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An Examination of Self-Directed Learning Readiness in Executive-Level Fire Officers

by

Steven G. Knight

A dissertation submitted in partial fulfillment of the requirements for the degree of
Doctor of Philosophy
Department of Adult, Career, and Higher Education
College of Education
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Life-Long Learning, SDLRS, Self-Directed Learning, Myers-Briggs Typology Indicator, Learning Style

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Dedication

This dissertation is dedicated to my wife Andrea, my daughter Haley, and my son David. Thank you all for giving up four years of weekends and evenings for my *homework*. Thank you for all of your love, support, and encouragement by graciously allowing me the time necessary to earn a doctoral degree. You are the best family any father and husband could ever imagine.

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Abstract

The purpose of this study was to examine the self-directed learning readiness in executive fire officers in relation to the independent variables of personality type, educational attainment, and professional designation. This research utilized a quantitative design.

This study utilized the Myers-Briggs Type Indicator (MBTI) and the Self-Directed Learning Readiness Scale (SDLRS) with a sample of 250 professional firefighters. The total sample was divided equally between executive-level fire officers and firefighters at 125 each from professional departments in the Southeastern United States. Results were that the mean SDLRS score for the executive-level fire officers was 233.7 and significantly higher than the means of both the firefighters (221.6) and the adult population norm (214). Overall, results also found that the frequency of representation across the eight dominant functions of the MBTI were significantly different between the executive fire officer group and both the firefighter and the MBTI male norm group. However, only extroverted-sensors had a significant difference between the executive fire officers and the firefighters and only extroverted-thinkers had significant difference between executive fire officers and the reported male norm, respectively.

Similarly, the executive fire officer sample was compared to a sample of top public managers and found that there were no differences in the representativeness of the two

samples. Overall, there were no substantive differences in representativeness of dominant functions between groups.

Results indicated significant relationships between education, personality type, and the dependent variable SDLRS scores. The model that was developed explained 15.4% of the variability in SDLRS scores with significant positive correlations for two categories of educational attainment (undergraduate, graduate) and four categories of dominant functions of personality type (ES, EN, ET, and IN). When examining the same model exclusively for executive fire officers, the model explained 9.5% of the variability in SDLRS scores utilizing significant positive correlations for personality type for three categories of dominant function; IN, EN, and ET, respectively. Overall, the results of this study supported the theoretical construct that a high degree of self-directedness in learning was present at the executive fire officer level.

Chapter One

Introduction

Historically, the fire service community has continued to exist with a manageable and predictable rate of change. Coleman (2002) recognized that the basic skills asked of firefighters have not changed in 200 years. Changes typically manifest themselves in new service objectives with rare occasions to eliminate an existing deliverable. The modern all-purpose professional fire and emergency service organization provides firefighting, pre-hospital emergency medical services (EMS), hazardous materials response, pre-fire planning and inspections, fire cause determination, arson investigations, water rescue responses, emergency divers, and technical rescue responses for above and below grade rescues. In addition, a modern organization may deliver community risk reduction efforts that may include public education, drowning prevention, falls and injury prevention, cardio-pulmonary resuscitation (CPR), first-aid, and juvenile fire-setter training courses.

In general, the fire service has a well-defined regulatory system for purposes of certification, quality assurance, and continuing education that cover many of the fire and emergency service deliveries according to a Health and Safety Officer and Training Chief of a metro-sized fire and rescue agency (J. Bruni, personal communication, April 17, 2011). Federal oversight may also add specific annual training and competency requirements. Utilizing the state of Florida as an example, there is an annual commitment of nearly 300 continuing education hours after initial training depending on

the specific certifications required. This example is not intended to be exhaustive as many organizations require formal education and generally employees have the autonomy to seek out certification above conditions of employment. The minimum qualifications for most agencies in Florida are the Firefighter and Emergency Medical Technician (EMT) or Paramedic certifications.

