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GROWING RESILIENCE WITH MOBILE TECHNOLOGY: "USMC CONNECT" AND RESILIENCE IN THE MARINE CORPS RESERVE FORCES

by

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GROWING RESILIENCE WITH MOBILE TECHNOLOGY: "USMC CONNECT" AND RESILIENCE IN THE MARINE CORPS RESERVE FORCES

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LIST OF ACRONYMS AND ABBREVIATIONS

3RECON	3rd Force Reconnaissance
AA	Amphibious Assault
ANOVA	Analysis of Variance
app	application
CAC	Common Access Card
CD-RISC	Connor-Davidson Resilience Scale
CEB	Combat Engineer Battalion
DC	Division/Unit Cohesion
DIV	Division
DRS	Division/Unit Resilience
G1	Group 1
G2	Group 2
G3	Group 3
G4	Group 4
Gen X(er)	Generation X
Gen Z(er)	Generation Z
HQ	Headquarters
MARFORRES	Marine Force Reserve
MOS	Military Occupational Specialty
OCS	Officer Candidate School
PII	Personal Identifiable Information
PF	Positive Framing
PS	Psychological Safety
SWB	Subjective Well-Being
USMC	United States Marine Corps
TAM	Technology Acceptance Model
T1	Initial Survey
T2	Final Survey

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I. INTRODUCTION

Many people use applications (apps) as part of everyday living—from Lyft/Uber to finding restaurants, banking, and creating or deconflicting schedules. But apps can also be a part of a personal resilience toolkit. In particular, the growing awareness and importance of mental health has the Marine Corps interested in finding ways to help the Marine Corps team build resilience at every level, from personal, mental, and organizational resilience. The Marine Corps' Recruit Training mission is to create "Marines by recruiting quality young men and women and transform them through the foundations of rigorous basic training, shared legacy, and a commitment to core values, preparing them to win the nation's battles in service to the country" (Marines, 2021). While also having an objective of returning them back to the nation as quality citizens. Citizens who embody honor, courage, and commitment, as well as able to adapt to any situation, persevere, lead, and serve. The USMC Reserve Connect application (app) is the Marine Corps' current effort to measure possible psychological learning on resilience from a mobile application. USMC Reserve Connect is a new application and has not been studied yet. The aim of this study is to evaluate the application's efficacy using volunteers from the Marine Corps Reserves Force (MARFORRES) as participants. The tools that were used in this study were surveys delivered through Qualtrics, the USMC Reserve Connect app, and resilience interventions.

A. UNITED STATES MARINE CORPS RESERVES FORCE

To assess the effectiveness of the USMC Reserve Connect app, it requires first establishing the unique differences of the Marine Corps Reserve Forces and Marine active-duty units. The Marine Corps Reserves Force is a vital element in the total force and may be called upon to supplement, strengthen, or reinforce active forces in peacetime and in war. They are trained exactly like those on active duty. The enlisted go through 13 weeks of boot camp, three months of Marine combat training, and their military occupational specialties (MOS) school. Marine Corps Reserve Officers go through the same selection and meet the same qualification process as those officers on active duty. They must be

selected to go to and complete Officer Candidate School (OCS), The Basic School, and their MOS school (Marines, 2020).

Reservist and active-duty Marines differ in time commitment, benefits, pay, and lifestyle. Reservists are committed to serving one weekend a month (called drill weekends) and two weeks of active service a year (called annual training) (MARFORRES, 2021). If reserve units get activated for a particular event or situation, such as an overseas deployment, or filling an individual augmented role, they will be put on an active-duty status and be paid accordingly. With respect to benefits, active-duty have full coverage with medical and dental, while selected reservists may have the option to participate in a premium-based plan provided through the same insurance company as active-duty.

Lifestyles of reservists differ from active duty in terms of job selection, duty station, and duty status. One of the benefits of being a reservist is that reservists can select a specific MOS of their choice. Active-duty Marines are normally assigned an MOS during contracting, unless the MOS that one desires is available. If the MOS is available, then their recruiter can draft a contract with the desired MOS. The MOS of a reservist is important because it will help determine the duty station to which they will report to when on drill. Most reservists try to stay within the station that they live closest to. However, if they selected an MOS that is not geographically co-located near them, they may have to travel to where their unit is located, and they will have to pay to travel to get to drill. The Marine Corps will pay up to a designated dollar amount if the unit that Marine is assigned to is located 150 miles or more from their primary residence (MARADMIN 568/19, 2019).

Another way reservist Marines differ from active-duty Marines' is daily and weekly lifestyle. Active-duty Marines' lifestyle contain weekly haircuts, daily physical fitness training, multiple uniform inspections, long work hours in the office or in the field, and being on-call 24/7. Some advantages they have are a military work routine, other Marines constantly around them, and resources surrounding them on base. Since a reservist's life in the Marines is more of a part-time role, they normally have a primary day job, their "civilian" job. Depending on what the reservist's occupation is in their "civilian" job, these differences may present unique challenges to those Marines. For example, there could be added stress on preparing to leave for drill weekends, or weeks in which they have to pre-

plan with their primary jobs and families for their upcoming absence on top of their normal daily stresses. Also, extra expenses for drill not covered by pay or entitlements could add financial stress to the family or individual.

B. BACKGROUND

The definition of resilience that will be used for this study will be: "Resilience refers to the maintenance of positive adjustment under challenging conditions" (Sutcliffe & Vogus, 2003, pg. 95). It is important to distinguish between resiliency and resilience. Sutcliffe and Vogus deemed resiliency as a personality trait, and resilience, as a process (Sutcliffe & Vogus, 2003). Furthermore, resilience may aid in dealing with sociopolitical, technological, and economic trends once an individual understands their own process.

Suicide, retention, mental health, and pushing past one's comfort zones are tied to psychological resilience and are subjects in which the Marine Corps Reserve Force needs help in bringing awareness to its diverse force. All Marines come from diverse backgrounds and have many experiences that have shaped their individual characters. When those diverse individuals decide to be a Marines, they choose to join a service that almost strips them of their individuality and replaces it with team mentality. They have all joined an organization that works toward mission accomplishment and that expects newly graduated high schoolers, and some college graduates, to balance life while ensuring that national security is their priority. This is especially true in the Marine Corps Reserves Force. They are an organization whose purpose is "to augment, reinforce and support active Marines in time of war, national emergency, contingency operations, and provide personnel and operational tempo relief for the active-duty force in peace time and provide service to the community" (Marines, 2020). Reservists must do all of this while maintaining their civilian work-life balance. They stay mission ready by keeping up to date on training during their drill periods.

With all the responsibilities reservists have, their need to employ the study and practice of resilience in their everyday lives has become increasingly important. Since most have full-time jobs outside of the military, along with family responsibilities, they were more sensitive to the mentally taxing sociopolitical, technological, and economic trends

than those on active duty, who have access to more mental health resources (Lane et al., 2021). During the time of COVID-19, all three sociopolitical, technological, and economic trend categories have come into play including events like lockdown and quarantine due to the pandemic, riots across the United States, people losing their jobs, and the 2020 United States election. Furthermore, government imposed COVID-19 rules have led to not having as many face-to-face connections from family and friend social circles, as well as the occasional acquaintance or the ability to meet new people in person. This problem is even more prevalent for reservists because of uncertainty and possibly lack of perceived support. Support that could come from on-base resources or their military comrades. Thus, a key rationale for choosing the reserves for this study is that they lack the same kind of military unit camaraderie and resources than that of an active-duty Marine unit that works with each other nearly every day.

MARFORRES wants to examine psychological resilience and empower change in the Marine Corps. The hope is that this kind of mobile resilience-building process will help strengthen their units, because by nature they are much more distributed than active-duty units. Technology will be important during this time due to strict social distancing rules, but there are not many studies on building resilience using technology. Therefore, this study is going to help determine if the USMC Reserve Connect mobile application will be effective in building resilience in individuals in the MARFORRES.

C. OBJECTIVE/PURPOSE

MARFORRES is seeking to examine factors that contribute to resilience and identify ways to increase this key capability. The Marine Corps wants to introduce a resilience application for the Marine Corps Reserves. They want this application, USMC Reserve Connect, to be something the Marines would want to use and is effective in learning about and developing resilience. To help integrate this application, the research team used voluntary participants in the Marine Corps Reserve Force with the aid of the USMC Reserve Connect application as the aggregator to explore change intervention using mobile applications. The aim of the study is to analyze the introduction and use of interventions with the USMC Reserve Connect application in order to develop possible

structured ways to introduce consistent resilience training to the Marines, while also examining USMC Reserve Connect's effectiveness in individuals learning its material. In addition, the way this study measured unit resilience was through taking the average of every participant's key dimension score per category within the unit. For example, in the Amphibious Assault (AA) unit, the unit's positive framing score was the average of every member in the unit's positive framing score.

The null hypothesis predicts there will be no difference between Marines increasing resilience through the USMC Reserve Connect application. The alternative hypothesis is that the user of the mobile technology will self-report an increase in their resilience because of their use of the USMC Reserve Connect application. The expected relationships in this study were the user's adoption of the technology or frequency of use of the application, and the effectiveness of the way the resilience interventions were portrayed through the application. If the user frequently used the application or adopted the technology into their life to learn and participate in the resilience interventions, then it is perceived that the technology would aid in increasing resilience in the user. There is the possibility that if the user did not adopt the technology, cared not to participate in the resilience interventions, or the interventions were not effectively portrayed to the application, then there would be no change in the user's resilience.

D. BENEFITS OF THIS STUDY

There are not many studies on how mobile applications impact resilience. As the literature review will uncover, there are many studies on how on-line or mobile application can impact mental health, but not many on resilience (Tam-Seto et al., 2018). There were even fewer studies that involved the military. The military units involved in those studies were mostly on active-duty military versus those who were serving in the reserves, and currently, none involved Marines. This is a new mobile application made for the Marine Corps Reserves and this study aims to determine if the mix of interventions loaded in the mobile application contribute to resilience, and whether a mobile application is appropriate and effective for these interventions to be distributed and learnt. Due to the way the control groups were set up, the research team may see how proactive participants are with and

without the push of notifications to complete the interventions that some groups received. By identifying whether this mobile application is effective in building resilience in participants of the Marine Corps Reserve, the Marine Corps can be confident that they will be able to improve reservist resilience, as well as division and unit resilience, from distributed locations. This will enable warfighters to be more effective as life's obstacles, such as separation and deployments, are a part of the military life.

