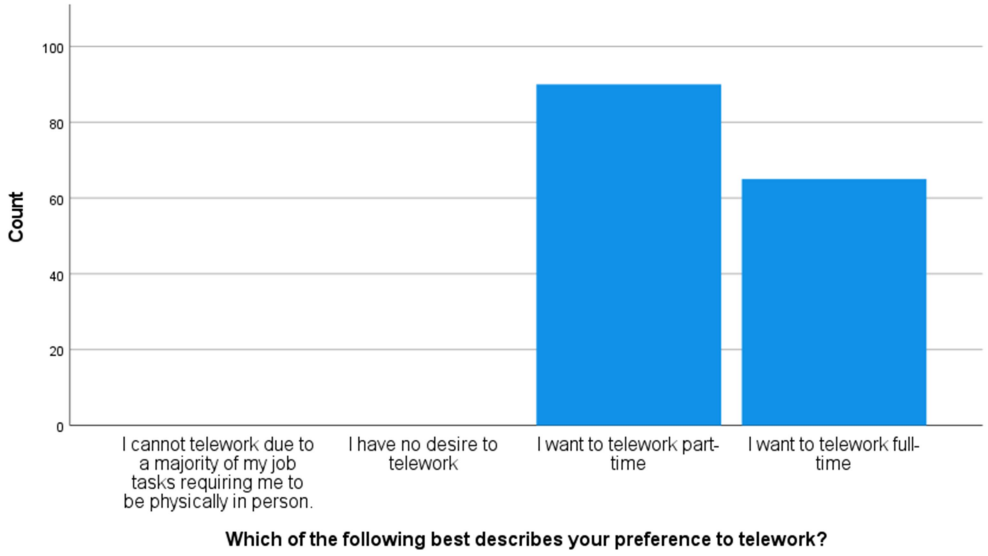

Figure 7 Histogram of Telework Preference (Teleworkers)

An interesting observation in Figure 7 shows that all teleworking participants desire to telework part-time or full-time. Not a single teleworker responded with the "I have no desire to telework" option. Although we weren't approved to measure overall satisfaction due to the Air Force Survey Office already having surveys geared toward satisfaction, job satisfaction would have been an area of research linked to telework preference.

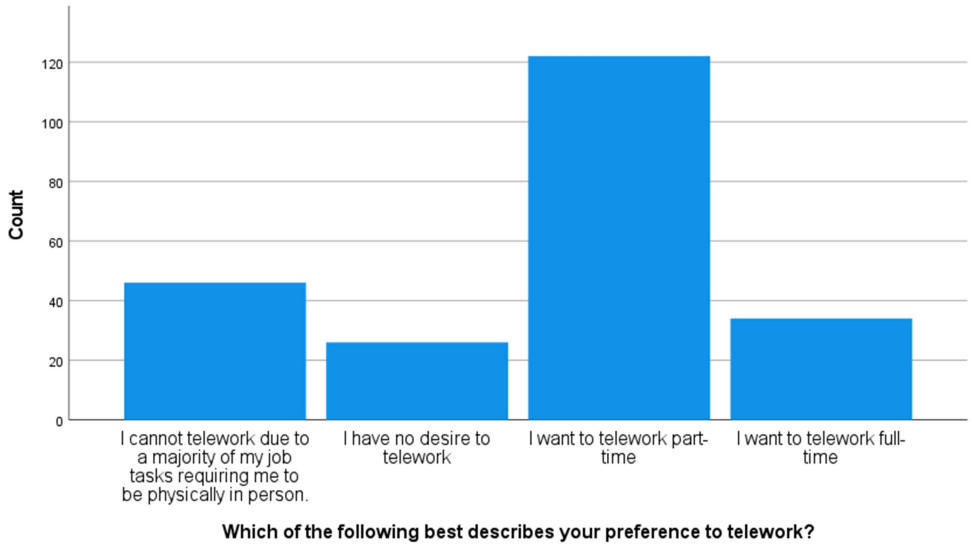

Figure 8 Histogram of Telework Preference (Non-teleworkers)

In both Figure 7 and Figure 8, both teleworkers and non-teleworkers reported wanting to telework part-time the most, possibly indicating that they agree some level of in-person work is useful vs. full-time telework. For those that could not telework due to a majority of their work tasks requiring them to be physically in person, many stated that admin tasks, emails, online training, and other computer-based tasks could be accomplished while teleworking.

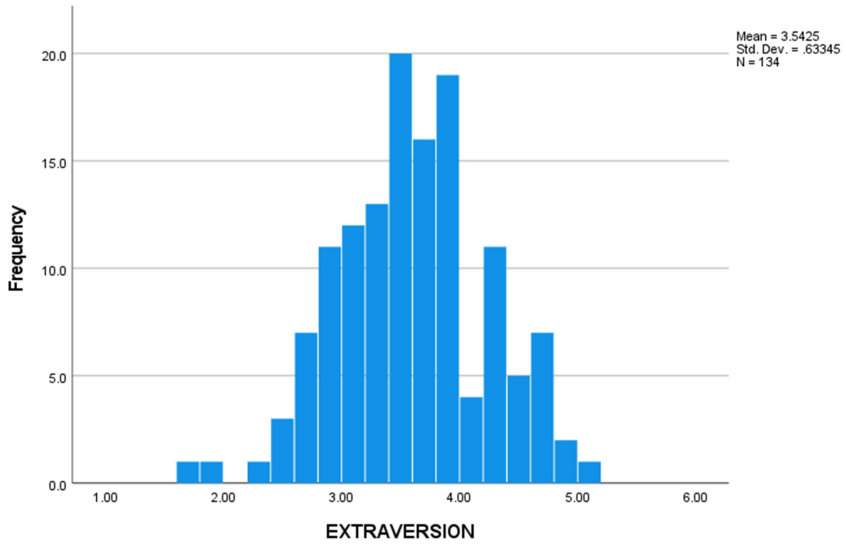

Figure 9 Histogram of Extraversion (Teleworkers)

Our sample of teleworkers overall tended to be slightly more extroverted than introverted, with a mean of 3.54 as seen in Figure 9. The distribution follows a normal distribution fairly well, and since 3.0 in this score represents the balancing point between introversion and extraversion, we can see the sample is fairly equally represented between introverts and extroverts.

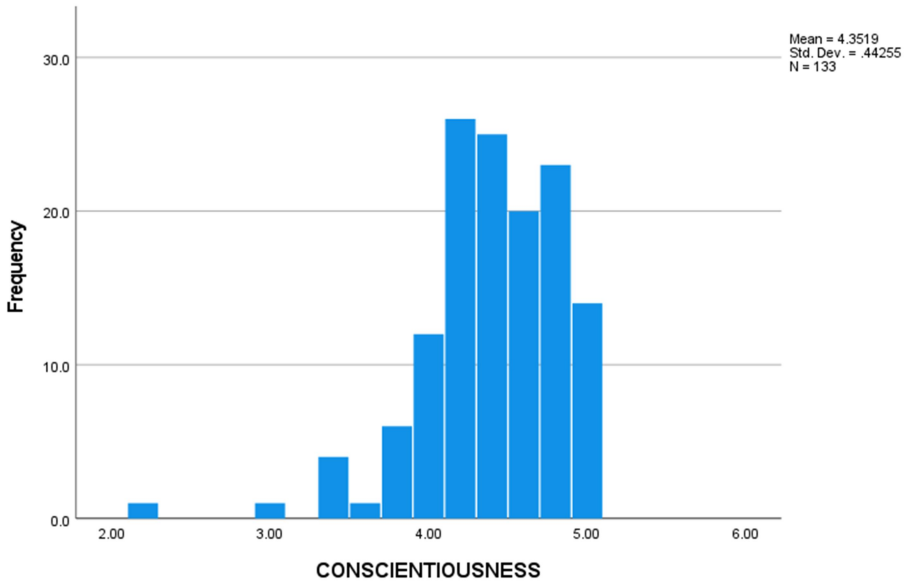

Figure 10 Histogram of Conscientiousness (Teleworkers)

Overall, a majority of respondents scored high in conscientiousness as seen in Figure 10. This distribution is relatively similar to those of communication, overload, and telework performance as seen in Figure 15, Figure 16, and Figure 19 respectively.

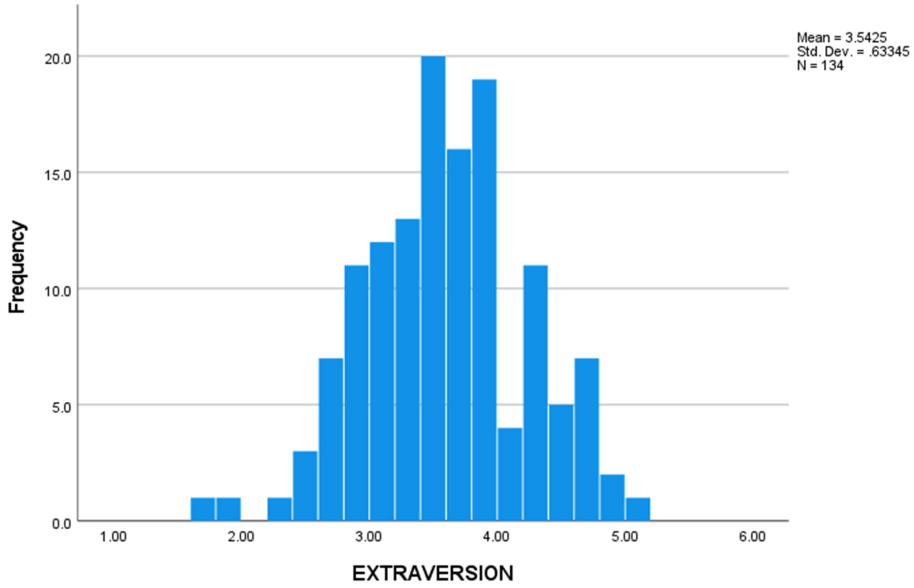

Figure 11 Histogram of Extraversion (Teleworkers)

Figure 11 shows a mean score of slightly greater than 3.0. This signifies the sample on average had slightly more extraversion than introversion, however, the sample was relatively equally distributed between the two.

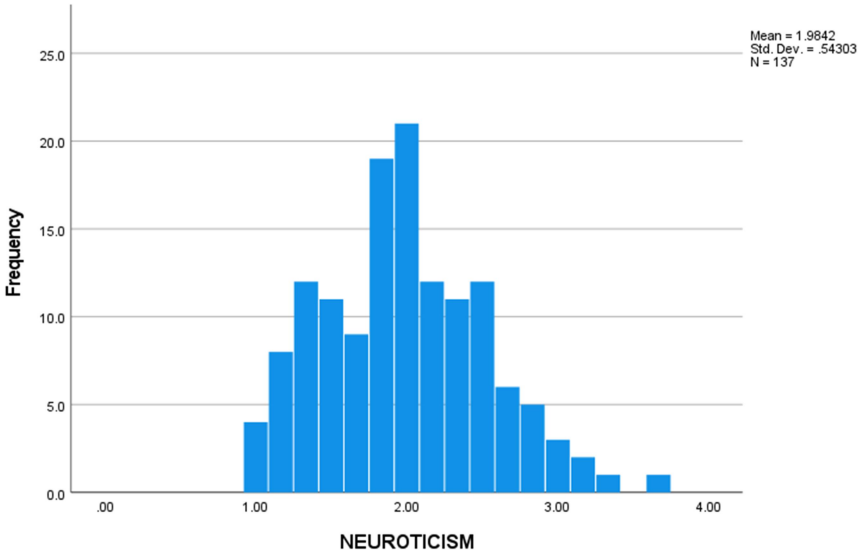

Figure 12 Histogram of Neuroticism (Teleworkers)

Figure 12 shows a low mean score for neuroticism which suggests most respondents are emotionally stable. As found in the literature review, low neuroticism scores are typically sought after by employers.