Formal training is only the beginning as knowledge is accumulating at such a fast rate that one must continue to learn to be effective (Williams, 2001). According to Davis and Botkin (1994), the knowledge base doubles every seven years and more quickly in some industries. Black, the program manager for the Commission of Fire Accreditation International, believes that the half-life of knowledge for executive-level fire officers may be closer to five years (R. Black, personal communication, May 26, 2011). This is in contrast to the information half-life of firefighters described by Coleman (2002). Therefore, self-directed learning or lifelong learning is essential for continuous growth and to combat obsolescence (Moulton & Fickel, 1993). Knowles (1975) defines self-directed learning as "a process in which individuals take the initiative, with or without the help of others, in diagnosing their learning needs, formulating learning goals, identifying human and material resources for learning, choosing and implementing appropriate learning strategies and evaluating learning outcomes" (p. 18). Guglielmino (1977) offers the most used definition of self-directed learning readiness stating that it consists of a complex of attitudes, values, and abilities that create the likelihood that an individual is capable of self-directed learning.

This need for continuous self-directed learning is essential for executive fire officers as they require higher order skills than the firefighter population especially in the

rapidly changing environment of today. A fact highlighted by Flagello (1998) when speaking about empowered professional leaders who are adaptive, generative, and reflective. He stated "they require an ongoing educational commitment of a very different sort from rote learning or skill training and development geared toward passing a certification and/or licensing examination" (p. 46). Much of the lower-order mandated training is retained through the executive level because of the paramilitary and public benefit structures. These structures encroach on the limited resources of time and energy.

In addition, there are few institutions offering graduate degrees in the field of fire service administration, and even fewer at the doctoral level limiting opportunities to earn in-field regionally accredited terminal degrees. Therefore, most of the learning undertaken by executive fire officers between the work environment and their out-of-field formal education are self-directed. An empirical understanding of the readiness for self-directed learning among executive fire officers may guide future policy decisions, curricula, organizational and personal development, and methods to sustain or improve self-directed learning.

Statement of the Problem

Although some research does exist related to firefighters and self-directed learning, there has been little empirical research conducted examining self-directed learning readiness in executive-level fire officers. The only research study found concerning self-directed learning readiness and the firefighting population was conducted by Clark (1989) where he utilized a convenience sample of 30 students in an executive development course. In addition, no research was found that attempted to examine the relationship between personality type and self-directed learning readiness in executive-

level fire officers. Similarly, no research was found that attempted to explain the relationship of educational attainment or professional designation on self-directed learning readiness in executive-level fire officers.

Purpose

The purpose of this study was to examine the self-directed learning readiness in executive fire officers in relation to the independent variables of personality type, educational attainment, and professional designation. First, this study examined the degree of self-directed learning readiness in executive level fire officers. Second, the Self-Directed Learning Readiness Scale (SDLRS) scores of executive level fire officers were compared to other population means. Third, the relationships between SDLRS scores and personality type, educational attainment, and professional designations were examined.

Research Questions

Four research questions will be used to guide this study.

1. What is the mean SDLRS score for executive-level fire officers?
2. How does the mean SDLRS score of the executive-level fire officers compare to the firefighters and the reported norms for the adult population?
3. Is there a difference between the frequency of MBTI personality type of the executive fire officers and that of the MBTI reported norms and of the firefighters?
4. What is the relationship between SDLRS scores and the independent variables educational attainment, professional designation, and MBTI personality type?

Theoretical and Conceptual Framework

The International City/County Management Association's (ICMA) Deputy Executive Director Kellar believes that this economy has been the most difficult economic period since the great depression (ICMA, 2011). The combination of a recession, tax reform movements, and declining property values have substantially reduced the ad valorem revenues for local governments. Ad valorem taxes based on property values are the primary source of funding for public safety departments within cities and counties (Lee & Johnson, 1998). According to Parow, the President of the International Association of Fire Chiefs, substantial budget reductions are being made quickly across the United States for public safety departments such as fire departments (J. Parow, personal communication, April 30, 2011). Executive fire officers are being asked to redefine and justify century-old business models with little to no formal training within a single budget cycle in many cases. Large, the Fire Chief of St. Petersburg Fire & Rescue and the Vice President of the Florida Fire Chiefs Association believes that the speed of change is now approaching what has long been reserved for the private sector (J. Large, personal communication, April 24, 2011).

In a rapidly changing world, one either continues to grow or dies and it is suggested that all development is self-development (Moulton & Fickel, 1993). Professionals are now recognizing the importance of learning as a vital component to empowerment (Flagello, 1998). Executive fire officers require a different type of learning, self-directed learning, that diverges from traditional learning methods employed in the fire service because of the rapidly changing environment and limited opportunities for academic study in field.