E. METHODOLOGY

The research was quantitative and two surveys were used. The initial survey was used to get an initial baseline of participant's resiliency scales to develop a better understanding of individual and unit resilience of reservists. The initial survey aided in examining the social and individual processes that most likely foster resilience. The second survey was given after the conclusion of the study. The second survey was used to determine the quantifiable impact of the study by seeing if there were any changes from T1 to T2. The study consisted of four groups who were pre-designated by the research team to either download the USMC Reserve Connect application as well as which groups would receive resilience interventions.

There were four units from MARFORRES that were used in this study. A recruitment email was sent to these groups asking for volunteers to participate. The recruitment letter for each unit put them in a particular group which instructed them whether they were to download the USMC Reserve Connect or not, and if they would be receiving resilience interventions. Group 1 was asked to complete the surveys. The participants were told to download the USMC Reserve Connect application and would receive interventions through push notifications from the USMC Reserve Connect application. Group 2 was asked to complete the surveys. The participants were told to download the USMC Reserve Connect application but did not receive push notification or interventions. Group 3 participants were only asked to complete the surveys. They were not told to download the USMC Reserve Connect application and did not receive interventions. Group 4 participants were asked to complete the surveys. They were not told to download the USMC Reserve Connect application; however, they received the

interventions via email. The total study period was approximately 30 days with each group starting on different dates to ensure it coincided with their drill schedule. The recruitment letters were sent on their drill days designated by their leadership.

F. THESIS OUTLINE

In the chapters that follow, a broader treatment of the literature, the methodology used, and the results of the quantitative study are reported and examined. Chapter II provides a literature review of all relevant studies and research related to mobile technology and resilience, military reservist, and resilience interventions and resilience scales. Chapter III describes the methodology used for this study. It includes the description of the scales used in the survey and the resilience interventions. Chapter IV examines the quantitative results gathered from the surveys. Chapter V offers conclusions and recommendations based on the results of the study.

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II. LITERATURE REVIEW

A. DEFINING RESILIENCE

Resilience is a word that is widely used in many disciplines and is defined differently in almost all of them. Therefore, in this study it will be important to define it. According to Walsh-Dilley, Wolford, and McCarthy (2016), there are many frameworks and subjectivity to resilience. They explore how meanings of resilience are produced in the communities that target resilience-building. In the organizational sciences, "Resilience refers to the maintenance of positive adjustment under challenging conditions" (Sutcliffe and Vogus, 2003, pg. 95). Defining resilience will aid in finding an appropriate framework for the military when it comes to resilience building. It will be important to understand the current perception of resilience in individuals and the organization. Do they focus on adversity being negative or positive? In particular, it is important to see how the organization strengthens their process of resilience through various interventions.

B. WHAT IS RESILIENCE IN THE MILITARY AND ORGANIZATIONAL RESILIENCE

This topic still is in the realm of defining resilience however each organization and military organization have their own culture and therefore have their own understanding of resilience. According to Horvath (2019), "the culture of the organization is a vital component of its ability to function." (Horvath, 2019, pg. 13) Although Horvath's subject is mostly about organizational resilience in the U.S. Army, some characteristics of the Army's culture do bleed into the Marine Corps. They are both two vastly different organizations in their mission but are under the umbrella of military. Horvath's definition of resilience specific to the U.S. Army is that it's measured by the unit's capability to "maintain its ability to perform its mission" (Horvath, 2019, pg. 12) and continue its operations to provide their basic services when interruptions arise. One might hypothesize that targeted interventions which strengthen individuals may indeed affect resilience of the organization, but the focus of this study is about developing resilience through personal resilience exercises.

C. RESILIENCE

As people go through life, with different stressors, loss, emotional pain, and/or trauma their resilience will be tested. With so many difficult tests in life, the next question one would probably ask is how do you build resilience? What behaviors, thoughts, and actions would a person need to take to learn and develop resilience?

> Psychologists define resilience as the process of adapting well in the face of adversity, trauma, tragedy, threats, or significant sources of stress. As much as resilience involves "bouncing back" from these difficult experiences, it can also involve profound personal growth. (American Psychological Association, 2021, para. 4)

Scholars suggest that resilience is built on positive emotions (Fredrickson et al., 2003). People who cultivate positive emotions considers more options, seeks opportunities, and are able to build strategies to combat vulnerability and risks. While others write that people are naturally resilient especially during different situations/context and time (Bananno, 2004). Resilience also relies on the desire to want to learn from past experiences while understanding the resources and capabilities an individual or organization has that would match, or is able to combat, the adverse event(s) or situation(s) that come up (Sutcliffe & Christianson, 2012). That to increase resilience, like building a muscle, it will take intentionality and time while focusing on core components. Core components include building connections, fostering wellness, healthy thinking, and finding and establishing purpose/meaning, to get through difficult and traumatic situations (American Psychological Association, 2021).

This study investigates whether technology will aid in building a repertoire of actions that cultivate positive emotions. We expect that technology may be able to aid in cultivating positive emotions due to the observations that technology is able to cultivate negative emotions. For example, there have been reports of people having bad days when looking at the news and social media feeds. During the COVID-19 Pandemic, George Floyd riots, and the U.S. 2020 Election, social media and the news were constant sources of information overload for many people and have been sources that fed distress, panic, and fear in many. Technology will possibly also aid in determining how people will build

resilience in time and space without the contact of other people or contact on an irregular basis.

D. KEY FACTORS

There are some key factors that help build resilience, they also help measure particular resilience scales, as well as provide and categorizes interventions. Those who use resilience interventions will demonstrate greater levels of resilience and are explained by factors such as positive framing, subjective well-being, psychological safety, unit resilience, and unit cohesion. This section will examine those key factors by outlining key areas, definitions, and how these might affect individual resilience. However, before starting any interventions it is important to measure an individual's resilience baseline, which for this study the Connor-Davidson Resilience Scale will aid in.

1. The Connor-Davidson Resilience Scale

Individual resilience in this study was measured using the Connor-Davidson Resilience Scale (CD-RISC), originally developed for the clinical Post Traumatic Stress Disorder (PTSD) community as a self-reporting measure of resilience (Connor & Davidson, 2003). It is one of the most common tests that measures resilience or how well an individual is equipped to bounce back after experiencing tragedy, trauma, or stressful events. It measures resilience as a function of five interconnected components: personal competence, acceptance of change and secure relationships, trust/tolerance/strengthening effects of stress, control, and spiritual influences (Connor & Davidson, 2003). This scale used a scoring of 1 to 7 depending on what the item asked.

2. Positive Framing

Positive Framing (PF) refers to cognitions an individual chooses to alter their understanding of a situation. This is done through a cognitive self-management tactic when someone elects to place the situation in a positive frame versus negative frame (Ashford & Black, 1996). Ashford and Black's definition particularly focused on newcomers to an organization and their ability to adjust over time to their new environment. Positive framing studies have shown to be a strong influence in overcoming and reducing awareness of

adversity overtime, as well as reduces stress, yield greater learning, and lower uncertainty (Ashford & Black, 1996). Whereas a negative frame normally associated with negative emotions will lead to a narrow focus that most individuals cannot build on, because there is nothing to build on (Fredrickson et al., 2003).

This study used three items to measure positive framing with the scale of one to seven, depending on what the item asked. They measured how often an individual is able to frame tough situations in a positive way or looks at the situation as an opportunity to improve and grow. We expect that more positive framing supports higher levels of resilience. This study also will investigate whether or not technology could help build an individual's ability to frame situations positively (i.e., consider more options, create options, and seek opportunities).

3. Subjective Well-Being

Subjective well-being (SWB) is how a person cognitively and affectively evaluates their life (Stone & Mackie, 2013). The cognitive evaluation refers to what a person thinks about their life satisfaction of their life wholistically as well as in specific domains in their life, like their work, relationships, etc. The affective evaluation is one's emotions or moods. It is considered a positive affect when the experience is pleasant (e.g., overjoyed, euphoric, excited) and negative affect with the emotion is unpleasant (e.g., shame, rage, remorse, etc.) (Stone & Mackie, 2013).

The components of subjective well-being include life satisfaction, positive affect, and negative affect (Stone & Mackie, 2013). The concept of subjective well-being (SWB) falls within the hedonic perspective where happiness is about maximizing pleasure and avoiding pain. A person with "a high level of subjective well-being is deemed to have a high level of satisfaction with their life" (Albuquerque, 2010, para. 2). This means that they experience life situations with a greater positive affect while experiencing less situations with negative affect. SWB is measured by how people think and feel about their lives and can be measured using a questionnaire, like this study's surveys. We suspect that those with who practice SWB have higher levels of individual resilience.

4. Psychological Safety

Psychological safety (PS) refers to a sense or feeling comfortable when employing oneself in a job or organization without the fear of negative repercussions of "self-image, status or career" (Kahn, 1990, pg. 708) According to Timothy R. Clark, he defines psychological safety as "a condition in which human beings feel (1) included, (2) safe to learn, (3) safe to contribute, and (4) safe to challenge the status quo—all without fear of being embarrassed, marginalized, or punished in some way" (Clark, 2020, pg. 1). This makes members feel accepted and respected.

No one wants to look ignorant, incompetent, intrusive, and negative—especially in a shame-based military command and control organization where to be strong is highly valued. The ways people manage this are that they do not ask questions, do not admit weakness or mistakes, they do not offer ideas, and they do not critique the status quo. Every time people withhold, the group loses a chance to learn and possibly innovate. Teams with high psychological safety are more open about talking about errors and mistakes to find ways in reducing them and making the organization better.

According to Edmondson (1999), if there is uncertainty and interdependence in an organization, it is vital that the organization has high psychological safety. She shows different levels of psychological safety and their relationship to performance standards in Figure 1. The goal of an organization is to be in the learning zone, where psychological safety and performance are both high.