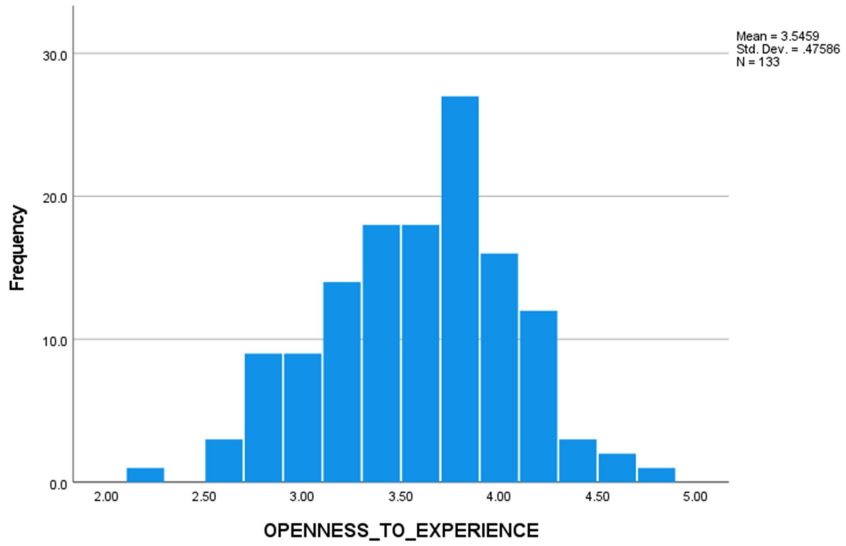

Figure 13 Histogram of Openness to Experience (Teleworkers)

Figure 13 shows a normal distribution with a mean of 3.5 for openness to experience.

This suggests an equally distributed sample of both high and low scores of openness.

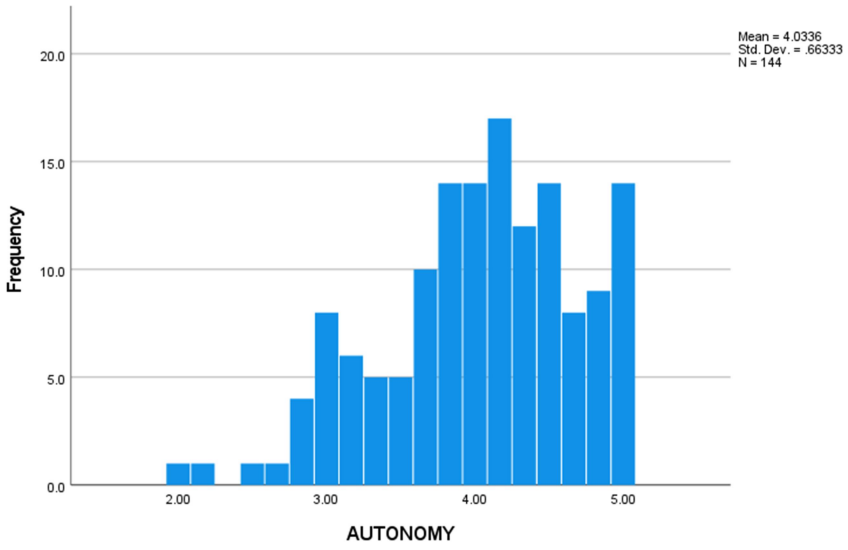

Figure 14 Histogram of Autonomy (Teleworkers)

The mean score for autonomy among teleworkers is 4.03 with a standard deviation of 0.66 as seen in Figure 14. This makes sense in that teleworker is unsupervised while working and has the independence from supervision to control how they perform their work.

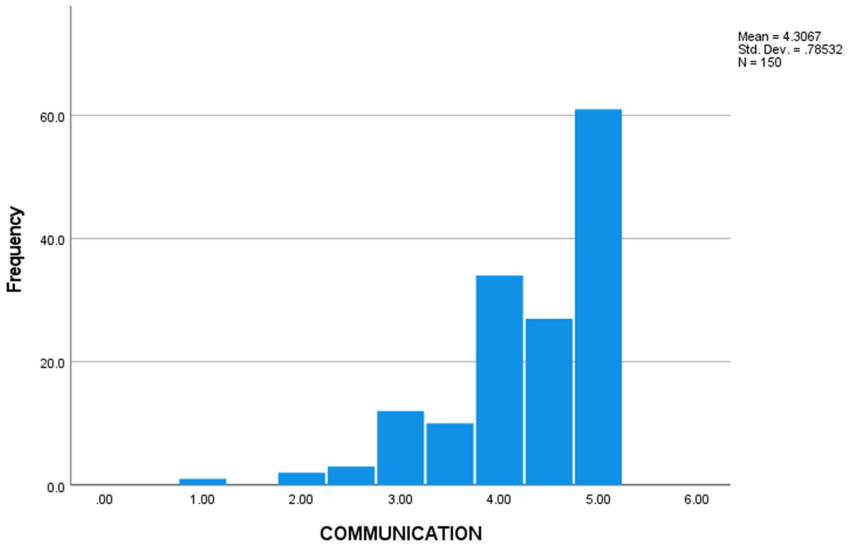

Figure 15 Histogram of Communication (Teleworkers)

The histogram of communication in Figure 15 follows the distribution of non-distractibility closely as seen in Figure 16. Overall, in both variables, the respondents scored relatively high in communication and non-distractibility indicating communication is good and the respondents are very difficult to distract.

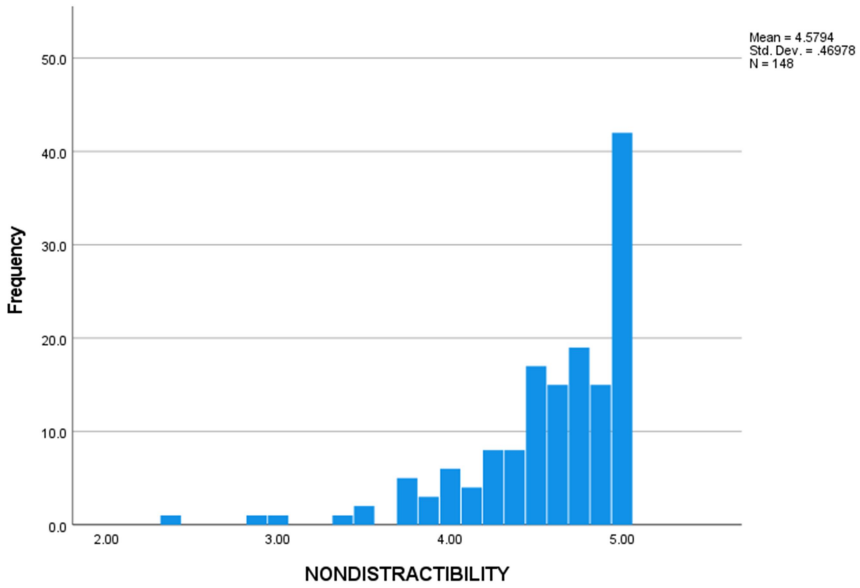

Figure 16 Histogram of Non-distractibility (Teleworkers)

Observations from Figure 16 include a skewed left distribution, with a majority of respondents reporting higher non-distractibility. This distribution closely matches communication, yet we did not predict this.

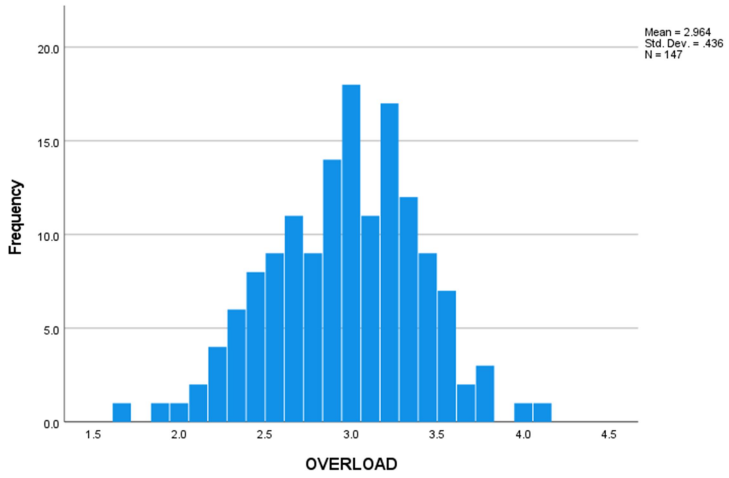

Figure 17 Histogram of Overload (Teleworkers)

The distribution of overload in Figure 13 is centered right on the midpoint of the 5-point scale, which reflects mid-range levels of overload among the respondents. This distribution closely matches openness to experience. We did not predict any type of relationship between openness and overload.

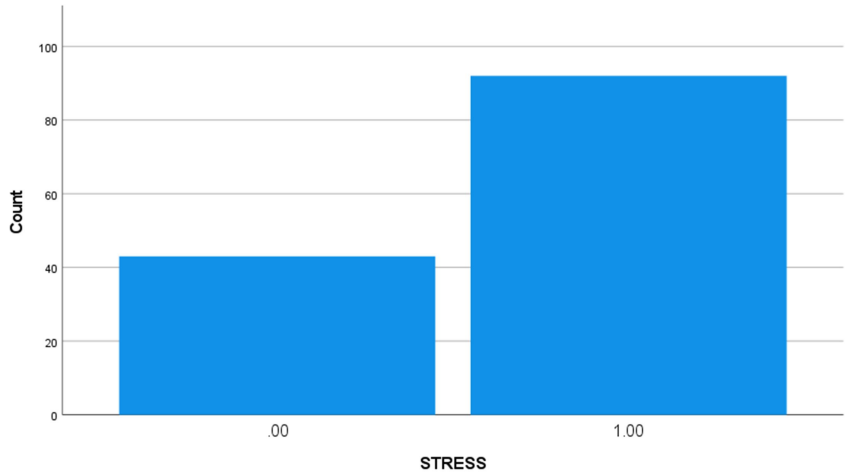

Figure 18 Histogram of Reported Stress (Teleworkers)

Those that reported stress while teleworking versus those that reported having no stress can be seen in Figure 18. We can see that there was almost double the number of participants that reported some form of telework stress than those who reported no stress. In this categorization, we did not attempt to measure the intensity of the stress, only that it was present.

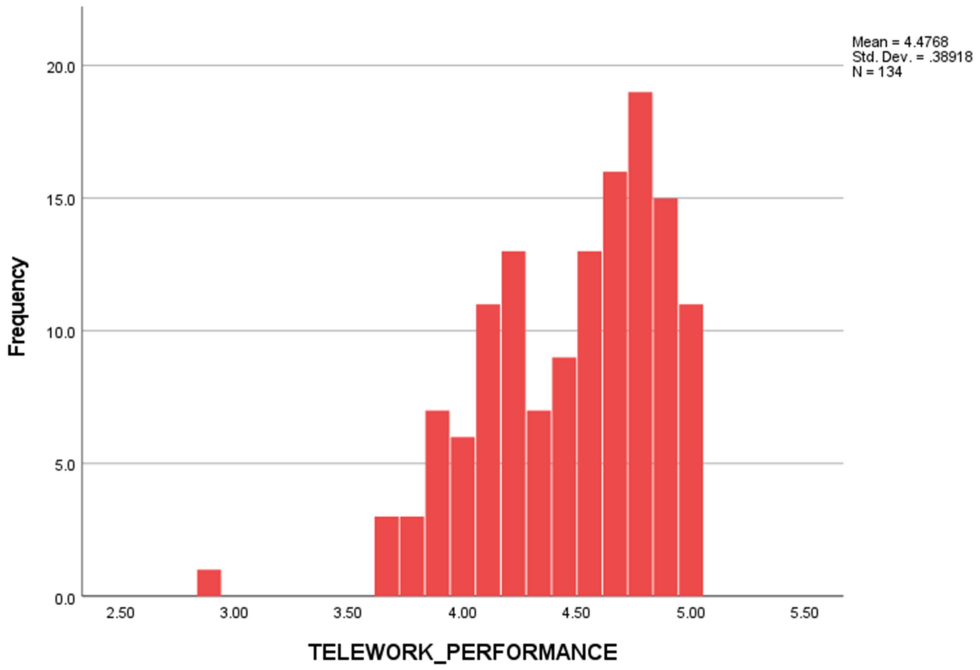

Figure 19 Histogram of Telework Performance

The main response variable, telework performance can be seen to have a higher self-reported score of telework performance with a majority of scores greater than 3.5. This distribution supports some aspects of the literature review that telework has a positive relationship with higher performance.

Review of Hypotheses

Each hypothesis was tested using linear regression as described in Chapter III. We summarize the results of the hypotheses in Table 5, and then individually explain each hypothesis in the remainder of this section.