Moulton and Fickel (1993) reported that the median stay in any professional position was just over two years, with the maximum tenure being nearly three years. McGrath and Kenny (1999) reported that Briese, the executive director of the International Association of Fire Chiefs (IAFC), has estimated the average tenure of a fire chief in any single community is three to five years. As previously stated, continuous learning is an essential tool in combating obsolescence. The cumulative nature of the acquisition of knowledge is key for executives as no learning occurs in isolation from experience (Bickham, 1998). Kotter (1996) expanded this cumulative nature to explain that it is the compounding effect of consistent dedication to learning that takes executives from good to great. However, the typical hierarchal and bureaucratic structure of fire departments may retard such growth for many long-term employees.

The literature supports high employee empowerment, participation, and discretion as conducive to learning. Argyris and Schon (1996) suggested that punishment-oriented control systems lead to discourage learning, a rather typical para-military description of the fire service. As reported by Moynihan (2005), "The public sector has traditionally relied on centralized controls on behavior, human and financial resources, and decision making, leading to goal displacement, trained incapacity, and a decline in creativity and effectiveness (Klay 1994; Merton, 1940; Osborn & Gaebler, 1992)" (p. 205). The training and education requirements that exist outside of formal academia are both mandated and technical in orientation. The difficulty in mastering and maintaining a professional knowledge base of a higher order is difficult with the myriad of mandated lower order training. The long-term results are the creation of experts that have limited

breadth of the larger landscape (Bickham, 1998). These skills might only be developed through self-directing activities.

Long (1992) defines self-directed learning as "a cognitive process that is dependent on meta-cognitive behaviors such as attending, focusing, questioning, comparing, contrasting, etc., that are personally controlled or managed by the learner with little or no external supervision by a powerful other" (p. 12). Knowles (1975) defined self-directed learning as a process in which individuals take the initiative in designing learning experiences, diagnosing needs, locating resources, and evaluating learning. Similarly, a definition for the readiness for self-directed learning is provided by Guglielmino (1977) stating that it consists of a complex of attitudes, values, and abilities that create the likelihood that an individual is capable of self-directed learning. Guglielmino (1977) further identified the qualities of self-directed learning readiness as initiative, independence, and persistence in learning; acceptance of responsibility for one's own learning; self-discipline; curiosity; ability to learn independently; enjoyment of learning; a tendency to be goal oriented; and to view problems as challenges rather than obstacles. Although, these definitions describe personal control and independence over learning, due caution should be used to prevent erroneously assuming that self-directed learning is synonymous with learning in isolation or solitude. Brookfield (1986) cautioned that definitions of self-directed learning that emphasize independence to the exclusion of outside stimuli are dangerous, yet common.

Self-directed learning may occur in any environment in and away from the workplace. However, for the purposes of this study, with the exception of the literature

review, self-directed learning readiness shall be restricted to learning in the workplace of professional executive fire officers.

There has been little empirical research concerning self-directed learning readiness in the professional firefighting population. As mentioned previously, the only research study found concerning self-directed learning readiness and the firefighting population was conducted by Clark (1989). Clark found that a convenience sample of 30 fire executive students possessed a significantly higher mean score on the Self-Directed Learning Readiness Scale (SDLRS) than the means scores of both the adult population norm (Guglielmino, 1988) and a sample of public managers (Johnson, Sample, & Jones, 1987). Clark's study has some inherent limitations to the generalizibility of findings due to his sampling methods. All participants in the sample had to apply to the program, presumably voluntarily, and were selected through a competitive process. Therefore, confounding attitudes may be present that serve to inflate the degree of readiness for self-directed learning in the sample. However, Clark's research is a foundational piece for this population and has provided the framework to begin further research. This research expanded on Clark's work.

Although there is limited information concerning a professional executive fire officer population, several studies have been published concerning public leadership roles and self-directed learning readiness. Phares (2006) found that community leaders had a higher SDLRS score than that of the general population norm. This is consistent with the findings of Johnson, Sample, and Jones (1987) and the public manager sample population compared by Clark (1989). Statistically significant findings of self-directed learning readiness scores and increased task significance, skill variety, autonomy, and job

feedback were reported by Middlemiss (1987). Similarly, Parcells (2006) found a significant correlation between self-directed learning readiness scores and an increase in experimentation, initiative, and resourcefulness. Findings of Middlemiss and Parcells would be consistent with general assumptions and desirability of supervisory job classifications providing a framework for this study.