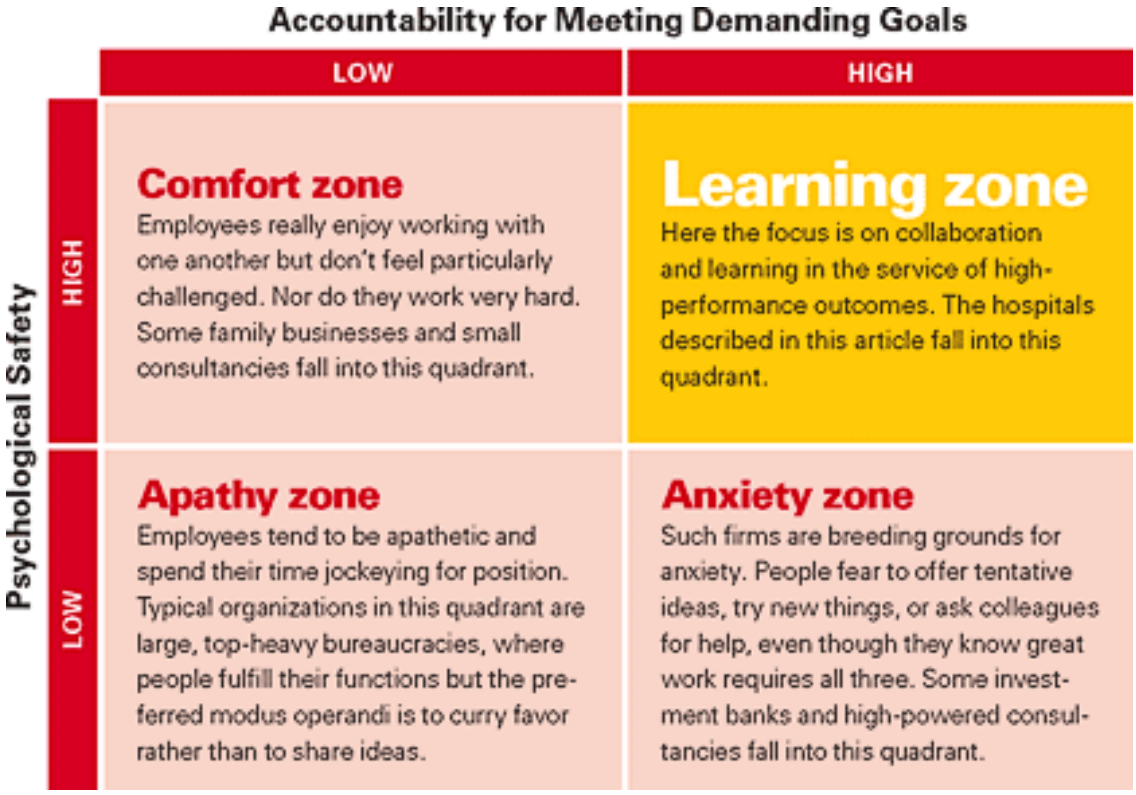

Figure 1. How Psychological Safety Relates to Performance Standards. Source: Edmondson (2014).

When team members are not afraid of how they will be judged, but instead feel motivated at work, it makes them want to share ideas to help improve their organization (Edmondson, 1999). Psychological safety measures team members feeling safe to take interpersonal risks. It is an important element to foster the right conditions for high-performing teams because it prioritizes the development of an inclusive culture built on trust, collaboration, and purpose. Psychological safety explains higher levels of individual and unit resilience. This study used six items to measure psychological safety.

5. Unit/Division Resilience

Although there is no agreed upon definition of unit resilience that exist (Cato et al., 2018), teams and small units play a critical role in the military, especially the Marine Corps. Themes associated with unit resilience were absorbing, adapting, withstanding, and

bouncing back, as well as preparing/anticipating, learning, and growing/thriving Cato et al., 2018). According to Cato et al. (2018), unit resilience is defined as:

> A multi-phasic process in which members of the unit deliberately and collectively apply skills, abilities, and resources to **prepare** the unit for adversity by planning and anticipating adverse events, successfully **respond** to challenging events by withstanding or adapting to stressors, and **recover** after the event**,** which involves the unit returning to homeostasis (e.g., bouncing back) or an improved state through post-event learning and growth. (Cato et al., 2018, p. 1)

Resilient teams are important to an organization, they are just as important as resilient individuals. Individuals normally develop their resilience interdependently of the team, and individual resilience can aid in building unit resilience. But unit resilience can be carefully fostered by leadership. Resilient units are able to effectively and efficiently complete tasks together. They share a common mental framework of teamwork, they feel safe with each other, can improvise together, and trust one another (Kirkman et al., 2019). One of the big prerequisites in unit resilience is trust.

Strong unit resilience can get through responding to big changes easier. There is power in teamwork and unconditional support for one another. Especially in times of turnover, burnout and satisfaction. Resilient organizations practice their focus on making sure that they have their resources, talent, and work design ready to respond and sense continuous change. This enhances mental toughness by emphasizing and improving strengths which cultivates strong relationships in the team/unit. It also helps prepare unit psychological safety, unit resource gathering, transformational leadership, sense-giving/ sense-making, collective efficacy (Hanrahan et al., 2019). This allows the unit to respond by being flexible in the use of their unit's resources, creates situational awareness, and manage risk and uncertainty (Hanrahan et al., 2019). The unit recovers by replenishing unit resources, unit learning, positive climate, and positive cohesion (Hanrahan et al., 2019). In this study 14 items were asked on unit resilience that examines learning, recovery, leadership, and social support (Lopes, 2010).

6. Division/Unit Cohesion

Division/unit cohesion is another term that does not have a standard definition. For this study it will be defined as "the degree to which soldiers feel committed to and supported by their military units" (Armistead-Jehle et al., 2011, pg. 81). Cohesive units remain united as they pursue goals and objectives through trust. They feel supported and have a sense of belonging because of that trust. Unit cohesion is an important contributor to military performance and combat effectiveness while having positive impacts on the ability for an individual to cope with military stressors (Oliver et al., 1999). In a study conducted by Oliver et al. (1999), they found that unit cohesion was positively related to individual well-being, unit readiness, and increased performances in individuals and the unit as a whole (Oliver, et al., 1999). In this study, 12 items were dedicated to unit cohesion with scales that measured from one to seven depending on what was asked. Those items helped gage propinquity through shared attitude, threat, group membership, leadership, and training (National Defense Research Institute (U.S.), 2010).

The key dimensions and their definitions for this study will be important to understand because the interventions will fall in these categories. Once the participant's answers are collected, their data will be analyzed to determine each unit's level.

E. UNDERSTANDING THE PEOPLE IN THE ORGANIZATION

The military is heavily made up of millennials and Generation Z (Gen Zers), who were born between 1980 to 2005. A brief introduction to these generation differences in this section lays a foundation for understanding technology use (in the section that follows). Many of whom are in the beginning or middle of their careers in the military. Their mentors and bosses would possibly be service men or women born to the Baby Boomers generation (born between 1946 to 1964) or Generation X (born between 1965 to 1980). According to Kaifi et al. (2012), it is important to study the multiple generations who "work side-by-side in the organization because organization's behaviors change to adapt to each generation" (pg. 88), which have an impact on the success of the leadership and organization.

1. Baby Boomers Generation

Baby Boomers were born between 1946 to 1964. They were shaped by events such as the Vietnam War, Civil Rights Movement, and Watergate. Their worldview consists of "achievement comes after paying one's dues, and sacrifice for success" (Purdue University Global, 2022, para. 8). According to the Purdue University Global generational chart, Baby Boomers are described as "optimistic, competitive, workaholic, and team-oriented; and motivated by company loyalty, teamwork, and duty" (Purdue University Global, 2022, para. 8). Their communication style includes "whatever is most efficient preferring phone calls and face-to-face" (Purdue University Global, 2022, para. 8).

Most Baby Boomers that are associated with the military are often retired from the military or work in government or contractor jobs that influence or work with those that are currently in uniform. There are multiple organizations in the military that recruit these individuals to serve in mentor roles for those that are currently serving.

2. Generation X (Gen Xer)

The Generation X population were born between 1965 and 1980. "They were shaped by events like the AIDs epidemic, the fall of the Berlin Wall, and the dot-com boom" (Purdue University Global, 2022, para. 9). Their world view consists of "favoring diversity; quick to move on if their employer fails to meet their needs; resistant to change at work if it affects their personal lives" (Purdue University Global, 2022, para. 9). Gen Xers are often described as "individualistic, risk-tolerant, self-reliant, entrepreneurial, comfortable with diversity, and valuing work life balance" (Gentry et al., 2011, p. 39). They are "motivated by diversity, work-life balance, their personal-professional interests rather than the company's interest" (Purdue University Global, 2022, para. 9).

They are similar to Baby Boomers when it comes to communication styles, favoring those that are most efficient. Like Baby Boomers, Gen Xers are either retired from the military, will be retiring and are either in top military ranks and/ or positions, or are working at government jobs or contracts that influence the military workforce.

3. Millennials

Millennials were born between 1981 and 2000. They were "shaped by events like Columbine, 9/11, and the internet" (Purdue University Global, 2022, para. 10). Their world view consists of "seeking challenge, growth, development; a fun work like and work-life balance; and they are likely to leave an organization if they don't like the change" (Purdue University Global, 2022, para. 10). They are described to be competitive, civic- and open-minded, and achievement-oriented; and "motivated by responsibility, the quality of their manager, and unique work experiences" (Purdue University Global, 2022, para. 10).

Millennials are unique compared to the other generations because they grew up in the digital age, which makes them prefer IMs, texts and emails as their communication style preference. They are also referred to as the "Trophy Generation" because they are widely known to have been rewarded for participating in clubs or sports instead of winning or standing out (Tolbzie 2008, pg. 12). According to Kaifi et al. (2012),

> millennials are thought to be skeptical of long-term commitments and are said to desire greater flexibility in their career. Members of this generation are described as preferring collective action, working in teams, wanting work that really matters to them, and being civic-minded, eco-aware, confident, conventional, optimistic, and socially conscious. (Kaifi et al., 2012, pg. 89)

Kaifi et al., (2012) stated that "millennials may have a competitive advantage because of their computer proficiencies" (Kaifi et al., 2012, pg. 89) and the fact that the generation as a whole is more engaged in the newer media, which continues to be incorporated into work processes and procedures.

4. Generation Z (Gen Z)

Generation Z were born between 2001 and 2020. They were "shaped by life after 9/11, access to technology from a young age or from birth, and the Great Recession" (Purdue University Global, 2022, para. 11). Their world view consists of "digital device addict who value independence and individuality; prefer innovative coworkers and new technologies" (Purdue University Global, 2022, para. 11). They are described as global, "entrepreneurial, progressive, and less focused" (Purdue University Global, 2022, para.

11); and are "motivated by diversity, personalization, individuality, and creativity" (Purdue University Global, 2022, para. 11). As self-proclaimed digital device addicts, their communication style are similar to millennials in which they prefer IMs, text, and social media.