Table 5 Summary of Rejected/Supported Hypotheses

		Supported?
H1	Agreeableness is positively related to telework performance	Y
H2	Conscientiousness is positively related to telework performance	Y
H3	Extraversion is negatively related to telework performance	N
H4	Neuroticism is negatively related to telework performance	Y
H5	Openness to experience is positively related to telework performance	Y
H6	Autonomy is positively related to telework performance	Y
H7	Communication is positively related to telework performance	Y
H8	Non-distractibility is positively related to telework performance	Y
H9	Overload is negatively related to telework performance	Y
H10	Telework stress is negatively related to telework performance	Y
H11	The number of children who reside with teleworker is negatively related to telework performance	N
H12	Work-life balance mediates the relationship between agreeableness and telework performance	Y
H13	Motivation mediates the relationship between agreeableness and telework performance	Y
H14	Motivation mediates the relationship between openness and telework performance	N
H15	Communication mediates the relationship between extraversion and telework stress	N
H16	Time management mediates the relationship between conscientiousness and telework performance	Y
H17	Non-distractibility mediates the relationship between neuroticism and telework performance	N
H18	Telework stress mediates the relationship between neuroticism and telework performance	N
H19	Telework stress mediates the relationship between communication and telework performance	Y
H20	Non-distractibility mediates the relationship between conscientiousness and telework performance	Y

Table 6 H1: Agreeableness is positively related to telework performance

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	t	Sig.
1	(Constant)	2.766	.284		9.733	<.001
	AGREEABLENESS	.392	.065	.467	6.051	<.001

a. Dependent Variable: TELEWORK_PERFORMANCE

H1 is supported since the regression in

		Supported?
H1	Agreeableness is positively related to telework performance	Y
H2	Conscientiousness is positively related to telework performance	Y
H3	Extraversion is negatively related to telework performance	N
H4	Neuroticism is negatively related to telework performance	Y
H5	Openness to experience is positively related to telework performance	Y
H6	Autonomy is positively related to telework performance	Y
H7	Communication is positively related to telework performance	Y
H8	Non-distractibility is positively related to telework performance	Y
H9	Overload is negatively related to telework performance	Y
H10	Telework stress is negatively related to telework performance	Y
H11	The number of children who reside with teleworker is negatively related to telework performance	N
H12	Work-life balance mediates the relationship between agreeableness and telework performance	Y
H13	Motivation mediates the relationship between agreeableness and telework performance	Y
H14	Motivation mediates the relationship between openness and telework performance	N
H15	Communication mediates the relationship between extraversion and telework stress	N
H16	Time management mediates the relationship between conscientiousness and telework performance	Y
H17	Non-distractibility mediates the relationship between neuroticism and telework performance	N
H18	Telework stress mediates the relationship between neuroticism and telework performance	N
H19	Telework stress mediates the relationship between communication and telework performance	Y
H20	Non-distractibility mediates the relationship between conscientiousness and telework performance	Y

Table 6 between agreeableness and telework performance is significant to 0.001, which is less than our defined alpha level of 0.05.

Table 7 H2: Conscientiousness is positively related to telework performance

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	t	Sig.
1	(Constant)	1.832	.245		7.476	<.001
	CONSCIENTIOUSNESS	.607	.056	.689	10.840	<.001

a. Dependent Variable: TELEWORK_PERFORMANCE

H2 is supported since the regression in Table 7 between conscientiousness and telework performance is significant to 0.001, which is less than our defined alpha level of 0.05.

Table 8 H3: Extraversion is negatively related to telework performance

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	3.755	.185		20.292	<.001
	EXTRAVERSION	.204	.052	.329	3.962	<.001

a. Dependent Variable: TELEWORK_PERFORMANCE

H3 is not supported since the regression in

Table 8 between extraversion and telework performance is significant to 0.001, which is less than our defined alpha level of 0.05, however the direction of the relationship is reversed and our results show a positive relationship with telework performance.

Table 9 H4: Neuroticism is negatively related to telework performance

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	4.920	.122		40.288	<.001
	NEUROTICISM	-.223	.059	-.311	-3.760	<.001

a. Dependent Variable: TELEWORK_PERFORMANCE

H4 is supported since the regression in Table 9 between neuroticism and telework performance is significant to 0.001, which is less than our defined alpha level of 0.05.

Table 10 H5: Openness to experience is positively related to telework performance

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	3.760	.248		15.131	<.001
	OPENNESS_TO_EXPERIENCE	.203	.069	.248	2.916	.004

a. Dependent Variable: TELEWORK_PERFORMANCE

H5 is supported since the regression in Table 10 between openness to experience and telework performance is significant to 0.004, which is less than our defined alpha level of 0.05.

Table 11 H6: Autonomy is positively related to telework performance

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	3.811	.203		18.731	<.001
	AUTONOMY	.163	.049	.278	3.289	.001

a. Dependent Variable: TELEWORK_PERFORMANCE

H6 is supported since the regression in Table 11 between autonomy and telework performance is significant to 0.001, which is less than our defined alpha level of 0.05.

Table 12 H7: Communication is positively related to telework performance

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	t	Sig.
1	(Constant)	3.575	.168		21.304	<.001
	COMMUNICATION	.210	.038	.430	5.464	<.001

a. Dependent Variable: TELEWORK_PERFORMANCE

H7 is supported since the regression in Table 12 between communication and telework performance is significant to 0.001, which is less than our defined alpha level of 0.05.

Table 13 H8: Non-distractibility is positively related to telework performance

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	t	Sig.
1	(Constant)	2.599	.298		8.717	<.001
	NONDISTRACTIBILITY	.410	.065	.483	6.320	<.001

a. Dependent Variable: TELEWORK_PERFORMANCE

H8 is supported since the regression in Table 13 between non-distractibility and telework performance is significant to 0.001, which is less than our defined alpha level of 0.05.

Table 14 H9: Overload is negatively related to telework performance

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	t	Sig.
1	(Constant)	5.176	.226		22.851	<.001
	OVERLOAD	-.233	.075	-.262	-3.097	.002

a. Dependent Variable: TELEWORK_PERFORMANCE

H9 is supported since the regression in

Table 14 between overload and telework performance is significant to 0.002, which is less than our defined alpha level of 0.05.

Table 15 H10: Telework stress is negatively related to telework performance

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	t	Sig.
1	(Constant)	4.639	.063		74.094	<.001
	TELEWORK_STRESS	-.217	.074	-.257	-2.921	.004

a. Dependent Variable: TELEWORK_PERFORMANCE

H10 is supported since the regression in

Table 15 between telework stress and telework performance is significant to 0.004, which is less than our defined alpha level of 0.05.

Table 16 H11: No. of children who reside with a teleworker is negatively related to telework performance

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	4.483	.040		111.071	<.001
	How many children reside with you while you telework?	-.009	.035	-.022	-.256	.798

a. Dependent Variable: TELEWORK_PERFORMANCE

H11 is not supported since the regression in Table 16 between the number of children and telework performance is only significant to 0.798, which is greater than our defined alpha level of 0.05.

Table 17 H12: Work-life balance mediates the relationship between agreeableness and telework performance

Step 1		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	t	Sig.
	(Constant)	2.766	0.284		9.733	0.000
	AGREEABLENESS	0.392	0.065	0.467	6.051	0.000
a. Dependent Variable: TELEWORK_PERFORMANCE						
Step 2		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	t	Sig.
	(Constant)	3.911	0.384		10.195	0.000
	AGREEABLENESS	0.194	0.087	0.188	2.217	0.028
a. Dependent Variable: How satisfied are you with your overall work-life						
Step 3		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	t	Sig.
	(Constant)	1.364	0.328		4.152	0.000
	AGREEABLENESS	0.320	0.057	0.382	5.568	0.000
	How satisfied are you with your overall work-life balance while teleworking?	0.361	0.055	0.446	6.504	0.000
a. Dependent Variable: TELEWORK_PERFORMANCE						

H12 is supported since the regressions in

Table 17 demonstrate that work-life balance mediates the relationship between agreeableness and telework performance. Since the significance level of agreeableness in Step 3 is still less than 0.05 and the beta coefficient decreased from steps 1 to 3, work-life balance only partially mediates the relationship.

Table 18 H13: Motivation mediates the relationship between agreeableness and telework performance

Step 1		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	t	Sig.
	(Constant)	2.766	0.284		9.733	0.000
	AGREEABLENESS	0.392	0.065	0.467	6.051	0.000
a. Dependent Variable: TELEWORK_PERFORMANCE						
Step 2		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	t	Sig.
	(Constant)	2.969	0.423		7.013	0.000
	AGREEABLENESS	0.386	0.096	0.327	4.003	0.000
a. Dependent Variable: While teleworking, how would you rate your level of motivation						
Step 3		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	t	Sig.
	(Constant)	1.463	0.249		5.874	0.000
	AGREEABLENESS	0.220	0.051	0.263	4.286	0.000
	Motivation to complete work	0.441	0.043	0.622	10.136	0.000
a. Dependent Variable: TELEWORK_PERFORMANCE						

H13 is supported since the regressions in Table 18 demonstrate that motivation mediates the relationship between agreeableness and telework performance. Since the significance level of agreeableness in Step 3 is still less than 0.05 and the beta coefficient decreased from steps 1 to 3, motivation only partially mediates the relationship.

Table 19 H14: Motivation mediates the relationship between openness and telework performance

Step 1		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	t	Sig.
	(Constant)	3.760	0.248		15.131	0.000
	OPENNESS_TO_EXPERIENCE	0.203	0.069	0.248	2.916	0.004
a. Dependent Variable: TELEWORK_PERFORMANCE						
Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	t	Sig.
Step 2	(Constant)	4.334	0.359		12.059	0.000
	OPENNESS_TO_EXPERIENCE	0.092	0.100	0.080	0.920	0.359
a. Dependent Variable: While teleworking, how would you rate your level of motivation						

H14 is not supported since the regressions in Table 19 demonstrate that motivation does not mediate the relationship between openness to experience and telework performance. Since the significance level of openness predicting motivation in Step 2 is greater than 0.05 (0.359), there is not a significant relationship between openness and motivation. Mediation requires a significant relationship between the predictor and mediator in step 2 (Frazier et al. 2004).

Table 20 H15 Communication mediates the relationship between extraversion and telework stress

Step 1		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	t	Sig.
	(Constant)	1.214	0.236		5.150	0.000
	EXTRAVERSION	-0.144	0.065	-0.196	-2.207	0.029
a. Dependent Variable: TELEWORK_STRESS						
Step 2		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	t	Sig.
	(Constant)	3.241	0.380		8.539	0.000
	EXTRAVERSION	0.297	0.105	0.238	2.819	0.006
a. Dependent Variable: COMMUNICATION						
Step 3		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	t	Sig.
	(Constant)	1.400	0.289		4.842	0.000
	EXTRAVERSION	-0.127	0.067	-0.173	-1.898	0.060
	COMMUNICATION	-0.058	0.052	-0.101	-1.109	0.269
a. Dependent Variable: TELEWORK_STRESS						

H15 is not supported since the regressions in Table 20 demonstrate that communication does not mediate the relationship between extraversion and telework performance. Since the significance in Step 3 less than 0.05, communication does not mediate the relationship.

Table 21 H16: Time management mediates the relationship between conscientiousness and telework performance

Step 1		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	t	Sig.
	(Constant)	1.832	0.245		7.476	0.000
	CONSCIENTIOUSNESS	0.607	0.056	0.689	10.840	0.000
a. Dependent Variable: TELEWORK_PERFORMANCE						
Step 2		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	t	Sig.
	(Constant)	2.155	0.456		4.727	0.000
	CONSCIENTIOUSNESS	0.553	0.104	0.421	5.311	0.000
a. Dependent Variable: While teleworking, how effective would you rate your time						
Step 3		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	t	Sig.
	(Constant)	0.895	0.177		5.065	0.000
	CONSCIENTIOUSNESS	0.391	0.040	0.444	9.671	0.000
	While teleworking, how effective would you rate your time management?	0.410	0.031	0.599	13.058	0.000
a. Dependent Variable: TELEWORK_PERFORMANCE						

H16 is supported since the regressions in Table 21 demonstrate that time management mediates the relationship between conscientiousness and telework performance. Since the significance level of conscientiousness in Step 3 is still less than 0.05 and the beta coefficient decreased from steps 1 to 3, time management only partially mediates the relationship.

Table 22 H17: Non-distractibility mediates the relationship between neuroticism and telework performance

Step 1		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	t	Sig.
	(Constant)	4.920	0.122		40.288	0.000
	NEUROTICISM	-0.223	0.059	-0.311	-3.760	0.000
a. Dependent Variable: TELEWORK_PERFORMANCE						
Step 2		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	t	Sig.
	(Constant)	4.969	0.146		34.127	0.000
	NEUROTICISM	-0.196	0.071	-0.232	-2.757	0.007
a. Dependent Variable: NONDISTRACTIBILITY						
Step 3		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	t	Sig.
	(Constant)	3.121	0.339		9.216	0.000
	NEUROTICISM	-0.163	0.055	-0.227	-2.973	0.004
	NONDISTRACTIBILITY	0.366	0.065	0.432	5.672	0.000
a. Dependent Variable: TELEWORK_PERFORMANCE						

H17 is not supported since the regressions in Table 22 demonstrate that non-distractibility does not mediate the relationship between neuroticism and telework performance. Since the beta coefficient increased from steps 1 to 3, non-distractibility does not mediate the relationship.