Several studies have been published concerning the medical field and self-directed learning readiness. Local governments that provide emergency medical services (EMS) within their fire organizations have a disproportionate workload towards the pre-hospital care of the sick and injured. Nationally, over 65% of the calls for service are for EMS (National Fire Protection Association, 2010). In general, nurses were found to have a higher mean self-directed learning readiness score than the adult norm (Alspach, 1991; Middlemiss, 1987). In addition, Alspach (1991) found that the nursing faculty had a higher self-directed learning readiness score than the students. Similarly, medical students were found to have higher mean self-directed learning readiness scores than the adult population norm (Shokar, Shokar, Romero, & Bulik, 2002). Assuming this would hold true with the firefighter population as a whole, a control group of firefighters was utilized to overcome bias for the executive fire officers. In other words, if the entire population of firefighters, a group that produces executive fire officers, is higher than the norm group, then false assumptions may be derived from a higher than norm self-directed readiness score.

The relationship between three independent variables and the total self-directed learning readiness score was examined to provide greater insight into the variability of

total self-directed learning readiness scores in this population. The three independent variables are educational attainment, professional recognition, and personality type.

Educational attainment was chosen for this study as it may have a mediating affect on the self-directed learning readiness scores of executive fire officers since it is common to have positional requirements of a bachelor's degree and master's preferred. The preponderance of the literature suggests that the higher the degree obtained the higher the self-directed learning readiness score (Alspach, 1991; Amey, 2008; Harvey et al., 2003; Long & Agyekum, 1983; Robinson, 2003). Since the individual motivation for degree obtainment for members of the sample could be different, educational attainment was included in the study design. Educational attainment was operationally defined as the highest degree earned (high school, undergraduate, and graduate).

The variable, professional designations, was included as an extension of Clark's (1989) earlier work with executive fire officers. This research studied a population of executive level fire officers that included members with and without the professional designations. These variables were included to assist in explaining the relationship of the attainment of the professional designations and the degree of self-directness. For example, if executive level fire officers that are graduates of the National Fire Academy's (NFA) Executive Fire Officer (EFO) program have higher self-directed learning readiness scores than non-graduates this may provide insight into the curriculum's ability to promote self-directed learning and/or suggest that highly self-directed fire officers seek out professional designations. Therefore, professional designations were incorporated into the study design.

In Clark's study, the sample included first-year students in an executive development course as part of the Executive Fire Officer Program (EFO). Presumably, the majority of these students completed the four-year program, but it would not be uncommon that a percentage of the officers did not complete the program and receive the designation of EFO. The operational definition of professional designations included two categorical variables EFO and the Chief Fire Officer Designation (CFO) issued as a professional accreditation from the Center for Public Safety Excellence and the Commission on Professional Credentialing.

Personality type was operationally defined as the psychological typologies identified by the Myers-Briggs Typology Indicator (MBTI). Sixteen personality types can be identified using four dichotomous scales that measure mental processes. The extraversion/introversion (E/I) scale measures where one would prefer to focus their attention and get energy. An outward focus would be extraversion and an inward focus would be introversion. The sensing/intuition (S/N) scale measures how one would prefer to take in information. The thinking/feeling (T/F) scale measures how one makes decisions either through thinking or feeling. Lastly, the judging/perceiving (J/P) scale measures how one deals with the outer world (Myers, 1998).

Personality type is suggested to be a contributing factor to the selection of vocation. Considerable contribution has been made in this area by Holland. Holland's body of research suggested that there is a match of personality type and vocation and further suggests that the success, tenure, and performance of individuals in specific vocations is a matter of match or congruency between the vocation (environment) and personality (Gottfredson, Jones, & Holland, 1993; Holland & Gottfredson, 1976;

Holland, 1958, 1960, 1966, 1996). Holland's vocational codes include realistic, investigative, artistic, social, enterprising, and conventional. The vocational classification of firefighter consistently is reported as realistic (Clarke, 2004) and accordingly, the theory supports an associated personality type(s).

The research suggested that it is possible to identify prevalent personality types among firefighters and as such executive level fire officers that are attracted to the vocation (Clarke, 2004, Pappas, 2001; Platts, 2000; Pretz, 1999; Seeley & Seidler, 1985). There remains little empirical research examining the personality profile of executive level fire officers, however. Few studies have attempted to provide predictive capabilities between the personality typology of the MBTI and the overall score of the SDLRS. The literature is silent on utilizing MBTI to predict self-directed learning readiness scores in the executive level fire officer population.