By understanding the generations in the workforce, it may aid to understanding their framework of resilience, how they learn about resilience, and how to mesh it with the needs of the military environment, or help it evolve. It will also be interesting to see how they leverage technology to benefit the organization and its people. Currently there are different types of literature on different generations and their relationship to resilience that are speculative at best. Most citing that millennials and Gen Zers are less resilient than past generations, however nothing concrete.

F. TECHNOLOGY ACCEPTANCE AND ADOPTION

Adoption is the action or fact of choosing to take up, follow, or use something. In this case, we are choosing to use something (technology). When we review adoption from a technological perspective, we consider it the decision "to accept an innovation, but also the extent to which that innovation is integrated into the appropriate context" (Straub, 2009, pg. 626). The Technology Acceptance Model (TAM) will aid in to understanding influence, implementation, and measurements to understand individual tolerance to adopt the process. It will also be a way to identify gaps and misalignments of incentives within the organization in relation to the benefits of the technology as well as the socio-technical relationship.

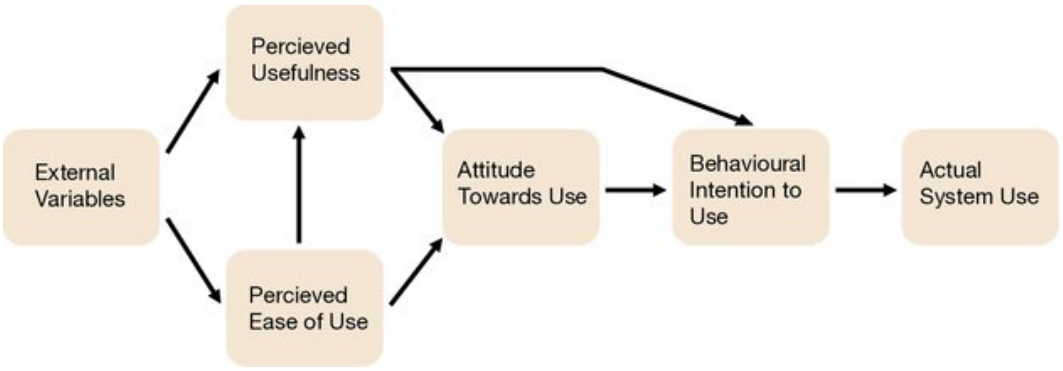

Figure 2. Technology Acceptance Model (Davis, 1986) Source: Cass & Dau (2019, pg. 7).

TAM is a way to evaluate how likely or why an individual or organization will choose to use, accept, or adopt a technology system or process. It is based on "perceptions and attitudes towards the perceived usefulness" (Cass and Dau, 2019, pg.7) of the technology or system, and the "perceived ease of use of the technology" (Cass and Dau, 2019, pg.7) or system. As depicted in Figure 2, personal experiences or external variables feed perceived usefulness and ease of use which drive an individual's attitude towards a behavioral change by creating a habit to actually use the system or technology. The limitation in this theory is that it assumes that people plan their behavior and that they are logical and rational in their actions by evaluating their perceived usefulness of ease of use of a technology. Which is not always true of an individual or organization. TAM also does not give any design advice or any advice on how to make the technology or system useful.

In this study, the more one uses technology, the more they grow comfortable in using it, and the more they can use it to build habits. With a workforce that mostly consist of millennials and Gen Zers, who prefer technology, it is believed they will have a higher willingness to accept and adopt new technology or process. Especially since the USMC Reserve Connect application is a social media app with an objective to help build resilience. Those with low TAM will not adopt or implement the technology or process.

III. METHODOLOGY

To understand fully the relationship between resilience and technology use, the study design was a quasi-experimental field experiment. Self-report surveys captured resilience and other factors before and after the study period. Groups of reservists were designated to respond to certain resilience intervention. This section of the thesis outlines the procedures used in this study.

A. THE USMC CONNECT APPLICATION

The USMC Reserve Connect Application served as the primary tool for the intervention in this study. It represents one of the newest technology solutions for strategic communication and is one-stop information source for reservists about broad organization notifications as well as use for specific units in the Marine Corps Reserve.

Reservists add their unit designation as a favorite to their profile so that they can get up-to-date information on their unit; they may add other units as desired. The app features include instant notifications, news, weather, directories, events, PFT/CFT calculators, and links to different social media like Facebook and twitter. There are also informational sections like Orders and Directives, tool kits from the unit Chaplain, the latest information on COVID-19. It also provides checklist for new Marines as well as checklist for Marines separating or retiring. They have also added common access card (CAC) mobile for sites that are CAC enabled. There is a help feature which connects to sites such as SAPR, Military Crisis Line, inTransition, important numbers and more. There are also features specifically for family, medical, and mental health which connect to resources like Military OneSource, Unit, Personal, and Family Readiness (UPFRP), TriCare, and other resources.

We concentrated on the resilience section of the app. The resilience section of the app has references in many categories to include anger, stress/anxiety, PTSD, depression and suicide, alcohol and substance abuse, grief and loss, transitions, sleep, benefits and finances, family and relationships, and sexual assault. The resilience section provides tips

and interventions on building resilience, healthy relationships, and getting motivated. It also contains a subsection that recommends apps for an issue.

Another aspect of the app that we will be testing is its ability to push notifications to certain groups within a given unit. This will test the apps delivery of content to specific units and individuals. It will be a good measure to evaluate how easy or difficult it will be for administration users to quickly adapt and use the app to deliver messages to the masses without sending it to the entire Marine Corps users. This is the aspect where the interface will be something that individuals and leaders will both technologically accept and adopt or not.

B. SURVEY DESCRIPTION

1. Survey Details

The research included a pre- and post-surveys. The initial survey was used to get an initial baseline of the participant's resiliency scales to develop a better understanding of the individual and unit resilience of reservists. The initial survey aided in examining the social and individual processes that most likely foster resilience. The second survey was given after the conclusion of the study. The second survey was used to determine the quantifiable impact of the study by seeing if there were any changes from T1. Participants who did not have access to the USMC Reserve Connect application were instructed to download it to a personal or business device. The total study period was approximately 30 days. No Personal Identifiable Information (PII) was stored with the data. The research took place during drill weekends. Some aspects of the study were completed at short (2–3 minute) intervals between drill weekends.

The surveys were administered online via Qualtrics survey software. Each survey took 10–15 minutes to complete and were disseminated during drill weekends. The date the unit received the study's initial survey marked the start day of the study for each unit. Each survey contained 12 subsections, one of which asked for demographics and the 11 other subsections were questions from various resilience scales. In the initial survey (T1) 13 demographic questions, like a unique participant number, unit identifier and their email were asked. In the final survey (T2) only two demographic questions were asked so that it

would link that survey to the participant's baseline T1 survey. The other subsections included six items from the Connor-Davidson Resilience Scale (CD-RISC), three questions on positive framing (PF), five questions on subjective well-being (SWB), six questions on psychological safety (PS), 13 questions on unit resilience or division/unit resilience (DRS), and 14 questions on division/unit cohesion (DC).

2. Survey Participants

Four USMC Reserves units, with adults who were 18 years or older, voluntarily participated in this experimental field study. After completing the first survey, certain groups received resilience interventions. Resilience interventions for this study will be defined as activities focused on fostering resilience by using evidenced resilience wellness education. One unit received resilience interventions in the form of regular nudge notifications. Another had access to the mobile application but no nudge notification interventions from the researchers. A third group served as a control group and did not have access to the application or interventions. The fourth control group did not receive access to the application but received resilience interventions via email. Each group was assessed for resilience and other factors before and after the intervention period (between two to three weeks in duration).

Group 1 (G1): 4th Marine Division, 3rd Force Reconnaissance Company, stationed in Mobile, Alabama. We anticipated this unit would have approximately 150 Marines and Sailors participating. They received both the application and push interventions. Their start date was 22 April 2021.

Group 2 (G2): 4th Marine Division, Amphibious Assault Battalion, Headquarters and Service Company, stationed in Tampa, Florida. The anticipated participation from this unit was approximately 125 Marines and Sailors. They received the application but no push interventions. Their start date was 15 April 2021.

Group 3 (G3): 4th Marine Division, Combat Engineer Battalion, Charlie Company stationed in Lynchburg, Virginia. Approximately 100 Marines and Sailors participated. They did not have access to the application and interventions. Their start date was 11 April 2021.

Group 4 (G4): 4th Marine Division Headquarters stationed in New Orleans, Louisiana. A group of 50 Marines and Sailors participated. They did not have access to the application. However, they received access to the interventions via email. Their start date was 11 April 2021.

C. SURVEY MEASURES/RESILIENCE SCALE

Measures of resilience and other related instruments were used to assess changes in resilience and what we expected would affect those changes. Control measures were used to rule out potential confounding factors. The organizational framework for measurement concentrated on resilience being process focused. The process seemingly resembles the concept of coping. It highlights the role of self-governed methods that are executed in response to some type of adversity (Carver et al., 1989). According to Carver et al., the commonality that process-focused assessments have are that when an individual experiences adversity, they review and think about their reactions, responses, and procedures (Carver et al., 1989). While there are many resilience measures out there to explore, six measures were used to conduct this study using three to 14 items from each to build this study's surveys. The six measures were: the Connor-Davidson Resilience Scale, Positive Framing, Subjective Well-being, Psychological Safety, Division/Unit Resilience, and Division/Unit Cohesion. Table 1 gives a brief definition of the key factors as well as an example of the items that were asked in the survey for each key factor and what type of scoring was used for each measure.

Table 1. Key Factors with Brief Definitions and Examples

Measures / Key Factors	Brief Definition	Item Example	Scoring Example
Connor-Davidson Resilience Scale (CD-RISC)	Is one the of the most known and commonly used resilience scale measures	"I tend to bounce back quickly after hard times" (Smith, B.W. et al., 2008, pg. 196)	Agree-Scale 1 to 7 and
Positive Framing (PF)	Measures how often an individual is able to frame a situation positively versus negatively	"Tried to see my situation as an opportunity rather than a threat?" (Ashford & Black, 1996, pg. 200)	Extent Scale - 1 to 7
Subjective Well-Being (SWB)	Self-measures an individual's life satisfaction in the categories of work, life, and relationships	"In most ways my life is close to ideal" (Diener, Emmons, Larson, & Griffin. 1985, pg. 72)	Agree Scale - 1 to 7
Psychological Safety (PS)	Is the ability to feel included and safe to contribute to the organization without worrying about being judged harshly	Members of this unit value and respect each other's contributions.	Agree-Scale 1 to 7 and
Division/Unit Resilience (DRS)	Units that deliberately work together to prepare, execute, respond and recover before, during, and after a challenging event	We often "take time to figure out ways to improve our work processes" (Guchait, Lanza-Abbott, Madera, & Dawson. 2016, pg. 386)	Agree Scale - 1 to 7
Division/Unit Cohesion (DC)	Units who feel united through the pursuit of goals and objectives, and feel supported through mutual trust in each other	Our unit is well coordinated	Agree Scale - 1 to 7

D. INTERVENTIONS

This study used resilience interventions in the USMC Reserve Connect application. Interventions in this study were called resilience boosts for our participants.