Table 23 H18: Telework stress mediates the relationship between neuroticism and telework performance

Step 1		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	t	Sig.
	(Constant)	4.920	0.122		40.288	0.000
	NEUROTICISM	-0.223	0.059	-0.311	-3.760	0.000
a. Dependent Variable: TELEWORK_PERFORMANCE						
Step 2		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	t	Sig.
	(Constant)	0.369	0.156		2.362	0.020
	NEUROTICISM	0.168	0.077	0.193	2.185	0.031
a. Dependent Variable: TELEWORK_STRESS						
Step 3		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	t	Sig.
	(Constant)	4.963	0.131		37.847	0.000
	NEUROTICISM	-0.178	0.064	-0.242	-2.792	0.006
	TELEWORK_STRESS	-0.183	0.073	-0.216	-2.487	0.014
a. Dependent Variable: TELEWORK_PERFORMANCE						

H18 is not supported since the regressions in Table 23 demonstrate that telework stress does not mediate the relationship between neuroticism and telework performance. Since the beta coefficient increased from step 1 to 3, telework stress does not mediate the relationship.

Table 24 H19: Telework stress mediates the relationship between communication and telework performance

Step 1		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	t	Sig.
	(Constant)	3.575	0.168		21.304	0.000
	COMMUNICATION	0.210	0.038	0.430	5.464	0.000
a. Dependent Variable: TELEWORK_PERFORMANCE						
Step 2		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	t	Sig.
	(Constant)	1.161	0.217		5.346	0.000
	COMMUNICATION	-0.111	0.050	-0.191	-2.246	0.026
a. Dependent Variable: TELEWORK_STRESS						
Step 3		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	t	Sig.
	(Constant)	3.815	0.183		20.841	0.000
	COMMUNICATION	0.185	0.039	0.388	4.742	0.000
	TELEWORK_STRESS	-0.170	0.069	-0.201	-2.451	0.016
a. Dependent Variable: TELEWORK_PERFORMANCE						

H19 is supported since the regressions in Table 24 demonstrate that telework stress mediates the relationship between communication and telework performance. Since the significance level of communication in Step 3 is still less than 0.05 and the beta coefficient decreased from step 1 to 3, telework stress only partially mediates the relationship.

Table 25 H20: Non-distractibility mediates the relationship between conscientiousness and telework performance

Step 1		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	t	Sig.
	(Constant)	1.832	0.245		7.476	0.000
	CONSCIENTIOUSNESS	0.607	0.056	0.689	10.840	0.000
a. Dependent Variable: TELEWORK_PERFORMANCE						
Step 2		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	t	Sig.
	(Constant)	3.666	0.391		9.375	0.000
	CONSCIENTIOUSNESS	0.209	0.089	0.201	2.339	0.021
a. Dependent Variable: NONDISTRACTIBILITY						
Step 3		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	t	Sig.
	(Constant)	0.736	0.281		2.615	0.010
	CONSCIENTIOUSNESS	0.545	0.051	0.616	10.702	0.000
	NONDISTRACTIBILITY	0.299	0.049	0.354	6.150	0.000
a. Dependent Variable: TELEWORK_PERFORMANCE						

H20 is supported since the regressions in Table 25 demonstrate that non-distractibility mediates the relationship between conscientiousness and telework performance. Since the significance level of communication in Step 3 is still less than 0.05 and the beta coefficient decreased from steps 1 to 3, non-distractibility only partially mediates the relationship.

Multiple Linear Regression

The first step in determining which variables to include in our final model of telework performance was a regression of the Big 5 personality traits against telework performance. As seen in Table 26, when all five personalities are regressed together against telework performance only conscientiousness is significant to the 0.01. We use 0.01 instead of 0.05 because the Bonferroni correction (alpha risk value/number of predictors) is a method created to reduce the likelihood of Type I errors (Holm 1979). Type I error refers to showing a significant relationship when in reality none exists. Although all personality traits were significant in identifying a positive or negative relationship with telework performance individually, when combined, agreeableness, extraversion, openness, and neuroticism, are not significant in predicting telework performance using a Bonferroni correction of 0.01.

Table 26 Regression: Big 5 Personalities vs. Telework Performance

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients			Collinearity Statistics	
		B	Std. Error	Beta	t	Sig.	Tolerance	VIF
1	(Constant)	1.728	.367		4.711	<.001		
	AGREEABLENESS	.153	.068	.180	2.242	.027	.635	1.574
	CONSCIENTIOUSNESS	.500	.069	.567	7.272	<.001	.672	1.488
	EXTRAVERSION	.008	.047	.013	.167	.868	.701	1.427
	NEUROTICISM	-.052	.052	-.073	-.999	.320	.763	1.311
	OPENNESS_TO_EXPERIENCE	-.007	.057	-.009	-.128	.899	.817	1.224

a. Dependent Variable: TELEWORK_PERFORMANCE

In the next regression, we combine the remaining independent variables with conscientiousness. The results are shown in Table 27. In Table 27, we combine the remaining independent variables with conscientiousness. We eliminate autonomy from the model since the alpha level of autonomy is above 0.008. The Bonferroni correction in this model is (0.05/6=0.008). We repeat this process of eliminating one variable at a time until all variables are significant with a Bonferroni correction.

Table 27 Regression: All Independent Variables vs Telework Performance

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients			Collinearity Statistics	
		B	Std. Error	Beta	t	Sig.	Tolerance	VIF
1	(Constant)	1.149	.359		3.202	.002		
	CONSCIENTIOUSNESS	.474	.051	.525	9.246	<.001	.877	1.140
	NONDISTRACTIBILITY	.256	.048	.298	5.281	<.001	.885	1.130
	OVERLOAD	-.159	.048	-.184	-3.331	.001	.929	1.077
	COMMUNICATION	.095	.027	.200	3.551	<.001	.889	1.125
	TELEWORK_STRESS	-.100	.047	-.118	-2.108	.037	.904	1.107
	AUTONOMY	.056	.032	.098	1.742	.084	.898	1.113

a. Dependent Variable: TELEWORK_PERFORMANCE

Table 28 Regression: Semi-Final Model Predicting Telework Performance

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	1.239	.351		3.532	<.001		
	CONSCIENTIOUSNESS	.493	.050	.547	9.886	<.001	.916	1.092
	NONDISTRACTIBILITY	.259	.048	.302	5.360	<.001	.884	1.131
	OVERLOAD	-.146	.047	-.171	-3.125	.002	.941	1.063
	COMMUNICATION	.097	.026	.206	3.680	<.001	.895	1.117
	TELEWORK_STRESS	-.109	.047	-.129	-2.346	.021	.926	1.079

a. Dependent Variable: TELEWORK_PERFORMANCE

Table 28 shows that telework stress is significant to 0.021. With 5 predictors in this model, we use a Bonferroni correction of 0.05/5=0.01. Therefore, we eliminate this final variable leaving us with conscientiousness, non-distractibility, overload, and communication in our final model.

Final Regression Model of Telework Performance

Table 29 Final Regression Model of Telework Performance

Model Summary			
R	R Square	Adjusted R Square	Std. Error of the Estimate
0.812	0.660	0.649	0.23144

ANOVA

		Sum of Squares	df	Mean Square	F	Sig.
	Regression	12.874	4	3.219	60.090	<.001[b]
	Residual	6.642	124	0.054		
	Total	19.516	128			

Coefficients

		Unstandardized		Standardized Coefficients			Collinearity	
Model		B	Std. Error	Beta	t	Sig.	Tolerance	VIF
	(Constant)	1.071	0.317		3.382	0.001		
	CONSCIENTIOUSNESS	0.495	0.049	0.556	10.170	0.000	0.917	1.090
	NONDISTRACTIBILITY	0.250	0.047	0.296	5.337	0.000	0.890	1.124
	OVERLOAD	-0.125	0.047	-0.141	-2.659	0.009	0.972	1.029
	COMMUNICATION	0.112	0.027	0.232	4.201	0.000	0.897	1.115

With only 4 variables (conscientiousness, non-distractibility, overload, and communication) our final regression model in Table 29 predicts 66% percent of the variance in telework performance. Given a Bonferroni correction of 0.0125 (0.05/4), all four variables are significant in predicting the response. Our Variance Inflation Factor (VIF) for all variables is close to 1, indicating that very little multicollinearity exists between these four variables. Had we decided to use an alpha level of 0.1 versus 0.05, variables of telework stress, autonomy, and agreeableness had the potential to be significant in our model.

Validation: Normality, Constant Variance, & Independence

Normality

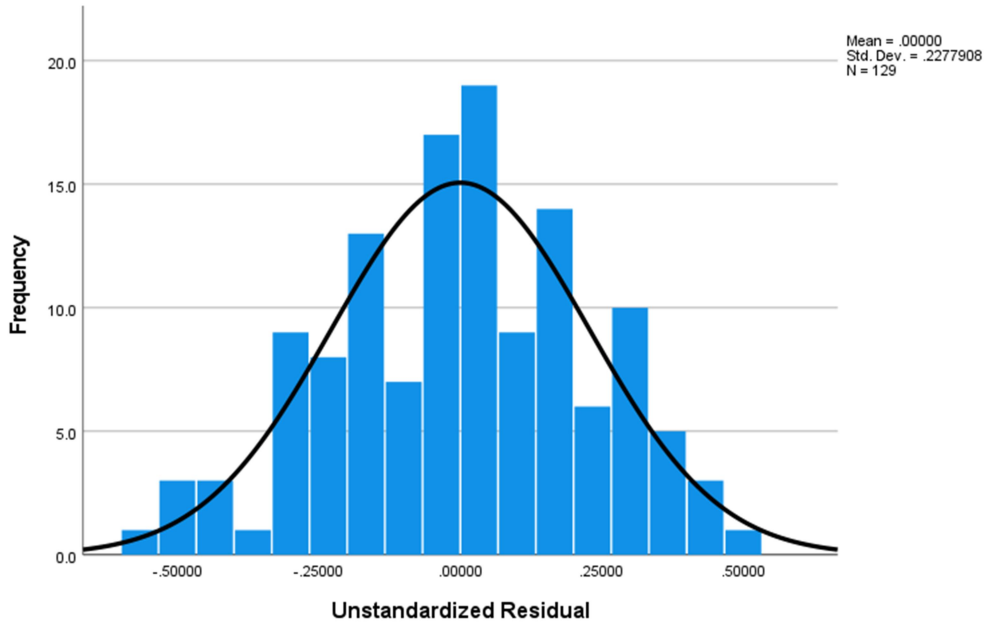

Figure 20 Histogram of Residuals (Telework Performance Final Model)

The histogram of residuals is shown in Figure 20. The residuals follow a normal distribution fairly well, with the peak of the distribution near the center.

Table 30 Shapiro-Wilk Test for Normality

	Shapiro-Wilk		
	Statistic	df	Sig.
Unstandardized Residual	0.990	129	0.457

With a significance of 0.457 in Table 30, we accept the alternate hypothesis that states the residuals follow a normal distribution.

Constant Variance

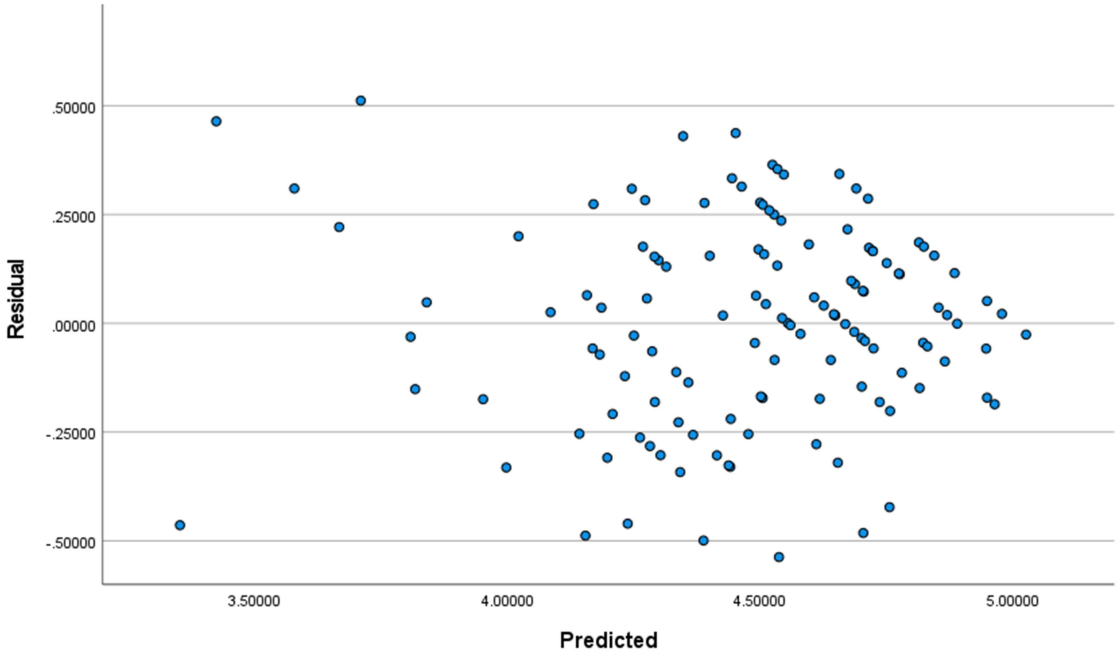

Figure 21 Residuals Vs Predicted Scatterplot (Final Telework Performance Model)

The residuals vs predicted scatterplot in Figure 21 are not equally scattered across zero with an alligator-type pattern from the right to the left. The residuals do not appear to be homoscedastic and do not display constant variance.