Theoretically, a framework is postulated that executive level fire officers will need above average levels of self-directedness in their learning to remain relevant and provide adaptive transformational leadership in rapidly changing times. The literature supports the correlation between personality traits and vocational choice. Therefore, if a particular set of personalities are overrepresented among executive level fire officers than personality may influence the overall degree of self-directedness in learning and confound other variables and their relationships to self-directed learning readiness. Similarly, educational attainment and professional designations were included in this study to better explain variance in SDLRS scores among the sample of executive level fire officers.

Significance of the Study

At the conclusion of the first decade in the 21st century, executive-level fire officers exist in a highly volatile and dynamic industry requiring continuous career-long learning in the workplace. The higher order knowledge and skills that must be learned at the executive officer level may not be readily available as the speed of change outpaces formal education and therefore will need to be self-directed. However, limited empirical research is available concerning the degree of self-directed learning readiness in executive level fire officers. Also, there is limited empirical research examining personality traits in executive fire officers. This study begins to fill these gaps in knowledge and provide valuable data necessary for fire and emergency service organizations, and their executive leaders, to make informed decisions regarding organizational and individual development, effective communication, curricula, program changes, and methods to sustain or improve self-directed learning. Results could also be useful to universities, colleges, and training centers that offer programs to executive fire officers.

Limitations

Several limitations exist within the context of this study.

1. Although the SDLRS is most utilized instrument in the study of self-directed learning readiness (McCune, 1988; Merriam, Caffarella, & Baumgartner, 2007; Redding, 1991), criticism of the construct validity of the instrument exists (Bonham, 1991; Field, 1989; Hoban, Lawson, Mazmanian, Best, & Seibel, 2005). Overall, the reliability and validity of the instrument is supported by the preponderance of the literature (Delahaye & Choy, 2000; Delahaye & Smith,

1995; Durr, 1992; Finestone, 1984; Long & Agyekum, 1984; McCune & Guglielmino, 1991; Harriman, 1990; Shokar et al., 2002).

2. The SDLRS is a self-report instrument and may be subject to socially desirable responses.
3. The MBTI is a self-report instrument and may be subject to socially desirable responses.
4. Membership in each of the executive-level fire officer groups is voluntary and may introduce pre-sample selection bias.

Delimitations

This sample was confined to current executive-level fire officers and/or members who hold the professional designations of EFO and/or CFO. Although this sample may appear representative, ultimately participation was voluntary. Therefore, self-selection bias may have threatened the internal validity of the results and may have weakened generalizibility.

Operational Definitions of Terms

The following terms are operational definitions for this study.

Chief Fire Officer (CFO)--an officer who holds the professional accreditation of CFO from the Center for Public Safety Excellence and the Commission on Professional Credentialing possessing a demonstrated level of expertise derived from a peer-reviewed accreditation process.

Educational attainment--independent variable consisting of three levels; High School diploma or equivalent, undergraduate degree, and graduate degree (Master's or Doctorate).

Executive Fire Officer (EFO)--a graduate of the National Fire Academy's (NFA) Executive Fire Officer Program possessing a demonstrated expertise derived from the NFA curriculum.

Executive-level fire officer--a chief fire officer in a fire and emergency service organization who has the rank of Battalion/District Chief, Division Chief, Deputy Chief, Assistant Chief, or Fire Chief. Also, included are those who hold the professional designations of EFO or CFO.

Fire Officer--a person in a fire and emergency service organization who holds a supervisor position, but is not a chief officer.

Firefighter--a person professionally trained in the field of preventing and extinguishing fires. Firefighters do not have consistent supervisory responsibilities. Therefore, from a hierarchal perspective, this is an entry-level position.

Personality type--one of the psychological types as reported by the Myers-Briggs Type Indicator.

Professional designation--level of demonstrated expertise consisting of two forms: CFO and EFO.

Self-Directed Learning Readiness Scale--an instrument developed by Guglielmino that measures the readiness for self-directed learning.

Self-directed learning readiness--a complex of attitudes, values, and abilities that create the likelihood than an individual is capable of self-directed learning (Guglielmino, 1977).

Self-directed learning--learner's ability independently to plan, conduct, and evaluate their learning activities (Guglielmino, 1977).