> An intervention is a combination of program elements or strategies designed to produce behavior changes or improve health status among individuals or an entire population. Interventions may include educational programs, new or stronger policies, improvements in the environment, or a health promotion campaign. Interventions that include multiple strategies are typically the most effective in producing desired and lasting change…interventions create change by: influencing individuals' knowledge, attitudes, beliefs and skills; increasing social support; and creating supportive environments, policies, and resources. (Health.mo.gov, 2021)

Two groups (Group 1 and 2) downloaded the USMC Reserve Connect application but only one group (Group 1) received push notifications from the application to remind them to do the interventions. Push notifications were a design feature in the application that allowed administrators to push notifications or messages to the participant's phones like they were receiving a text message. Depending on the individual's phone settings, the message would appear as a banner on their phone until they opened the application. In the USMC Reserve Connect application, the message would be in the notifications folder. Group 1 received no more than 12 personal notifications via the USMC Connect application about the intervention.

Group 2 were told to download the USMC Reserve Connect application but were not pushed notifications unlike Group 1. Group 2 was given instructions on the USMC Reserve Connect application by their leadership during a drill period and then were allowed to use the application as they wanted or needed.

Group 3 was the control group. They were not told to download the USMC Reserve Connect application or were given the interventions in any way. They were only given the T1 and T2 surveys.

Group 4, the control group, received the resilience interventions by email, and not instructed to download the USMC Reserve Connect application. In their survey's, they were asked to leave an email address to receive resilience boosts. They received the same message regarding the interventions as those that had the USMC Connect application. The interventions contained journaling exercises, social media challenges, and links to physical mindfulness exercises. The resilience journaling exercises were completed at short

intervals and took approximately 2–5 minutes to complete. The researchers understood that the participants have a busy work-life balance. It was assumed that if they were asked to carve out too much time to complete these interventions, it might deter them from doing them.

Table 2. Themes, Interventions, Descriptions, and Significance

Theme	Resilience Boost/Intervention	Significance of Intervention
Positive Self-Attributions	**Think Positive** Given all that's going on in your life right now, tonight or tomorrow morning write down (in a journal) several positive statements about yourself and your situation (work, service, family, etc.). What is giving you the most energy today? **Go and Do** Share what gives you energy today with a family member, close friend, or co-worker. (Pay it forward by inviting them to do the same with someone else).	Helps participant practice positive framing about what is happening in their lives. As well as evaluate their life wholistically and in different domains (SWB). By sharing they will evaluate how safe they feel to do so (PS) and will build trust in who or whom they share with.
Self- Learning	**Reflection** Think about what you learned in this unit. Think about the skills and abilities, new knowledge, and what have you learned most about yourself since you have joined this unit. Here are a few questions to consider: 1. What are the differences that you have noticed about how you overcome challenges that you did not know about yourself before joining this unit? 2. What experiences from the past have influenced the way you have overcome any challenges that you have faced since joining this unit? 3. What relationships, experiences, exercises, or aspects of your day-to-day life have been the most meaningful to you since joining this unit? **Go and Do** Share your reflections today with a family member, close friend, or member of your unit.	Helps participants with awareness as well as how they frame their life and their unit. It will also bring awareness to their psychological safety, unit resilience, and unit cohesion by questioning how safe they feel they learn in their unit. As they reflect, they will notice their subjective well-being in their attitudes and experiences in the unit, and how they adapted to their challenges.
Contribution	**Habits of Helping** Our work progress through the small actions we take throughout the day. We are constantly making small, consistent contributions. **Reflect** Think about progress you have made today in your job. Take a minute to write down one contribution that you made. It might be progress you made on a project, something you did to help someone, or a conversation that helped someone do better in their job. **Go and Do** Share your contribution with a family member, close friend, or co-worker. (Pay it forward by inviting them to do the same with someone else).	Helps participants with awareness in their personal competence and how they frame their abilities. This also contributes to their subjective well-being by evaluating their life satisfaction in the work they do. As well as psychological safety in feeling included, and their feeling of being safe to contribute. Which builds unit resilience and unit cohesion.

Theme	Resilience Boost/Intervention	Significance of Intervention
Gratitude	**Count your Blessings** We know that by showing appreciation and gratitude we strengthen our immune systems. Take a minute to think small acts of service or significant tasks your fellow reservists have done to help you. **Go and Do** Show appreciation by saying thank you to those individuals.	Helps participants with awareness in their relationships. They will notice how they frame each relationship, evaluate how they feel in their relationships (SWB), and if they feel safe and secure in that relationship(s) (PS). This helps build unit resilience and unit cohesion.
Responding to Challenges	**Bounce Back** Life can be tough as we have many demands on our jobs, families, or finances. These life challenges can cause frustration and confusion. Think about some of those challenges or roadblocks. Sometimes they are overwhelming, but at other times, when given the chance to look back and reflect, that those challenges were helpful, necessary, and memorable. Think of a challenge you faced since joining this unit. **Reflect** What challenge surprised you the most, one you did not expect or anticipate? What made it difficult? What was going on? What did you do? How did others respond? As you reflect, what made a difference in overcoming that challenge? Who helped you through? What did they do to support you? **Go and Do** In an upcoming "drill weekend," share your experience with a member of your unit.	Helps participants evaluate their tolerance, strengths, and weaknesses or areas of improvement (SWB). They will be aware about how they frame their responses (positive or negative). In sharing they will evaluate their psychological safety in their unit with the possibility of building both unit resilience and cohesion with their fellow Marine(s).
Helping Relationships	**Consider your Strengths** Think about what others who know you best would say about your strengths. When thinking of you when you are at your best, what would they say are your greatest strengths?	This will bring awareness to how the participant views their perception of themselves through another's point of view.

OTHER INTERVENTIONS		
Fitness	**Social Media Challenge!** Semper Fit! Post a picture or video of yourself to FB, IG or Twitter doing your favorite workout! Be sure to tag #4MARDIVResilience for a repost!	Exercise helps "improves mood states in the short and long term which leads to increased SWB" (Albuquerque, 2010, para. 16).
Historic Marine	**Social Media Challenge!** Post a picture of a historic Marine to FB, IG or Twitter who embodies the concept of resilience! Be sure to tag #4MARDIVResilience for a repost!	Aids in finding positive examples in history for those to emulate in the present with the common background of Marine; or at the very least read about in how they possibly made it through adverse/ challenging times.
Tag a Marine	**Social Media Challenge!** Tag a fellow Marine in your unit and share something that you admire about him/her. Be sure to use the hashtag #4MARDIVResilience for a repost!	"Social Supports – unsurprisingly, social support is important when it comes to resilience; those with strong social support networks are better equipped to bounce back from loss or disappointment" (Gleeson, 2020, para. 13).
Mindfulness	**Tactical Breathing** 5 Minute Mindfulness Did you know that 5 minutes of tactical breathing can significantly reduce stress, decrease tactical errors and increase marksmanship? Follow the link to engage in 5 minutes of tactical breathing. https://youtu.be/GViVk4RVJYE	Provides a short exercise in mindfulness while reducing stress.
Mindfulness	**Progressive Muscle Relaxation** 5 Minute Mindfulness Did you know that 5 minutes of progressive muscle relaxation can relieve tension and decrease anxiety? Follow the link to engage in a 5 minute PMR exercise. 12 minute video https://www.youtube.com/watch?v=CwqKbiUZdFU 20 minute video: https://www.youtube.com/watch?v=OuDhlbid9TU&t=28s	Provides a short exercise in relaxation to relieve tension and decrease anxiety.

Table 2 is a table of the themes, descriptions, and key factors/dimensions of the interventions (Developed by Edward H. Powley, Julia Beck, and Reinalyn Golino).

E. DATA COLLECTION/CHALLENGES SUMMARY

There was not enough data to prove or disprove the hypothesis. During T2 survey collection there were not enough participants to create a meaningful data set. The T2 survey was supposed to be used to determine the quantifiable impact of the study by seeing if there were any changes from T1; but due to the low participation in the T2 survey the differences in the data set could not be made. There were 229 T1 survey participants and 37 T2 survey participants. At the least, 50 T2 survey participants would have made the data set significant.

During the collection of the data, there were a few challenges and problems that arose. One of those challenges were response rates. T1 was collected over a drill period and the response rates were high. Although the response rates were high, during analysis, it was apparent that there were participants who consented and completed the whole T1 survey and some who did not complete it, and there were non-consenting participants who completed the T1 survey and some who did not complete it. For this study, during analysis, the non-consenting participant's answers were not counted. This study analyzed only the consenting participants, both those who completed the survey to its entirety and those that did not 100% complete the surveys. The sample size (N) for this study was 182 consenting participants.

Table 3. T1 Participation Data

USMC-R Participants	100% Complete	<100% Complete	Total
Consenting Participants			
3RECON	40	7	47
AA	89	13	102
CEB	48	10	58
HQ	19	3	22
Total	**196**	**33**	**229**
Non-consenting Participants			
3RECON	5	3	8
AA	39	7	46
CEB	5	1	6
HQ	5	0	5
Total	**54**	**11**	**65**

Table 3 represents the amount of participants who completed T1 and who did not. It was also broken up between consenting participants and non-consenting participants.

The T1 survey response rate seemed promising for participation throughout the study. However, once the intervention portion of the study was complete and T2 survey was disseminated to the participants, T2 survey response rates were very low. This could be due to the fact that T1 was completed during a drill weekend and T2 was emailed to consenting participants who completed the interventions on a non-drill weekend. Another cause for the low numbers for T2 was a deployment for one of the units.

Table 4. T2 Participation Data

USMC-R Units	100% Complete	<100% Complete	Total
3RECON	8	1	9
AA	8	7	15
CEB	7	3	10
HQ	3	0	3
Total	**26**	**11**	**37**

Table 4 represents the amount of participants who completed the T2 survey and who did not. It was also broken up between consenting participants and non-consenting participants. Due to the low numbers in the T2 survey, study was deemed inconclusive.