Breusch Pagan Test of Constant Variance

Table 31 Analysis of Variance Overall Model

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	12.874	4	3.219	60.090	<.001[b]
	Residual	6.642	124	.054		
	Total	19.516	128			

Table 32 Analysis of Variance Squared Residuals Model

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	.078	4	.019	5.276	<.001[b]
	Residual	.457	124	.004		
	Total	.534	128			

Our test statistic is $\frac{\left(\frac{0.078}{2}\right)}{\left(\frac{6.642}{128}\right)^2} = 14.48$. The p-value of this in comparison to a chi-square distribution with 4 degrees of freedom is 0.005. With the industry-standard set at 0.05, we reject the null hypothesis and accept the alternative that states the residuals do not display constant variance.

Independence

Our survey data was neither collected experimentally nor evenly spaced in time. Therefore neither a time series plot nor Durbin Watson test can test for independence.

Revised Model of Telework Performance

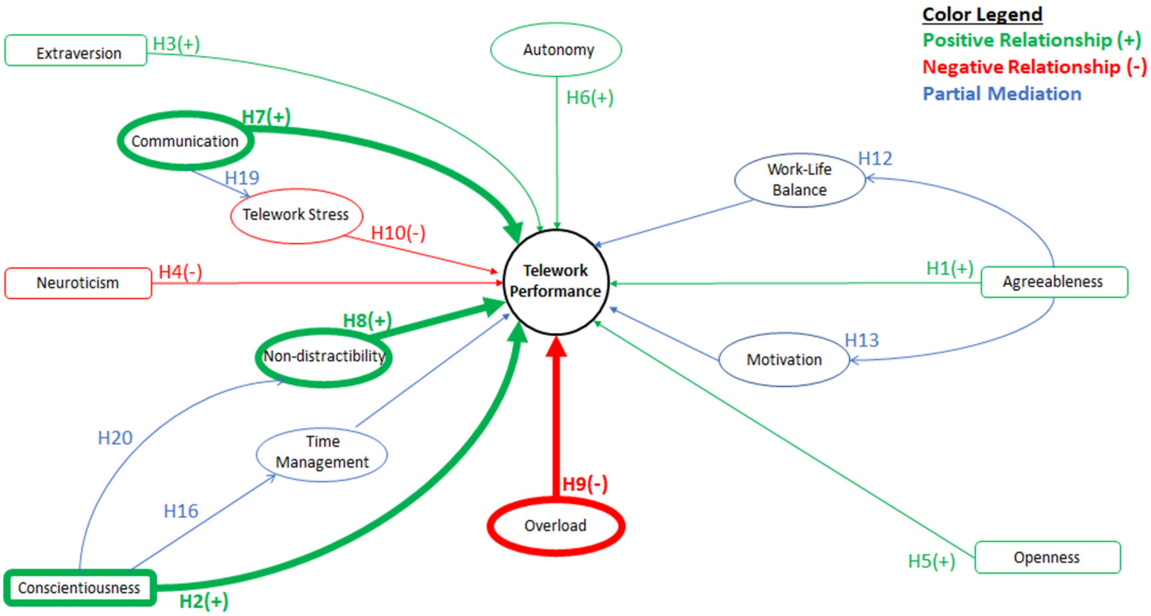

Figure 22 Revised Model of Telework Performance

The revised model of telework performance in Figure 22 is updated to reflect the supported hypotheses in Table 5.

V. Conclusions and Recommendations

Research Questions Answered

In Chapter I, we reported three investigative questions we aimed to answer:

- *1. How should telework performance be measured and assessed?*

From our results in Chapter IV, we have answered the first question by using Exploratory Factor Analysis. We created a measure of telework performance using confidence in telework, work-life balance, motivation, time management, difficulty of distraction, and self-rated performance, with a Cronbach reliability of 0.844.

- *2. How is an individual's telework performance related to other variables such as personality and attitude?*

Using our created variable of telework performance, we performed a multiple linear regression using autonomy, Big 5 personality traits, communication, non-distractibility, overload, and telework stress. Using an alpha risk level of 0.05 we found that communication, non-distractibility, overload, and conscientiousness affect telework performance the most.

Our hypotheses in predicting individual relationships between many individual variables and telework performance were tested using linear regression. We found that all variables we studied except one had either a positive or negative relationship with

telework performance. The only hypothesis that was not supported in predicting a positive or negative relationship was H11: The number of children who reside with teleworkers is negatively related to telework performance. As this survey was distributed 2 years after the pandemic first developed, we believe these results may be influenced by the idea that parents have adapted and adjusted to their children being at home. We might have seen a different outcome had this study been initiated during the March 2020 "Stay-at-home" orders.

- *3. Which variables are the strongest and most reliable predictors of telework performance?*

Conscientiousness was the personality trait of the Big 5 that predicted telework performance the most with the highest unstandardized beta of 0.495. Non-distractibility was rated 2nd, then overload, and finally communication. All four variables were able to explain 66% of the variance in telework performance with an R-square value of 0.660.

Implications and Significance of Research

Conscientiousness, non-distractibility, overload, and communication will be discussed in this section with an interpretation of the results and why they matter. Both conscientiousness and non-distractibility describe characteristics of self-regulation theory and tie closely to topics of self-control and internal motivation. Conscientious individuals make deliberate efforts to stay organized, on track, and exercise self-control to limit negative behaviors affecting their telework performance. Although it may seem obvious, this research highlighted the fact that telework operates in a highly autonomous environment where self-regulation and self-control drive effective outcomes of performance. Therefore a focus on improving personnel should revolve around preparing individuals to work autonomously and to self-regulate.

We defined non-distractibility as the ability of an individual to ignore or mitigate distractions and interruptions while teleworking. Every teleworker's home environment may differ slightly or extensively. Any teleworker can make deliberate efforts to separate themselves from distractions, but may not necessarily be able to stop interruptions. Our study found the sample was highly undistracted, which ultimately had a positive effect on their performance. On the flip side, if a teleworker were highly distracted and frequently interrupted, our study shows their performance would suffer in comparison. If a

teleworker communicates to their supervision that they are overly distracted at home, they should be allowed to return to their work center as needed.

We found overload as a significant predictor of telework performance, with lower levels of overload predicting higher performance. As previous literature has found, this relationship is closely associated with the stress that comes with overload. One reason why overload was perceived as lower in this sample may be that there is daily saved time and mental energy. Depending on the drive to work, time and energy are returned to the teleworker, giving them more flexibility to balancing their home life and work life. Another observation is that highly conscientious and non-distracted people may also be less likely to procrastinate, reducing the opportunity for overload to occur.

Finally, effective communication seems to tie these variables together well. Without effective communication, information is not sent or received optimally. Prompt and quality feedback, along with the occasional face-to-face meetings allows more information to be utilized more efficiently to complete work. As we have seen with this research, supervision that uses clear lines of communication influences an individual's perception of their telework effectiveness. It is imperative, especially for teleworkers, supervisors, and higher leadership to persistently and promptly communicate with each

other. This is easier said than done, but a deliberate and conscious effort is required by all parties for effective communication.

The key takeaway for the Peterson/Schriever Garrison is that mandated telework does not necessarily equate to effective telework for all. Supervisors are encouraged to withhold any subordinates' option to telework should they display any signs of abuse of the system, or decline in performance. There may be other personnel issues at hand, but counseling and close supervision are needed for some personalities. High performers should be allowed to continue to telework, as they self-report a higher quality of life and better productivity. Full-time telework should also be discouraged, as getting "eyes-on" subordinates at least once per week in-person is one way to ensure the physical, mental, social wellbeing of a teleworker.

At the highest level, the Office of Personnel Management can use the results of this thesis in their Annual Report to Congress on the Status of Telework in the Federal Government. These results may inform policymakers and shape the way the military and government approaches telework in upcoming emergencies.

Assumptions/Limitations

No research study is credible without limitations. There are many limitations to this research study, including subjectivity, social desirability, non-response bias, and that causality cannot be inferred due to the cross-sectional nature of surveys.

First, survey measures are highly subjective. Likert scales typically range from strongly disagree to strongly agree, however, there may be times when a respondent is unsure and might guess or approximate. Small and compounding variations in responses can accumulate and affect the explained variance of a response. We attempted to remove as much subjectivity as possible; however, it cannot be known with certainty that each measure is a true representation of an individual.

Second, social desirability is a threat that states people tend to respond with what makes them sound better, or more socially desirable. We attempted to reduce the likelihood of socially desirable responses by clearly stating that responses would be kept confidential and unanimous, however, this does not guarantee a respondent reverted to socially desirable answers. This may have been the case if they had a strong opinion about telework and wanted to steer their responses one way or another. We could have used a measure to test social reliability, but the Air Force Survey Office would have likely removed them.

The non-response bias can be a limitation to this study. As the Air Force Survey Office has stated, survey fatigue is an issue across the Air Force. Less and less personnel are volunteering to complete surveys, and those that do may have a biased viewpoint towards volunteerism. This is a problem when the sample does do a good job reflecting the population as a whole.

Finally, as this was a thesis effort, longitudinal survey data would have been very difficult to complete, especially with the Air Force Survey Office restricting, limiting, and delaying the research process to review our survey for compliance with Air Force regulations. As such, this research was only a cross-sectional snapshot of data in time, and therefore causality cannot be inferred.

Recommendations for Action

A robust personal development, training, and education program is one way that businesses and organizations can improve the efficiency of their teleworkers (Allen et al. 2015). Training in areas of communication and feedback, specifically training for supervisors and managers on how to effectively manage workers is essential for the optimized performance of teleworkers. On an individual level, training and development in areas such as establishing planning behaviors and other self-regulatory skills will also benefit teleworkers in maximizing their productivity (Allen et al. 2015). In a digital age, training on new digital software and platforms could also benefit the teleworker.

Even though a worker may desire to telework full-time, an organization needs to require periodic face-to-face and in-person interaction time with their employees. Although in times of a pandemic this may not be possible, it is important to implement to ensure the social connectedness & sense of belongingness of everyone in the organization. In an environment that's transitioned entirely online, supervisors should work on enriching their media experience with their subordinates. Video conferencing and collaborative online platforms are one way to get closer to the in-person experience and advancements in technology will improve both the connectivity and usability of these platforms (De' et al. 2020).

The screening of individuals based on their desire to telework, past performance, level of conscientiousness, and level of self-regulation has the potential to improve the effectiveness of an organization's telework program. With an efficient and pre-screened workforce, management should know with confidence that the workers selected for telework have been chosen based upon a set of researched criteria. Future research can aim to construct a set of screening criteria by creating reliable measures of situational awareness, self-regulation, telework performance, and other aspects of personality specifically geared toward telework.

Recommendations for Future Research

There are many opportunities in telework research to advance the telework performance of individuals. Advancements in technology will make broadband internet widely accessible with online collaboration and real-time media richness more identical to in-person meetings. As this thesis and many research studies have found, an individual's personality will have many effects on the individual's stress level and behaviors that impact individual performance. Future research opportunities can aim to establish models for specific personality types, and these models can be used for recruitment tools for specific teleworking jobs. When hiring a person for a teleworking job, a recruiter can use established personality trait tests to filter any personalities that do not fit the criteria of a productive teleworker.

However, during an emergency pandemic and mandated telework, a wider range of performing individuals is authorized to telework. In this case, it is recommended that organizations provide more support, guidance, and closer supervision in terms of best practices of teleworking and provide individualized feedback to teleworkers on how to improve their performance while teleworking. In a health emergency, there might not be the opportunity to screen employees based on personality, therefore the next best solution

is to provide extensive training and education to the tele-workforce on how to be more effective while working autonomously.