Organization of Study

Chapter 1 introduced the study, presenting the problem, purpose, limitations, and definition of terms. Chapter 2 introduces a review of related literature concerning self-directed learning readiness, personality, and the relationships between self-directed learning readiness, personality, learning-style, and occupation. Chapter 3 reports the procedures utilized in this study, including the population and sample, instrumentation, data collection, and the data analysis. The findings of this study are presented in Chapter 4. Chapter 5 includes a summary of the study, conclusions, implications, and recommendations for further practice and research.

Chapter Two

Review of the Literature

The purpose of this study was to examine the self-directed learning readiness in executive fire officers in relation to the independent variables of personality type, educational attainment, and professional designation. First, this study examined the degree of self-directed learning readiness in executive level fire officers. Second, the SDLRS scores of executive level fire officers were compared to other population means. Third, the relationships between SDLRS scores and personality type, educational attainment, and professional designations were examined.

This chapter provides a brief introduction to the literature on self-directed learning and provides a review of relevant research of self-directed learning readiness in the workplace. Finally, a review of the literature is presented in the context of the three independent variables personality, educational attainment, and professional designations.

Self-Directed Learning

Self-directed learning is an extension of Tough's learning projects research. Tough (1971) defined a learning project as "a highly deliberate effort to gain and retain a defined area of knowledge or a skill, or to change in some other way" (p. 1). Tough (1978) found that adults spent an average of 500 hours annually on learning projects. His research found that adults who responded to his research surveys completed five learning projects per year and that more than 70% of the learning projects were self-planned or

self-taught (Tough, 1978). Tough's research was continued by Knowles as a graduate student and eventually lead to the definition of the term self-directed learning.

> Self-directed learning is defined by Knowles (1975) as a process in which individuals take the initiative, with or without the help of others, in diagnosing their learning needs, formulating learning goals, identifying human and material resources for learning, choosing and implementing appropriate learning strategies, and evaluating learning outcomes. (p. 18)

Long (1992) defined self-directed learning as "a cognitive process that is dependent on meta-cognitive behaviors such as attending, focusing, questioning, comparing, contrasting, etc. that are personally controlled or managed by the learner with little or no external supervision by a powerful other" (p. 12).

Similarly, a definition for the readiness for self-directed learning is provided by Guglielmino (1977) stating that it consists of a complex of attitudes, values, and abilities that create the likelihood than an individual is capable of self-directed learning. Guglielmino further identified the qualities of self-directed learning readiness as initiative, independence, and persistence in learning; acceptance of responsibility for one's own learning; self-discipline; curiosity; ability to learn independently; enjoyment of learning; a tendency to be goal oriented; and to view problems as challenges rather than obstacles (p. 73).

Although, these definitions describe personal control and independence over learning, due caution should be used to prevent erroneously assuming that self-directed learning is synonymous with learning in isolation or solitude. Brookfield (1986) "cautions that definitions of self-directed learning that emphasize independence to the exclusion of outside stimuli are dangerous" (p. 48). Self-directed learners will still need a considerable degree of collaboration thus challenging the very definition of an

autonomous learner (Candy, 1991; Peters & Gray, 2005). Tobin (2000) believes that all learning is self-directed, regardless of the medium, and that ultimately the individual learner will decide what is learned and retained. The difficulty in defining self-directed learning has served to provide a myriad of erroneous assumptions about self-directed learning.

Brockett and Hiemstra (1991) identified 10 myths associated with self direction in learning:

> Myth 1: Self-directedness is an all or nothing concept.
> Myth 2: Self-direction implies learning in isolation.
> Myth 3: Self-direction is just another adult education fad.
> Myth 4: Self-direction is not worth the time required to make it work.
> Myth 5: Self-directed learning activities are limited primarily to reading and writing.
> Myth 6: Facilitating self-direction is an easy way out for teachers.
> Myth 7: Self-directed learning is limited primarily to those settings where freedom and democracy prevail.
> Myth 8: Self-direction in learning is limited primarily to white, middle-class adults.
> Myth 9: Self-directed learning will erode the quality of institutional programs.
> Myth 10: Self-directed learning is the best approach for adults. (p. 10)

Theoretically, if Tobin (2000), Candy (1991), and Peters and Gray (2005) are correct then the "shift" towards self-directed learning is not a passing of the torch from the learned to the learner, but rather a recognition and emphasis of who is ultimately responsible for learning. Self-directed learning is therefore in need of strategies or a strict set of competencies to guide the process.