Once all data was collected and analyzed, the decision to change the method of the study was needed due to T2 numbers being too low to be considered a sample size. The switch to compare organizational resilience across the four groups made sense. The analysis turned to reporting and analyzing resilience scores from each unit's T1 results to examine resilience and associated factors.

IV. ANALYSIS AND RESULTS

This chapter reviews the analysis and results of the T1 surveys from the participating units (groups 1–4). The correlation results were that 3RECON (group 1) had the highest averages in the resilience measure as well as the key dimensions. However, after running an analysis of variance (ANOVA) of the five key dimensions (PF, SWB PS, DRS, and DC) only four had resulted in a significant difference between the averages of the groups/units for each.

A. RESILIENCE ASSESSMENT

The following figures and tables depict the differences in each unit's resilience measures and their resilience measure averages, followed by the analysis of variance of each unit and key factor. Figure 3 is the depicted summary of the averages of each resilience measure per unit. It shows that across all the resilience measures, 3RECON has the highest average of each resilience measure.

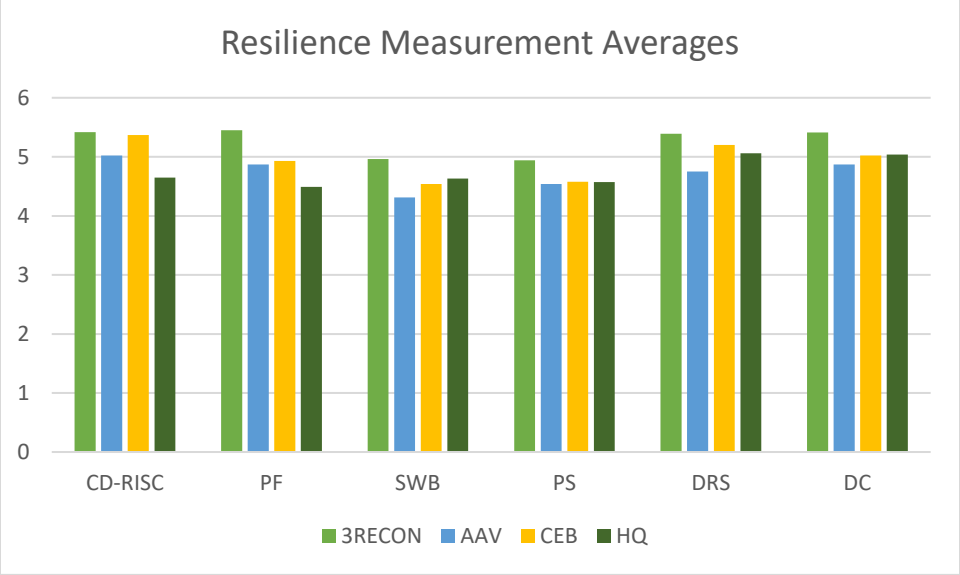

Figure 3. Resilience Measurement Averages per Unit

According to Table 5, the difference between the averages of the highest (3RECON) and lowest (HQ) average for the CD-RISC score was 0.77. An analysis of variance (ANOVA) was calculated to compare the statistical differences between the groups/units for each resilience measurement. The ANOVA tested the hypothesis at 0.05 level of significance. The null hypothesis was that there was no significant difference between the averages of the groups/units for each resilience measurement category. The alternative hypothesis was that there was a significant difference between the averages of the groups/units for each resilience measurement category.

Table 5. Resilience Measurement Average for Each Key Factors per Unit

Measures/Key Factors	3RECON (G1)	AAV (G2)	CEB (G3)	HQ (G4)
CD-RISC	5.42	5.02	5.37	4.65
PF	5.45	4.87	4.93	4.49
SWB	4.96	4.31	4.54	4.63
PS	4.94	4.54	4.58	4.57
DRS	5.39	4.75	5.2	5.06
DC	5.41	4.87	5.02	5.04

Resilience Measurement Average was calculated by taking the average of everyone's key factors score per category within each unit. These numbers were depicted in Figure 3.

A one-way ANOVA, Table 6, was performed to compare the effect of the different groups/units in the study, independent variable, on the CD-RISC resilience scale, the dependent variable. The one-way ANOVA revealed that there was a statistically significant difference in CD-RISC resilience scale between at least two groups ($F(3, 217) = 5.07$, $p = 0.002$). The test indicates strong evidence against the null hypothesis, as there is less than a five percent probability the null is correct. Therefore, we can reject the null hypothesis.

Table 6. Summary ANOVA of CD-RISC

SUMMARY: CD-RISC ANOVA

Groups	*Count*	*Sum*	*Average*	*Variance*
3RECON	46	249.1667	5.416667	0.792284
AAV	97	487.1667	5.022337	0.877679
CEB	57	306.3333	5.374269	0.90504
HQ	21	97.66667	4.650794	0.688624

ANOVA

Source of Variation	*SS*	*df*	*MS*	*F*	*P-value*	*F crit*
Between Groups	12.93069	3	4.31023	5.073205	0.00205	2.646205
Within Groups	184.3647	217	0.849607			
Total	197.2954	220				

In Table 7, six Bonferroni Post-Hoc test showed that two CD-RISC average measurements were significant and four were not significant between the groups ($F(3,217)=5.073$, $p<008$). Post-hoc analyses revealed that the CD-RISC average measurements in CEB v HQ and HQ v 3RECON were significant.

Table 7. Post-Hoc Test CD-RISC

Bonferroni Correction Post-Hoc Test CD-RISC		**0.008333**
Groups	P-Value (T-test)	Significant?
3RECON v AAV	0.018237999	No
AAV v CEB	0.026669664	No
CEB v HQ	0.002902184	Yes
HQ v 3RECON	0.001412759	Yes
3RECON v CEB	0.817495567	No
AAV v HQ	0.095795994	No

B. CORRELATION RESULTS PER KEY FACTOR

1. Positive Framing (PF) Summary

According to Table 5, the difference between the averages of the highest (3RECON) and lowest (HQ) average for the PF was 0.96. A one-way ANOVA was performed to compare the effect of groups/units in the study, independent variable, on PF measurement scale. Table 8 is the summary ANOVA for the positive framing. The one-way ANOVA revealed that there was a statistically significant difference in PF measurement scale between at least two groups ($F(3, 208) = 4.13$, $p = 0.007$). The test indicates strong evidence against the null hypothesis, as there is less than a five percent probability the null is correct. Therefore, we can reject the null hypothesis.

Table 8. Summary ANOVA for PF

SUMMARY: PF ANOVA

Groups	*Count*	*Sum*	*Average*	*Variance*
3RECON	45	245.3333	5.451852	1.14725
AAV	91	443.3333	4.871795	1.473504
CEB	55	271	4.927273	1.332061
HQ	21	94.33333	4.492063	0.873545

ANOVA

Source of Variation	*SS*	*df*	*MS*	*F*	*P-value*	*F crit*
Between Groups	16.22247	3	5.407489	4.127603	0.007191	2.64801
Within Groups	272.4966	208	1.31008			
Total	288.7191	211				

In Table 9, six Bonferroni Post-Hoc test showed that two PF average measurements were significant and four were not significant between the groups ($F(3,208)=4.128$, $p<008$). Post-hoc analyses revealed that the PF average measurements in 3RECON v AAV and HQ v 3RECON were significant.

Table 9. Post-Hoc Test PF

Bonferroni Correction Post-Hoc Test PF		**0.0083333**
Groups	P-Value (T-test)	Significant?
3RECON v AAV	0.007331314	Yes
AAV v CEB	0.785597243	No
CEB v HQ	0.126960441	No
HQ v 3RECON	0.000789107	Yes
3RECON v CEB	0.02157855	No
AAV v HQ	0.182088745	No

2. Subjective Well Being

According to Table 5, the difference between the averages of the highest (3RECON) and lowest (AAV) average for the SWB was 0.65. A one-way ANOVA was performed to compare the effect groups/units in the study, independent variable, on the SWB measurement scale. Table 10 is the summary ANOVA for the SWB. The one-way ANOVA revealed that there was a statistically significant difference in the SWB measurement scale between at least two groups ($F(3, 203) = 3.30$, $p = 0.021$). The test indicates strong evidence against the null hypothesis, as there is less than a five percent probability the null is correct. Therefore, we can reject the null hypothesis.

Table 10. Summary ANOVA of SWB

SUMMARY: SWB ANOVA

Groups	*Count*	*Sum*	*Average*	*Variance*
3RECON	44	218.2	4.959091	0.940613
AAV	90	387.6	4.306667	1.660404
CEB	52	236	4.538462	1.357707
HQ	21	97.2	4.628571	0.249143

ANOVA

Source of Variation	*SS*	*df*	*MS*	*F*	*P-value*	*F crit*
Between Groups	12.78996	3	4.263321	3.297618	0.021462	2.649082
Within Groups	262.4483	203	1.292849			
Total	275.2383	206				

In Table 11, six Bonferroni Post-Hoc test showed that one SWB average measurements were significant and five were not significant between the groups ($F(3,203)=3.30$, $p<008$). Post-hoc analyses revealed that the SWB average measurements in 3RECON v AAV was significant.

Table 11. Post-Hoc Test SWB

Bonferroni Correction Post-Hoc Test SWB		**0.0083333**
Groups	P-Value (T-test)	Significant?
3RECON v AAV	0.003537177	Yes
AAV v CEB	0.286997864	No
CEB v HQ	0.734216955	No
HQ v 3RECON	0.147214118	No
3RECON v CEB	0.060370523	No
AAV v HQ	0.264312688	No

3. Psychological Safety

According to Table 5, the difference between the averages of the highest (3RECON) and lowest (AAV) average for the PS was 0.4. A one-way ANOVA, Table 12, was performed to compare the effect of groups/units in the study, independent variable, on PS measurement scale. The one-way ANOVA revealed that there was a statistically significant difference in PS measurement scale between at least two groups ($F(3, 203) = 2.73$, $p = 0.045$). The test indicates strong evidence against the null hypothesis, as there is less than a five percent probability the null is correct. Therefore, we can reject the null hypothesis.