Situation awareness has been noted in literature as an important aspect of human factors research (Badiru and Lamont 2022). The connection between the environment, time, and space all contribute to one's level of situational awareness. As a teleworker, there are multiple opportunities for distractions in their home environment to occur. There may be work-life issues causing an imbalance of prioritization of tasks. The connection between one's level of situational awareness and their level of self-regulation and self-discipline to stay focused on current objectives will play a key role in future research. Future research could explore the relationship between an individual's level of situation awareness, self-regulation, and how they affect one's teleworking job performance. As there are many antecedents to situational awareness such as attention, memory, automation, stress, and workload (Badiru and Lamont 2022), one person's situational awareness while teleworking should vary between each teleworker. An individual's telework environment might differ completely from being completely silent and living alone to a teleworker co-residing with noisy family members that have the potential to cause major distractions and interruptions. An individual's situational awareness will affect their ability to manage their time, set boundaries, plan ahead, and

prioritize their objectives. Generalized models about telework situation awareness might not be feasible because a teleworker's own environment and a teleworker's individuality are very specific. Prior research has explored many motivating factors that contribute to an individual's performance, including the accomplishment of set goals and rewarding of individuals based on reaching set goals (Bandura 1991). Research targeting how to establish an optimum telework environment, and increasing one's situational awareness could act as another step toward crafting the most effective teleworkers.

Conclusion

This research found that conscientiousness, non-distractibility, communication, and overload were significant predictors of telework performance. Although not all career fields are telework-capable or eligible, those that are capable were found to have more positive outcomes with telework than negative. This is not to say the negative outcomes should be overlooked, but instead, leaders of organizations can use this teleworking research to provide education, training, and professional development for its personnel to better improve their telework programs. Effective communication and the development of a teleworker for career growth are both important aspects leaders of organizations should prioritize. A teleworker should be provided the opportunity to voice their opinion about whether they wish to continue teleworking after the pandemic ends, especially if they found their time teleworking effective.

Appendix A – Telework Survey of Peterson & Schriever AFB Personnel

Thank you for participating in our survey, your feedback is important! Please take time to read this entire page and ask questions before deciding whether to participate.

The purpose of the survey is to gauge the opinions of the Peterson/Schriever personnel with regards to telework. If you choose to participate, you will be asked to voluntarily answer survey questions provided on the next page. This will take approximately 15 minutes to complete.

Participation is voluntary. You can discontinue participation at any time without penalty or loss.

If you choose to participate, demographic information will be collected in order to understand which groups report the most efficiency with telework. However, responses to the questions will be anonymous and no data will be collected that could be used to link you to the survey.

To maintain the confidentiality of your data: Responses to the questions will be anonymous and no data will be collected that could be used to link you to the survey. Each subject will be assigned a random number code to ensure that personal identifiers are not known. Participant identifiers will not
be included in any publications.

By continuing and participating in the survey, you are providing your consent to participate. If you have questions regarding the survey, contact Capt Patrick Lopez (patrick.lopez@afit.edu).

Privacy Act Statement
Authority: 10 U.S.C.; 8013; SECAF
Purpose: To provide senior leadership insight on telework attitudes and opinions.
Air Force Survey Control Number:
Link to the AF Portal list of approved surveys:
https://www.my.af.mil/gcss-af/USAF/content/valid

1. Which of the following best describes your preference to telework?
   - I cannot telework due to a majority of my job tasks requiring me to be physically in person.
   - I have no desire to telework
   - I want to telework part-time
   - I want to telework full-time

2. How confident are you in your capability to successfully complete your work requirements while teleworking?
   - Not at all confident
   - Not so confident
   - Somewhat confident
   - Very confident
   - Extremely confident

3. What aspects of your job could be performed while teleworking? (Open response)

4. What aspects of your job do you feel would be better performed in person as opposed to telework? (Open response)

5. In a typical week, how many days per week do you telework? (Based on the response the survey is linked either to the next question or to question 62)
   - 0 Days
   - 1 Day
   - 2 Days
   - 3 Days
   - 4 Days
   - 5 Days
   - 6 Days
   - 7 Days

6. Prior to the COVID-19 pandemic, how many days per week did you telework?

- 0 Days
- 1 Day
- 2 Days
- 3 Days
- 4 Days
- 5 Days
- 6 Days
- 7 Days

7. What are your typical duty hours when teleworking on an average day?
(Open response)

8. Approximately how far is your commute to your workplace (in miles)?
(Open response)

9. Approximately how much time does it take for your commute to your workplace (in minutes)?
(Open response)

10. How often do you work outside your typical duty hours to complete your job requirements?

- None at all
- A little
- A moderate amount
- A lot
- A great deal

11. In your opinion, what is the most beneficial aspect of teleworking? (Open response)

12. What have you liked the most about teleworking? (Open response)

13. What have you disliked the most about teleworking? (Open response)

14. Are there any resources you wish you had that haven't been provided while teleworking?

- No
- Yes (please specify) (Open response)

15. How satisfied are you with the communication between you and your supervisor while teleworking?

- Very dissatisfied
- Dissatisfied
- Neither satisfied nor dissatisfied
- Satisfied
- Very satisfied

16. Are you currently a supervisor? (Based on the response, the survey is routed to the next question or to question 27)

- No
- Yes

17. In general, I trust my subordinate(s) to do quality work while they telework.

- Strongly disagree
- Disagree
- Neither agree nor disagree
- Agree
- Strongly agree

18. In general, how motivated do you think your subordinate(s) are to complete their work while teleworking?

- Not at all motivated
- Not so motivated
- Neutral
- Motivated
- Extremely motivated

19. In general, what has been the biggest challenge for you personally while supervising teleworkers? (Open response)

20. In general, how often do your subordinates have job performance issues while teleworking that require your attention?

- Never
- Rarely
- Sometimes
- Often
- Always

21. In general, how would you rate your subordinates' overall teleworking job performance?

- Not at all effective
- Not so effective
- Neutral
- Very effective
- Extremely effective

22. In general, I believe my subordinate(s) would be most effective performing their job by working in-person vs. teleworking.

- Strongly disagree
- Disagree
- Neither agree nor disagree
- Agree
- Strongly agree

23. In general, do you feel your subordinates put more or less effort into their work while teleworking vs. working in-person?

- A lot less effort
- A little less effort
- About the same
- A little more effort
- A lot more effort

24. In general, do you feel your subordinates spend more or less time on their work while teleworking vs. working in person?

- A lot less time
- A little less time
- About the same amount of time
- A little more time
- A lot more time

25. In general, how satisfied are you with the quality of your subordinates' work that they perform when teleworking?

- Very dissatisfied
- Dissatisfied
- Neither satisfied nor dissatisfied
- Satisfied
- Very satisfied

26. While teleworking during the COVID-19 pandemic, how would you rate the communication between you and your subordinate(s)?

- Very low quality
- Low quality
- Neither high nor low quality
- High quality
- Very high quality

27. How satisfied are you with the communication from leadership above your supervisor while teleworking?

- Very dissatisfied
- Dissatisfied
- Neither satisfied nor dissatisfied
- Satisfied
- Very satisfied

28. How satisfied are you with your overall work-life balance while teleworking?

- Very dissatisfied
- Dissatisfied
- Neither satisfied nor dissatisfied
- Satisfied
- Very satisfied

29. While teleworking, how would you rate your level of motivation to complete your work?

- Not at all motivated
- Not so motivated
- Neutral
- Motivated
- Extremely motivated

30. While teleworking, how easily distracted are you?

- Very easily distracted
- Easily distracted
- Neither easily distracted nor difficult to distract
- Difficult to distract
- Very difficult to distract

31. While teleworking, how distracting is your boss?

- Not at all distracting
- Not so distracting
- Neutral
- Distracting
- Extremely distracting

32. While teleworking, how distracting are your phone notifications/phone calls?
- Not at all distracting
- Not so distracting
- Neutral
- Distracting
- Extremely distracting

33. While teleworking, how distracting are people that are not work-related?
- Not at all distracting
- Not so distracting
- Neutral Distracting
- Extremely distracting

34. While teleworking, how distracting are your pets interrupting work?
- Not at all distracting (or do not have pets)
- Not so distracting
- Neutral
- Distracting
- Extremely distracting

35. While teleworking, how distracting is browsing the internet/social media?
- Not at all distracting
- Not so distracting
- Neutral
- Distracting
- Extremely distracting

36. While teleworking, how distracting is knowing that household chores need to be done?
- Not at all distracting
- Not so distracting
- Neutral
- Distracting
- Extremely distracting

37. How satisfied are you with the noise level in your workspace while teleworking?
- Very dissatisfied
- Dissatisfied
- Neither satisfied nor dissatisfied
- Satisfied
- Very satisfied

38. While teleworking, how distracting is the noise heard in your workspace?
- Not at all distracting
- Not so distracting
- Neutral
- Distracting
- Extremely distracting

39. While teleworking, how distracting are your household hobbies?
- Not at all distracting (or do not have household hobbies)
- Not so distracting
- Neutral
- Distracting
- Extremely distracting

40. While teleworking, how effective would you rate your time management?
- Not at all effective
- Not so effective
- Neutral
- Very effective
- Extremely effective

41. How would you rate your overall teleworking effectiveness with regards to your job performance?
- Not at all effective
- Not so effective
- Neutral
- Very effective
- Extremely effective

42. While teleworking, what stressors have you faced that you might not have experienced while working in person? (Open response)

43. What has been your biggest stressor while teleworking? (Open response)

44. While teleworking, my job requires me to work very fast.
- Strongly disagree
- Disagree
- Neither agree nor disagree
- Agree
- Strongly agree

(Caplan et al. 1980)

45. While teleworking, my job requires me to work very hard.
- Strongly disagree
- Disagree
- Neither agree nor disagree
- Agree
- Strongly agree

(Caplan et al. 1980)

46. While teleworking, my job leaves me with little time to get things done.
- Strongly disagree
- Disagree
- Neither agree nor disagree
- Agree
- Strongly agree

(Caplan et al. 1980)

47. Since you began teleworking, how has the pace of your work changed?
    - Slowed down a lot
    - Slowed down little
    - No change
    - Sped up a little
    - Sped up a lot

(Caplan et al. 1980)

48. While teleworking, I have a great deal of time to think and contemplate?
    - Strongly disagree
    - Disagree
    - Neither agree nor disagree
    - Agree
    - Strongly agree

(Caplan et al. 1980)

49. While teleworking, how much work do you have in a typical day?
    - Hardly Any
    - A little
    - A moderate amount
    - A lot
    - A great deal

(Caplan et al. 1980)

50. While teleworking, others expect a lot of work from me.
    - Strongly disagree
    - Disagree
    - Neither agree nor disagree
    - Agree
    - Strongly agree

(Caplan et al. 1980)

51. How satisfied are you with the amount of time you have to do all of your work while teleworking?

- Very dissatisfied
- Dissatisfied
- Neither satisfied nor dissatisfied
- Satisfied
- Very satisfied

(Caplan et al. 1980)

52. How often do you procrastinate while teleworking?

- None at all
- A little
- A moderate amount
- A lot
- A great deal

53. While teleworking, how many projects, assignments, or tasks do you typically have?

- Hardly Any
- A little
- Some
- A lot
- A great deal

(Caplan et al. 1980)

54. While teleworking, how many lulls between heavy workload periods do you typically have?

- Hardly Any
- A little
- Some
- A lot
- A great deal

(Sims, H. P., Szilagyi, A. D., & Keller, R. T. 1976)

55. While teleworking, how much are you left on your own to do your own work?

- None at all
- A little
- A moderate amount
- A lot
- A great deal

(Sims, H. P., Szilagyi, A. D., & Keller, R. T. 1976)

56. While teleworking, to what extent are you able to act independently of your supervisors in performing your job function?