Table 12. Summary of ANOVA for PS

SUMMARY: PS ANOVA

Groups	*Count*	*Sum*	*Average*	*Variance*
3RECON	44	217.2333	4.937121	0.498254
AAV	90	408.3	4.536667	0.690288
CEB	52	238.1667	4.580128	0.601841
HQ	21	96	4.571429	0.676587

ANOVA

Source of Variation	*SS*	*df*	*MS*	*F*	*P-value*	*F crit*
Between Groups	5.127569	3	1.70919	2.730158	0.045005	2.649082
Within Groups	127.0862	203	0.626041			
Total	132.2138	206				

In Table 13, six Bonferroni Post-Hoc test showed that one PS average measurements were significant and five were not significant between the groups ($F(3, 203)=2.73$, $p<008$). Post-hoc analyses revealed that the PS average measurements in 3RECON v AAV was significant.

Table 13. Post-Hoc Test PS

Bonferroni Correction Post-Hoc Test PS		**0.0083333**
Groups	P-Value (T-test)	Significant?
3RECON v AAV	0.00684213	Yes
AAV v CEB	0.758864284	No
CEB v HQ	0.966113993	No
HQ v 3RECON	0.068861932	No
3RECON v CEB	0.021369631	No
AAV v HQ	0.863002297	No

4. Division/Unit Resilience

According to Table 5, the difference between the averages of the highest (3RECON) and lowest (AAV) average for the DRS was 0.64. A one-way ANOVA, Table

14, was performed to compare the effect of groups/units in the study, independent variable, on DRS measurement scale. The one-way ANOVA revealed that there was a statistically significant difference in the DRS measurement scale between at least two groups ($F(3, 200) = 4.38$, $p = 0.005$). The test indicates strong evidence against the null hypothesis, as there is less than a five percent probability the null is correct. Therefore, we can reject the null hypothesis.

Table 14. Summary ANOVA for DRS

SUMMARY: DRS ANOVA

Groups	*Count*	*Sum*	*Average*	*Variance*
3RECON	43	231.5556	5.385013	0.724522
AAV	89	422.3485	4.745489	1.370154
CEB	51	265.3333	5.202614	0.866182
HQ	21	106.25	5.059524	1.062599

ANOVA

Source of Variation	*SS*	*df*	*MS*	*F*	*P-value*	*F crit*
Between Groups	14.15965	3	4.719885	4.379092	0.005197	2.649752
Within Groups	215.5645	200	1.077823			
Total	229.7242	203				

In Table 15, six Bonferroni Post-Hoc test showed that one DRS average measurements were significant and five were not significant between the groups ($F(3, 200) = 4.38$, $p<008$). Post-hoc analyses revealed that the DRS average measurements in 3RECON v AAV was significant.

Table 15. Post-Hoc Test DRS

Bonferroni Correction Post-Hoc Test DRS		**0.0083333**
Groups	P-Value (T-test)	Significant?
3RECON v AAV	0.001754763	Yes
AAV v CEB	0.018270712	No
CEB v HQ	0.567370581	No
HQ v 3RECON	0.185423046	No
3RECON v CEB	0.327666415	No
AAV v HQ	0.261151121	No

5. Division/Unit Cohesion

According to Table 5, the difference between the averages of the highest (3RECON) and lowest (AAV) average for the DC was 0.54. A one-way ANOVA, Table 16, was performed to compare the effect of groups/units in the study, independent variable, on DC measurement scale. The one-way ANOVA revealed that there was not a statistically significant difference in the DC measurement scale between at least two groups ($F(3, 191) = 2.44$, $p = 0.066$). Therefore, we fail to reject the null hypothesis and we do not have sufficient evidence to say that the alternative hypothesis is true.

Table 16. Summary ANOVA for DC

SUMMARY: DC ANOVA

Groups	*Count*	*Sum*	*Average*	*Variance*
3RECON	39	210.8626	5.406734	0.654907
AAV	86	418.5	4.866279	1.408259
CEB	51	255.9286	5.018207	0.727111
HQ	19	95.78571	5.041353	1.332945

ANOVA

Source of Variation	*SS*	*df*	*MS*	*F*	*P-value*	*F crit*
Between Groups	7.849689	3	2.616563	2.43862	0.06585	2.651888
Within Groups	204.937	191	1.072969			
Total	212.7867	194				

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V. CONCLUSION

The aim of this study was to evaluate the USMC Reserve Connect application's efficacy using volunteers from the Marine Corps Reserves Force. The tools that were used in this study were surveys delivered through Qualtrics, the USMC Reserve Connect app, and resilience interventions. Due to low participation in the T2 survey, the study turned to reporting and analyzing resilience scores from each unit's T1 results to examine resilience measurements and its associated key factors. This chapter summarizes the summary of findings, future recommendations, and conclusion for this study. Overall, this study offered us some insight on the different levels of resilience that each group/unit had. However, further research will be necessary to figure out why each group's resilience measurements differed from each other. In this chapter we also recommend further research in how to increase survey participation, TAM levels among groups, and the effectiveness of resilience interventions through an application.

A. SUMMARY OF FINDINGS

This study's original hypothesis predicted that there would be no difference among the different groups of Marines increasing their resilience through the USMC Reserve Connect application. The hypothesis was neither proven nor disproven due to inconclusive data; Without the T2 survey data, there was no way to prove or disprove that Marines increased their resilience through the USMC Reserve Connect application.

However, through the T1 survey data, we were able to interpret the participant's averages for their resilience measurements and key factors that help build resilience. For instance, based on the CD-RISC and key factor averages, 3RECON (Group 1) seemed to be more resilient than the other groups. They received the USMC Reserve Connect application, push notifications, and resilience interventions. 3RECON had the highest averages of the CD-RISC and all key factors among the units. 3RECON's high averages could be due to the Reconnaissance Marine's mission and the trust they have with each other due to the dangerous and secretive nature of their job. Alternatively, the 3RECON

Marines may not be more resilient than other Marines; however, further research is required before drawing a meaningful conclusion about 3RECON's resilience levels.

AAV (Group 2) seemed to show initiative in answering the T1 and T2 survey and using the application. They provided more response data than other units. They received the application and resilience interventions but did not receive push interventions. Based on incomplete response data, AAV participant numbers were anywhere between 30–69 participants more than the other units. AAV placed third in CD-RISC and PF and placed fourth in SWB, PS, DRS, and DC averages. Although AAV did not have higher averages in resilience measurements or key factors, based on the unit's participation, they could have a higher level of technology acceptance and therefore provided more response data than other units who declined to participate in T1 or T2. Although further research will be required before drawing TAM and resilience conclusions.

CEB (Group 3) placed second in the CD-RISC, PF, PS, and DRS averages and third in SWB and DC averages. CEB was the control group in this study, they did not have access to the application and interventions. Relatively, their survey outcomes were high likely due to a strong team bond when completing large-scale projects like building bridges and buildings which encompasses integrated key resilience factors. CEB also placed second in participation after AAV and before 3RECON. An assumption on CEB's high participation was that they had higher TAM due to the technical nature of their job/mission. However, further research is needed to conclude TAM and resilience.

HQ (Group 4) placed second in SWB and DC; they placed third in PS and DRS; and they placed fourth in CD-RISC and PF. They also had fewer participants compared to the rest of the units. HQ did not have access to the application but received the interventions via email.

B. RECOMMENDATIONS

One important modification to the study would be to find ways to have higher response rates and collect more data. The recommendation would be to complete both T1 and T2 surveys during a drill period. The difference between the group/unit participation in both T1 and T2 surveys were drastic. T1 survey had the most participants from each unit

overall and was completed during a drill weekend. Another recommendation would be to track whether individuals completed the interventions by unit/groups which would be beneficial to analyze which resilience interventions were completed most by unit and which were most useful to the app user.

It would be useful to see which interventions were helpful for different individuals. It would be instructive to see if certain interventions were helpful for the group, or to find trends on which interventions were best conveyed through the use of technology. A suggestion would be to follow up with a survey about the usefulness of the interventions or a poll button on each intervention, possibly creating a feature that asks, "was this helpful?" With buttons depicting a thumbs up or down.

We did not assess the TAM for these groups, but we recommend another study with a hypothesis that Marines have low TAM. Based on the results of this study, specifically the Marine population surveyed, may have low TAM. We suggest this hypothesis because the survey respondents tended to be minimally engaged with the T2 survey; therefore, they might have been minimally engaged with the application. Individuals or groups with low TAM typically do not readily adopt a new technology or process, which may explain the low participation rates of many units. Conversely, the TAM suggests that individuals who use technology often are generally more open to implement a new application or process and will use it more often to build habits. AAV unit had higher participation, which suggests that the organization included individuals with higher TAM than the average Marine in the study. We suggest that Marines may rate low on the TAM because they may have reason to distrust the organization's technology. At work, on Marine Corps computers, security systems bog down bandwidth or possibly do not allow certain browsers to open on a government computer. Marines have come to distrust technology that the organization produces, regardless of different generational communication styles. The TAM levels of Marines (or units) should be tested further in a variety of ways, including self-report surveys but also observational data from potential test groups of Marines compared to a civilian control group receiving the same technology. If found that TAM is not an obstacle, then we might want to find ways to advertise this application more.

The Marine Corps is not very good at advertising help modules such as the USMC Reserve Connect App. Even with the creation of an app, advertising the existence of the app and ensuring that the app is user friendly and palatable can be difficult. Most people download apps for a need they are trying to fulfill. The Marine Corps would need to market this app as a way to solve a problem for the end user to fill a user's need.

C. CONCLUSION

Regardless of TAM, "the key to achieving resilience is not much in people or technology itself but in the capability to harmonically combine both in a coherent whole" (Fulco et al., 2019, pg. 206). We believe that if a process or app is time efficient, fills a void or purpose, and there is trust in the application those factors will be the key factors for this app to be widely accepted and used.

APPENDIX. DEMOGRAPHICS OF SAMPLE SIZE

This appendix reviews the analysis and results of the T1 surveys from the participating units (groups 1–4). It is important to note that each demographic reported comprises different numbers. This is due to some participants leaving some of the demographic questions blank or chose to answer some of the questions and not others.

1. Gender

Below is a graph of the different genders that participated in the study. In total, 194 participants answered this question. There was a total of six non-binary/third gender participants, seven who preferred not to say, four were females, and 177 were males.

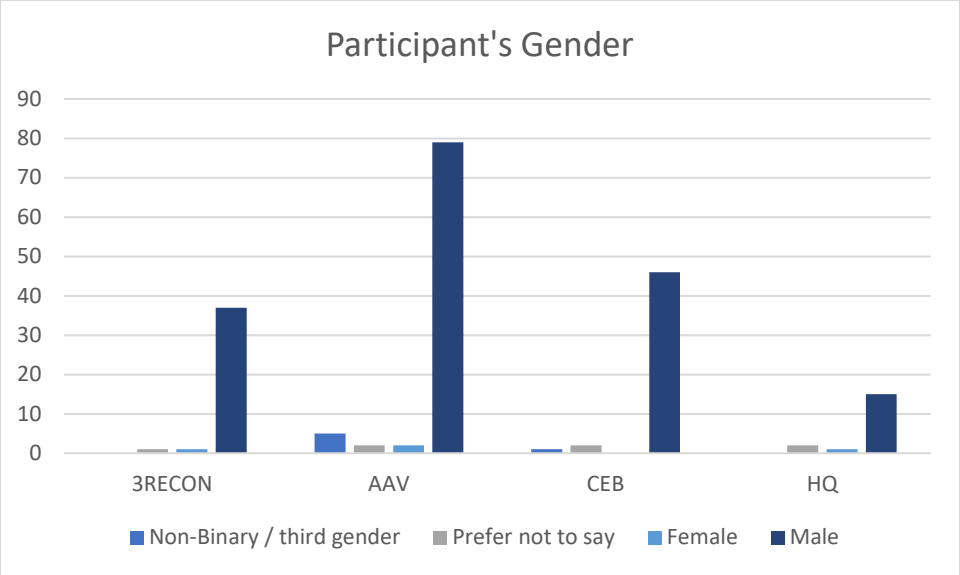

Figure 4. Participant's Gender per Unit/Group

Reconciling numbers with Table 17, out of 47 consenting participants from 3RECON unit members a total of 39 answered the gender question. 88 AA unit members answered out of the 102 participants consenting participants. 49 CEB members answered out of 58 consenting participants, and 18 HQ members answered this question out of the 22 consenting participants from the unit.

Table 17. Number of Participants per Gender Category

Gender	3RECON	AA	CEB	HQ	Totals
Non-Binary / third gender	0	5	1	0	6
Prefer not to say	1	2	2	2	7
Female	1	2	0	1	4
Male	37	79	46	15	177
Total	39	88	49	18	194

Table 17 represents the number of participants from each unit in each gender category that participated in the T1 Survey. These numbers were depicted in Figure 2.

2. Age

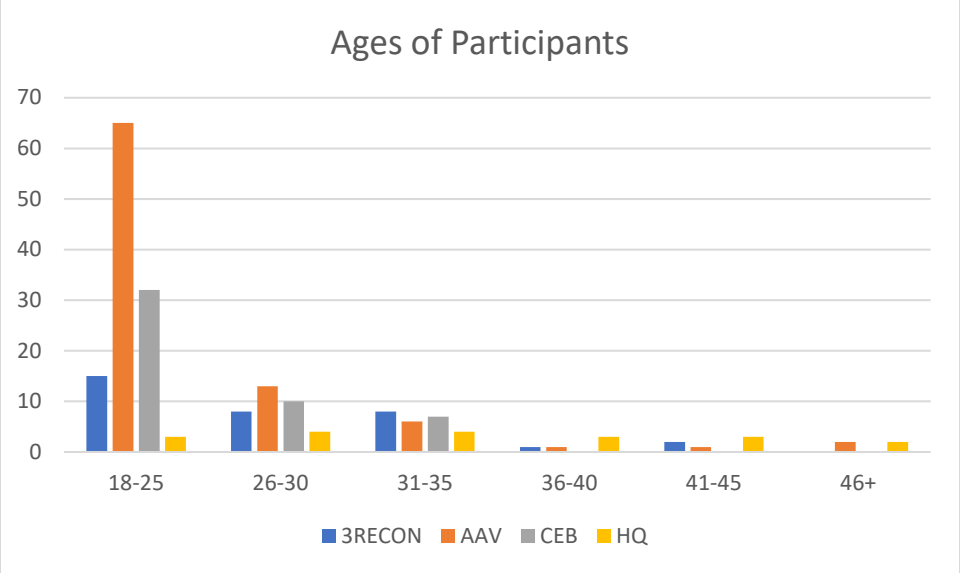

Figure 5. Ages of Participants from Each USMC-R Unit

The graph depicts the different ages of the participants. 190 participants answered this question out of the 229 total consenting participants. Majority of the participants were from the 18–25 year old age range which supports the makeup of the Marine Corps.

Table 18. Number of Participants in Each Age Group

Age	3RECON	AA	CEB	HQ	Totals
18-25	15	65	32	3	115
26-30	8	13	10	4	35
31-35	8	6	7	4	25
36-40	1	1	0	3	5
41-45	2	1	0	3	6
46+	0	2	0	2	4
Total	34	88	49	19	190

Table 18 represents the number of participants from each unit in each age group that participated in the T1 Survey. These numbers were depicted in Figure 3.

In each group that answered this question: 34 out of 47 RECON, 88 out of 102 AA, 49 out of 58 CEB, and 19 out of 22 HQ.

3. Ethnicity

A total of 188 participants answered this question.

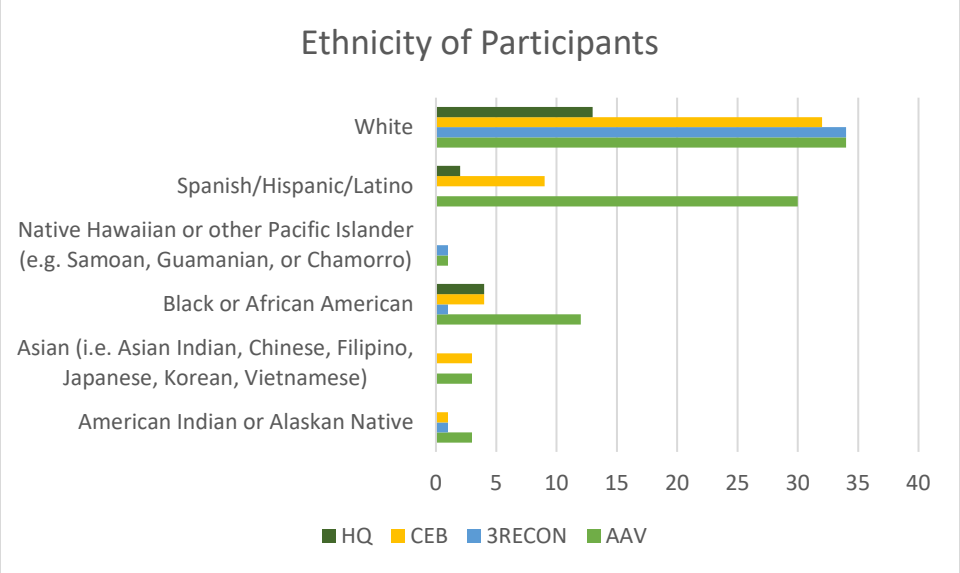

Figure 6. Ethnicity of Participants

Table 19. Number of Participants in Each Ethnic Category

Ethnicity	3RECON	AA	CEB	HQ	Totals
American Indian or Alaskan Native	1	3	1	0	5
Asian (i.e. Asian Indian, Chinese, Filipino, Japanese, Korean, Vietnamese)	0	3	3	0	6
Black or African American	1	12	4	4	21
Native Hawaiian or other Pacific Islander (e.g. Samoan, Guamanian, or Chamorro)	1	1	0	0	2
Spanish/Hispanic/Latino	0	30	9	2	41
White	34	34	32	13	113
Total	37	83	49	19	188

Table 19 represents the number of participants from each unit in each available ethnic category within the T1 survey. These numbers were depicted in Figure 4.

In each group that answered this question: 37 out of 47 RECON, 83 out of 102 AA, 49 out of 58 CEB, and 19 out of 22 HQ.

4. Rank

A total of 84 participants answered this question, which was placed toward the end of the survey. It was interesting to see that there were no Warrant Officers or Chief Warrant Officers 2–5 that participated, as well as no O1-O5 ranks that participated in this study. O1 to O5 ranks are Lieutenant, First Lieutenant, Captain, Major, and Lieutenant Colonel respectively. The lack of participants from these ranks could be due to not having them in their unit. Unfortunately, during the drill period that the T1 survey was disseminated, we were not able to obtain the unit's record of personnel at that time to confirm the amount of members each unit had per rank.

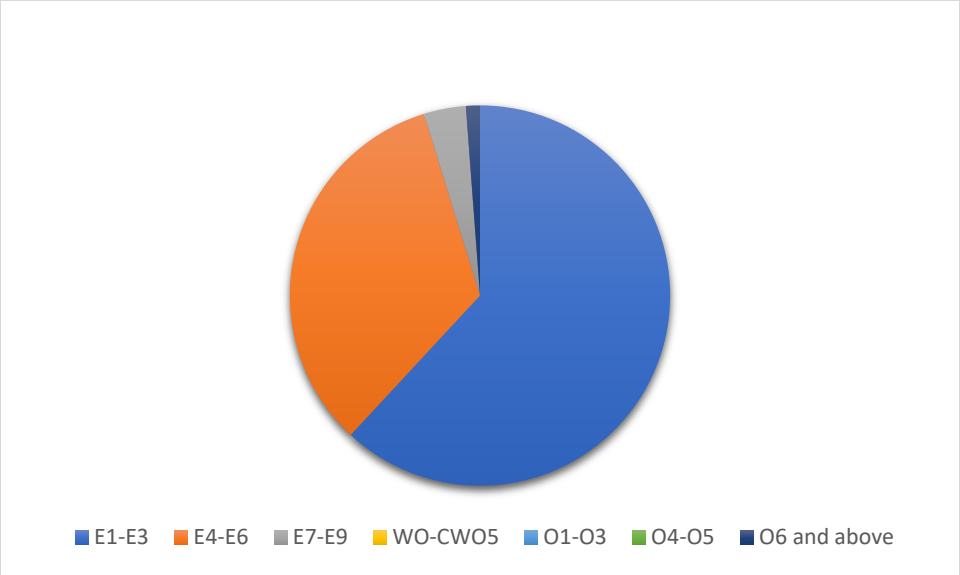

Figure 7. Percentage of Each Rank that Made Up the Study

The Marine Corps contains more E1-E3 than any other rank. It is not out of the ordinary that E1-E3 would have higher number in participants that answered this question.

Table 20. Number of Participants in Each Rank

E1-E3	52
E4-E6	28
E7-E9	3
WO-CWO5	0
O1-O3	0
O4-O5	0
O6 and above	1
Total	84

Table 20 represents the total number of T1 survey participants from each rank that answered this question. These numbers were depicted in Figure 5.

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