- None at all
- A little
- A moderate amount
- A lot
- A great deal

(Sims, H. P., Szilagyi, A. D., & Keller, R. T. 1976)

57. While teleworking, to what extent are you able to do your job independently of others?

- None at all
- A little
- A moderate amount
- A lot
- A great deal

(Sims, H. P., Szilagyi, A. D., & Keller, R. T. 1976)

58. While teleworking, to what extent do you have the opportunity for independent thought and action in your work?

- None at all
- A little
- A moderate amount
- A lot
- A great deal

(Sims, H. P., Szilagyi, A. D., & Keller, R. T. 1976)

59. While teleworking, to what extent do you have the freedom to do pretty much what you want on the job?

- None at all
- A little
- A moderate amount
- A lot
- A great deal

(Sims, H. P., Szilagyi, A. D., & Keller, R. T. 1976)

60. While teleworking, to what extent do you have the control over the pace of your work?

- None at all
- A little
- A moderate amount
- A lot
- A great deal

(Sims, H. P., Szilagyi, A. D., & Keller, R. T. 1976)

61. Below is a list of words or phrases commonly used to describe people. Read each word or phrase and decide whether you agree or disagree that it describes your typical behavior. Please respond to all the words or phrases. There are no right or wrong answers, so try to describe your behavior as accurately and honestly as you can.
You see yourself as:
artistic
assertive
calm
careless
cold and aloof
complex
conscientious
considerate
conventional
cooperative
(Goldberg 1992)

61. You see yourself as:
creative
daring
distrustful
easily distracted
efficient
inactive
inconsistent
intellectual
introverted
jealous
leader like
moody
neat
nervous
organized
philosophical
quiet
relaxed
rude
shy, inhibited
simple
sympathetic
thorough
timid
touchy
trustful
uncreative
undependable
an underachiever
unemotional
unenvious
unexcitable
unimaginative
unintellectual
(Goldberg 1992)

61. You see yourself as:
unkind
unsympathetic
verbal
vigorous
warm

- Strongly disagree
- Disagree
- Neither agree nor disagree
- Agree
- Strongly agree

(Goldberg 1992)

62. How old are you?
Under 18

- 18-24
- 25-34
- 35-44
- 45-54
- 55-64
- 65+

63. What is your gender?

- Male
- Female
- I prefer not to say

64. How many children reside with you while you telework?

- 0
- 1
- 2
- 3
- 4
- 5 or more

65. What is your Space Force Specialty Code (SFSC) or Air Force Specialty Code (AFSC)?

Thank you for participating in our survey!

Appendix B – Tables of Reliability

Table 33 Cronbach Alpha Reliability for Big 5 Personality Traits

	AGREEABLENESS	CONSCIENTIOUSNESS	EXTRAVERSION	NEUROTICISM	OPENNESS
	cold and aloof*R	careless*R	assertive	calm*R	artistic
	considerate	conscientious	daring	jealous	~~complex~~
	cooperative	easily distracted*R	inactive*R	moody	conventional*R
	distrustful*R	efficient	introverted*R	nervous	creative
	rude*R	inconsistent*R	leader like	relaxed*R	intellectual
	sympathetic	neat	quiet*R	touchy	philosophical
	trustful	organized	shy, inhibited*R	~~unemotional*R~~	simple*R
	unkind*R	thorough	timid*R	~~unenvious*R~~	uncreative*R
	unsympathetic	undependable*R	verbal	~~unexcitable*R~~	unimaginative*R
*R reverse code	warm	underachiever*R	vigorous		unintellectual*R
Cronbach Alpha	0.818	0.782	0.839	0.693	0.730
No. Items	10	10	10	6	9

Table 34 Cronbach Alpha Reliability for Autonomy

	Autonomy
	Q55 left to do own work
	Q56 independent of supervision
	Q57 independent of others
	Q58 independent though and action
	Q59 work freedom to do what you want
	Q60 controls pace of work
Cronbach Alpha	0.828

No. Items	6

Table 35 Cronbach Alpha Reliability for Communication

	Communication
	Q15 With supervisor
	Q27 With leadership above supervisor
Cronbach Alpha	0.782
No. Items	2

Table 36 Cronbach Alpha Reliability for Non-Distractibility

	Non-distractibility
	Q32 distracted from phone/notifications*R
	Q33 distracted from people not work related*R
	Q34 distracted from pets*R
	Q35 distracted from internet or social media*R
	Q36 distracted from household chores*R
	Q38 distracted from workspace noise*R
*R reverse code	Q39 distracted from household hobbies*R
Cronbach Alpha	0.812
No. Items	7

Table 37 Cronbach Alpha Reliability for Overload

	Overload
	Q44 work fast
	Q45 work hard
	Q46 little time to complete tasks
	Q47 change in pace of work
	~~Q48 time to think*R~~
	Q49 change in workload
	Q50 others expect a lot of me
	Q51 satisfaction with time to complete work*R
	Q53 number of projects, tasks assigned
*R reverse code	Q54 breaks between heavy workload*R
Cronbach Alpha	0.705
No. Survey Items	9

Table 38 Cronbach Alpha Reliability for Telework Performance

	TELEWORK PERFORMANCE
	Q2 confidence in telework
	Q29 motivation in completing work
	Q28 work life balance
	Q30 difficulty of distraction
	Q40 rated time management
	Q41 rated performance
	Q52 procrastination*R
Cronbach Alpha	0.844
No. Survey Items	7

Appendix C – Table of Correlations

Correlations

		TELEWORK_ PERFORMANCE	AGREEABLE -NESS	CONSCIENTIOUS -NESS	EXTRAVERSION	NEUROTICISM	OPENNESS_TO _EXPERIENCE	AUTONOMY	COMMUNICATION	NON -DISTRACTIBILITY	OVERLOAD	TELEWORK _STRESS
TELEWORK_ PERFORMANCE	Pearson Correlation	1	.467**	.689**	.329**	-.311**	.248**	.278**	.430**	.483**	-.262**	-.257**
	Sig. (2-tailed)		0.000	0.000	0.000	0.000	0.004	0.001	0.000	0.000	0.002	0.004
	N	134	133	132	131	134	132	131	134	133	132	123
AGREEABLE -NESS	Pearson Correlation	.467**	1	.511**	.388**	-.346**	.362**	0.097	.227**	.181*	-0.015	-0.046
	Sig. (2-tailed)	0.000		0.000	0.000	0.000	0.000	0.267	0.008	0.036	0.863	0.614
	N	133	136	132	133	136	132	133	136	135	134	125
CONSCIENTIOUS -NESS	Pearson Correlation	.689**	.511**	1	.401**	-.298**	.301**	.222*	.187*	.201*	-0.137	-0.124
	Sig. (2-tailed)	0.000	0.000		0.000	0.001	0.000	0.011	0.031	0.021	0.118	0.173
	N	132	132	133	130	133	131	130	133	132	131	122
EXTRAVERSION	Pearson Correlation	.329**	.388**	.401**	1	-.439**	.296**	.224**	.238**	.174*	0.037	-.196*
	Sig. (2-tailed)	0.000	0.000	0.000		0.000	0.001	0.010	0.006	0.045	0.673	0.029
	N	131	133	130	134	134	131	131	134	133	132	124
NEUROTICISM	Pearson Correlation	-.311**	-.346**	-.298**	-.439**	1	-0.139	-0.013	-.243**	-.232**	0.102	.193*
	Sig. (2-tailed)	0.000	0.000	0.001	0.000		0.110	0.885	0.004	0.007	0.239	0.031
	N	134	136	133	134	137	133	134	137	136	135	126
OPENNESS_ TO_EXPERIENCE	Pearson Correlation	.248**	.362**	.301**	.296**	-0.139	1	0.001	0.012	-0.098	-0.042	-0.012
	Sig. (2-tailed)	0.004	0.000	0.000	0.001	0.110		0.993	0.894	0.262	0.636	0.894
	N	132	132	131	131	133	133	130	133	132	132	122
AUTONOMY	Pearson Correlation	.278**	0.097	.222*	.224**	-0.013	0.001	1	0.147	0.119	0.085	-.192*
	Sig. (2-tailed)	0.001	0.267	0.011	0.010	0.885	0.993		0.079	0.158	0.319	0.028
	N	131	133	130	131	134	130	144	144	142	141	131
COMMUNICATION	Pearson Correlation	.430**	.227**	.187*	.238**	-.243**	0.012	0.147	1	.334**	-0.066	-.191*
	Sig. (2-tailed)	0.000	0.008	0.031	0.006	0.004	0.894	0.079		0.000	0.428	0.026
	N	134	136	133	134	137	133	144	150	148	147	135
NON-DISTRACTIBILITY	Pearson Correlation	.483**	.181*	.201*	.174*	-.232**	-0.098	0.119	.334**	1	-0.044	-.248**
	Sig. (2-tailed)	0.000	0.036	0.021	0.045	0.007	0.262	0.158	0.000		0.599	0.004
	N	133	135	132	133	136	132	142	148	148	145	134
OVERLOAD	Pearson Correlation	-.262**	-0.015	-0.137	0.037	0.102	-0.042	0.085	-0.066	-0.044	1	-0.097
	Sig. (2-tailed)	0.002	0.863	0.118	0.673	0.239	0.636	0.319	0.428	0.599		0.269
	N	132	134	131	132	135	132	141	147	145	147	133
TELEWORK_ STRESS	Pearson Correlation	-.257**	-0.046	-0.124	-.196*	.193*	-0.012	-.192*	-.191*	-.248**	-0.097	1
	Sig. (2-tailed)	0.004	0.614	0.173	0.029	0.031	0.894	0.028	0.026	0.004	0.269	
	N	123	125	122	124	126	122	131	135	134	133	135

**. Correlation is significant at the 0.01 level (2-tailed).
*. Correlation is significant at the 0.05 level (2-tailed).

References

111th U.S. Congress. 2010. “Telework Enhancement Act of 2010.”

Abulibdeh, A. 2020. “Can COVID-19 mitigation measures promote telework practices?” *Labor and Society*, 23 (4): 551–576. https://doi.org/10.1111/wusa.12498.

Ali, I. 2019. “Personality traits, individual innovativeness and satisfaction with life.” *Journal of Innovation & Knowledge*, 4 (1): 38–46. https://doi.org/10.1016/j.jik.2017.11.002.

Allen, T. D., T. D. Golden, and K. M. Shockley. 2015. “How Effective Is Telecommuting? Assessing the Status of Our Scientific Findings.” *Psychol Sci Public Interest*, 16 (2): 40–68. https://doi.org/10.1177/1529100615593273.

American Psychological Association. 2020. *Stress in America - A National Mental Health Crisis*. American Psychological Association.

American Psychological Association (2020). 2020. *Stress in America™ 2020: A National Mental Health Crisis.* New York: Oxford University Press.

Arabacı, G., and B. A. Parris. 2020. “Inattention and task switching performance: the role of predictability, working memory load and goal neglect.” *Psychological Research*, 84 (8): 2090–2110. https://doi.org/10.1007/s00426-019-01214-1.

Arling, P. 2004. “The Impact of Telework on Performance: A Social Network Approach.” *New York*, 8.

Badiru, A. B., and G. B. Lamont. 2022. *Innovation fundamentals: quantitative and qualitative techniques*. Systems innovation. Boca Raton, FL: CRC Press.

Bandura, A. 1991. “Social cognitive theory of self-regulation.” *Organizational Behavior and Human Decision Processes*, 50 (2): 248–287. https://doi.org/10.1016/0749-5978(91)90022-L.

Barrick, M. R., and M. K. Mount. 1991. “THE BIG FIVE PERSONALITY DIMENSIONS AND JOB PERFORMANCE: A META-ANALYSIS.” *Personnel Psychology*, 44 (1): 1–26. https://doi.org/10.1111/j.1744-6570.1991.tb00688.x.

Barrick, M. R., and M. K. Mount. 1993. “Autonomy as a Moderator of the Relationships Between the Big Five Personality Dimensions and Job Performance.” *Journal of Applied Psychology*, 78, No 1, 111–118.

Barrick, M. R., G. L. Stewart, and M. Piotrowski. 2003. “Personality and Job Performance:” *Journal of Applied Psychology*, 87: 19.

Bauer, L., K. Broady, W. Edelberg, and J. O’Donnell. 2020. “Ten Facts about COVID-19 and the U.S. Economy.” 29.

Baumeister, R. F., and K. D. Vohs (Eds.). 2004. *Handbook of self-regulation: research, theory, and applications*. New York: Guilford Press.

Belzunegui-Eraso, A., and A. Erro-Garcés. 2020. "Teleworking in the Context of the COVID-19 Crisis." *Sustainability*, 12 (9): 3662. https://doi.org/10.3390/su12093662.

Bentley, T. A., S. T. T. Teo, L. McLeod, F. Tan, R. Bosua, and M. Gloet. 2016. "The role of organisational support in teleworker wellbeing: A socio-technical systems approach." *Applied Ergonomics*, 52: 207–215. https://doi.org/10.1016/j.apergo.2015.07.019.

Betteke van Ruler. 2018. "Communication Theory: An Underrated Pillar on Which Strategic Communication Rests." *International Journal of Strategic Communication*, 12 (4): 367–381. https://doi.org/10.1080/1553118X.2018.1452240.

Brief, A. P., and R. J. Aldag. 1975. "Employee reactions to job characteristics: A constructive replication." *Journal of Applied Psychology*, 60 (2): 182–186. https://doi.org/10.1037/h0076548.

Bulger, C. 2014. "Work-Life Balance." *Encyclopedia of Quality of Life and Well-Being Research*. Springer.

Calvo, M. G., and A. Gutiérrez-García. 2016. "Cognition and Stress." *Stress: Concepts, Cognition, Emotion, and Behavior*, 139–144. Elsevier.

Campo, A. M. D. V., B. Avolio, and S. I. Carlier. 2021. "The Relationship Between Telework, Job Performance, Work–Life Balance and Family Supportive Supervisor Behaviours in the Context of COVID-19." *Global Business Review*, 097215092110499. https://doi.org/10.1177/09721509211049918.

Caplan, R. D., S. Cobb, J. R. P. French, R. Van Harrison, and S. R. Pinneau. 1980. "Job Demands and Worker Health." *Ann Arbor: University of Michigan, Institute for Social Research*.

Carlos, V. S., and R. G. Rodrigues. 2016. "Development and Validation of a Self-Reported Measure of Job Performance." *Soc Indic Res*, 126 (1): 279–307. https://doi.org/10.1007/s11205-015-0883-z.

Carroll, D., A. T. Ginty, and A. C. Phillips. 2016. "The Behavioral, Cognitive, and Neural Correlates of Deficient Biological Reactions to Acute Psychological Stress." *Stress: Concepts, Cognition, Emotion, and Behavior*, 187–194. Elsevier.

Chandler, K. D. 2021. "Work-family conflict is a public health concern." *Public Health in Practice*, 2: 100158. https://doi.org/10.1016/j.puhip.2021.100158.

Clark, L. A., S. J. Karau, M. D. Michalisin, and P. S. W. Scranton. 2012. "Telecommuting Attitudes and the 'Big Five' Personality Dimensions." 16.
Clark, S. 2000. "Work/family border theory: A new theory of work/family balance." *SAGE Publications*.
Cohen, J. 1992. "QUANTITATIVE METHODS IN PSYCHOLOGY." 5.
Colquitt, J., J. A. LePine, and M. J. Wesson. 2019. *Organizational behavior: improving performance and commitment in the workplace*. New York, NY: McGraw-Hill Education.
Crasta, D., J. S. Daks, and R. D. Rogge. 2020. "Modeling suicide risk among parents during the COVID-19 pandemic: Psychological inflexibility exacerbates the impact of COVID-19 stressors on interpersonal risk factors for suicide." *Journal of Contextual Behavioral Science*, 18: 117–127. https://doi.org/10.1016/j.jcbs.2020.09.003.
Cronbach, L. J. 1951. "Coefficient alpha and the internal structure of tests." 38.
De', R., N. Pandey, and A. Pal. 2020. "Impact of digital surge during Covid-19 pandemic: A viewpoint on research and practice." *International Journal of Information Management*, 55: 102171. https://doi.org/10.1016/j.ijinfomgt.2020.102171.
Elshaw, J. 2010. "Trust In a Virtual Workplace."
Fink, G. 2016. "Stress, Definitions, Mechanisms, and Effects Outlined." *Stress: Concepts, Cognition, Emotion, and Behavior*, 3–11. Elsevier.
Frazier, P. A., A. P. Tix, and K. E. Barron. 2004. "Testing Moderator and Mediator Effects in Counseling Psychology Research." *Journal of Counseling Psychology*, 51 (1): 115–134. https://doi.org/10.1037/0022-0167.51.1.115.
Giovanis, E. 2017. *Teleworking Effect on Traffic and Air Pollution*. preprint. SOCIAL SCIENCES.
Goldberg, L. R. 1992. "The development of markers for the Big-Five factor structure." 18.
Golden, T. D., J. F. Veiga, and R. N. Dino. 2008. "The impact of professional isolation on teleworker job performance and turnover intentions: Does time spent teleworking, interacting face-to-face, or having access to communication-enhancing technology matter?" *Journal of Applied Psychology*, 93 (6): 1412–1421. https://doi.org/10.1037/a0012722.
Griffiths, R. F. 2003. "TIME MANAGEMENT IN TELEWORK AND OTHER AUTONOMOUS WORK ENVIRONMENTS." 24.

Hassanzadeh, A., Z. Heidari, A. Feizi, A. Hassanzadeh Keshteli, H. Roohafza, H. Afshar, and P. Adibi. 2017. "Association of Stressful Life Events with Psychological Problems: A Large-Scale Community-Based Study Using Grouped Outcomes Latent Factor Regression with Latent Predictors." *Computational and Mathematical Methods in Medicine*, 2017: 1–12. https://doi.org/10.1155/2017/3457103.

Holm, S. 1979. "A Simple Sequentially Rejective Multiple Test Procedure." *Scandinavian Journal of Statistics*, 6 (2): 65–70.

Hoppock, R. 1935. *Job Satisfaction*. Harper and Brothers, New York, p.47.

Hourani, L. L., T. V. Williams, and A. M. Kress. 2006. "Stress, Mental Health, and Job Performance among Active Duty Military Personnel: Findings from the 2002 Department of Defense Health-Related Behaviors Survey." *Military Medicine*, 171 (9): 849–856. https://doi.org/10.7205/MILMED.171.9.849.

Inspector General, U.S. DoD. 2021. "Evaluation of Access to Department of Defense Information Technology and Communications During the Coronavirus Disease-2019 Pandemic."

John Hopkins University and Medicine. 2021. "COVID-19 Data in Motion: Wednesday, August 25, 2021." Accessed August 25, 2021. https://coronavirus.jhu.edu/.

Kop, W. J., and H. M. Kupper. 2016. "Fatigue and Stress☆." *Stress: Concepts, Cognition, Emotion, and Behavior*, 345–350. Elsevier.

Maslach, C., and M. P. Leiter. 2016. "Burnout." *Stress: Concepts, Cognition, Emotion, and Behavior*, 351–357. Elsevier.

Matthews, G., and S. E. Campbell. 2009. "Sustained performance under overload: personality and individual differences in stress and coping." *Theoretical Issues in Ergonomics Science*, 10 (5): 417–442. https://doi.org/10.1080/14639220903106395.

Maucione, S. 2021. "'We're not going back,' Air Force leadership says telework is here to stay." *'We're not going back,' Air Force leadership says telework is here to stay*. https://federalnewsnetwork.com/air-force/2020/09/were-not-going-back-air-force-leadership-says-telework-is-here-to-stay/.

Meymandpour, R., and Z. Bagheri. 2017. "A Study of Personality Traits, viz., Extraversion and Introversion on Telecommuters' Burnout." 10 (1): 8.

Muecke, S., and A. Iseke. 2019. "How Does Job Autonomy Influence Job Performance? A Meta-analytic Test of Theoretical Mechanisms." *Proceedings*, 2019 (1): 14632. https://doi.org/10.5465/AMBPP.2019.145.

National Center for Immunization and Respiratory Diseases (NCIRD), Division of Viral Diseases. 2021. “Interim Public Health Recommendations for Fully Vaccinated People.”

Nemțeanu, M.-S., D.-C. Dabija, and L. Stanca. 2021. “THE INFLUENCE OF TELEWORKING ON PERFORMANCE AND EMPLOYEES’ COUNTERPRODUCTIVE BEHAVIOUR.” *Amfiteatru Economic*, 23 (58): 20.

Nursey, J., and A. J. Phelps. 2016. “Stress, Trauma, and Memory in PTSD.” *Stress: Concepts, Cognition, Emotion, and Behavior*, 169–176. Elsevier.

OECD. 2020. *Productivity gains from teleworking in the post COVID-19 era: How can public policies make it happen?* OECD Policy Responses to Coronavirus (COVID-19). OECD Policy Responses to Coronavirus (COVID-19).

Office of the Under Secretary of Defense for Intelligence and Security. 2020. “DoD Information Security Program: Overview, Classification, and Declassification.”

Pflanz, S. E., and A. D. Ogle. 2006. “Job Stress, Depression, Work Performance, and Perceptions of Supervisors in Military Personnel.” *Military Medicine*, 171 (9): 861–865. https://doi.org/10.7205/MILMED.171.9.861.

Pushpakumari, M. D. 2008. “The Impact of Job Satisfaction on Job Performance : An Empirical Analysis.” 17.

Reger, M. A., I. H. Stanley, and T. E. Joiner. 2020. “Suicide Mortality and Coronavirus Disease 2019—A Perfect Storm?” *JAMA Psychiatry*, 77 (11): 1093. https://doi.org/10.1001/jamapsychiatry.2020.1060.

Roberts, B. W., K. E. Walton, and W. Viechtbauer. 2006. “Patterns of Mean-Level Change in Personality Traits across the Life Course: A Meta-Analysis of Longitudinal Studies.” *, pp.1-25*.

Sakamoto, H., M. Ishikane, C. Ghaznavi, and P. Ueda. 2021. “Assessment of Suicide in Japan During the COVID-19 Pandemic vs Previous Years.” *JAMA Netw Open*, 4 (2): e2037378. https://doi.org/10.1001/jamanetworkopen.2020.37378.

Sanders, G. S., and R. S. Baron. 1975. “The motivating effects of distraction on task performance.” *Journal of Personality and Social Psychology*, 8.

Schmitt, J. B., J. Breuer, and T. Wulf. 2021. “From cognitive overload to digital detox: Psychological implications of telework during the COVID-19 pandemic.” *Computers in Human Behavior*, 124: 106899. https://doi.org/10.1016/j.chb.2021.106899.

Sims, H. P., Szilagyi, A. D., & Keller, R. T. 1976. “The Measurement of Job Characteristics.” *Academy of Management Journal*, 19 (2): 195–212.

Smith, S. A., A. Patmos, and M. J. Pitts. 2018. “Communication and Teleworking: A Study of Communication Channel Satisfaction, Personality, and Job Satisfaction for Teleworking Employees.” *International Journal of Business Communication*, 55 (1): 44–68. https://doi.org/10.1177/2329488415589101.

Tavakol, M., and R. Dennick. 2011. “Making sense of Cronbach’s alpha.” *Int. J. Medical Education*, 2: 53–55. https://doi.org/10.5116/ijme.4dfb.8dfd.

Troll, E., L. Venz, F. Weitzenegger, and D. Loschelder. 2021. “Working from home during the COVID-19 crisis How self-control strategies elucidate.pdf.” *Applied Psychology*.

U.S. Office of Management and Budget. 2015. “Implementation of OMB Memorandum M-12-12 Section 3: Reduce the Footprint.”

U.S. Office of Personnel Management. 2017. *Federal Work-Life Survey Governmentwide Report.pdf*.

Volmer, J., D. Spurk, and C. Niessen. 2012. “Leader–member exchange (LMX), job autonomy, and creative work involvement.” *The Leadership Quarterly*, 23 (3): 456–465. https://doi.org/10.1016/j.leaqua.2011.10.005.

Witt, L. A. 2002. “The Interactive Effects of Extraversion and Conscientiousness on Performance.” *Journal of Management*, 17.

Witt, L. A., L. A. Burke, M. R. Barrick, and M. K. Mount. 2002. “The interactive effects of conscientiousness and agreeableness on job performance.” *Journal of Applied Psychology*, 87 (1): 164–169. https://doi.org/10.1037/0021-9010.87.1.164.

Zhang, S., R. Moeckel, A. T. Moreno, B. Shuai, and J. Gao. 2020. “A work-life conflict perspective on telework.” *Transportation Research Part A: Policy and Practice*, 141: 51–68. https://doi.org/10.1016/j.tra.2020.09.007.

Zickerick, B., S. Thönes, S. O. Kobald, E. Wascher, D. Schneider, and K. Küper. 2020. “Differential Effects of Interruptions and Distractions on Working Memory Processes in an ERP Study.” *Front. Hum. Neurosci.*, 14: 84. https://doi.org/10.3389/fnhum.2020.00084.

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14. ABSTRACT

The COVID-19 pandemic forced many individuals to shift from an atmosphere of face-to-face work to the digital work environment known as telework. Telework is an effective mitigation tool that ensures the continuity of operations. However, maximized telework may not be effective for all individuals. Many individual, organizational, and group level factors influence one's telework performance and this study examines four of the most influential antecedents. Using linear regression analysis, conscientiousness, overload, communication, and non-distractibility were found to be significant predictors that account for over half the variance explained in telework performance. Supported by self-regulation theories, both conscientiousness and non-distractibility contained the strongest beta coefficients, signifying the greatest impact on telework performance. These findings contribute to the telework body of literature by focusing on personal aspects that contribute to telework performance. Leaders and supervisors can use this research to revise telework policies and to train, educate, and develop their subordinates on aspects of effective self-regulation. In cases of degraded performance, employers are encouraged to counsel and withhold the option to telework from those with self-regulation issues.

15. SUBJECT TERMS
Telework performance, self-regulation, conscientiousness, overload, communication, non-distractibility

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