Knowles (1975) identified nine major competencies of self-directed learning:

1. An understanding of the differences in assumptions about learners and the skills required for learning under teacher-directed learning and self-directed learning and the ability to explain these differences to others.

2. A concept of oneself as being a non-dependent and self-directed person.
3. The ability to relate to peers collaboratively, to see them as resources for diagnosing needs, planning one's own learning, and learning; and to give help to them and receive help from them.
4. The ability to diagnose one's own learning needs realistically, with help from teachers and peers.
5. The ability to translate learning needs into learning objectives in a form that makes it possible for their accomplishment to be assessed.
6. The ability to relate to teachers and facilitators, helpers, or consultants, and to take the initiative in making use of their resources.
7. The ability to identify human and material resources appropriate to different kinds of learning objectives.
8. The ability to select effective strategies for making use of learning resources and to perform these strategies skillfully and with initiative.
9. The ability to collect and validate evidence of the accomplishment of various kinds of learning objectives. (p. 61)

In summary, this section reviewed several definitions of self-directed learning and provided some evidence of erroneous assumptions associated with self-directed learning. Finally, specific competencies for successful self-directed learning were provided.

Self-Directed Learning in the Workplace

Tobin (2000) identified workplace self-directed learning as an emergent theme in research. Specific to this study, Keirns (1998) suggested a renewed emphasis on self-directed learning as self-instruction, with and without direct guidance due to the prominence of computer-mediated instruction, distance learning, and hypermedia.

Guglielmino and Guglielmino (1983) studied a sample of 753 individuals in an American utility corporation and found overall positive correlations between job performance and SDLR. Outstanding performers had the highest SDLRS scores. Roberts (1986) studied a Hong Kong Telephone Company and found a significant relationship between SDLR and manager's performance ratings.

These original findings were supported by more recent research as well. Jude-York (1991) conducted research of 196 employees at various Clorox plants. Findings supported a significant correlation between SDLRS scores and job performance. Similarly, Durr (1992) studied 607 employees at a Midwestern electronics corporation and found a significant positive relationship with SDLRS scores and performance ratings. Shokar et al. (2002) studied 182 third-year internal medicine students while investigating the effects of problem-based learning (PBL) curriculum on SDLRS scores. Findings included a statistically significant relationship between final performance and SDLR scores. Lastly, Broomfield-Day (2000) studied 104 full-time hospital employees in the food and nutrition department and found that there were statistically significant correlations between job satisfaction and SDLR scores.

In summary, several studies were presented demonstrating that the theoretical concept of SDLR correlated with desirable outcomes such as job performance and job satisfaction in the workplace. However, there is a considerable lack of understanding of the degree of self-directed learning readiness of members in the professional fire service.

Self-Directed Learning Readiness Scale

Self-directed learning readiness was measured by the instrument entitled the Self-directed Learning Readiness Scale (SDLRS) developed by Guglielmino (1977) as part of her dissertation. It is the most widely used instrument in the measurement of self-directed learning to date (McCune, 1988; Merriam, Caffarella, & Baumgartner, 2007; Redding, 1991). It is now also known as the Learning Preference Assessment (LPA). For the purposes of this research and consistency, it was referred to as the SDLRS.

The instrument was developed utilizing the Delphi technique with experts from the field of adult education. The Delphi technique was designed to get group consensus while limiting the social group dynamics associated with a face to face setting (Isaac & Michael, 1997). The instrument was designed to measure the learner's perceived readiness for self-direction in learning. The most up-to-date version of the SDLRS has 58 items that are scored on a five-point Likert type scale. The Likert-type utilizes a 1 as "almost never" response to a 5 with "almost always" with closed-ended prompts. The instrument has eight factors that were revealed in a principal component analysis. The eight factors are:

1. Openness to learning opportunities
2. Self-concept of an effective learner
3. Initiative and independence in learning
4. Informed acceptance of responsibility for one's own learning
5. Love of learning
6. Creativity
7. Positive orientation to the future
8. Ability to use basic study skills and problem-solving skills. (p. 62)

Guglielmino (1977) does not recommend using any of the domains independently and only recommends using the total score in research.

Scores are intended to fall on a continuum from 58 to 290. High scores closer to 290 are indicative of highly self-directed and scores closer to 58 are highly other-directed in their learning. In other words, they may require considerable direction from an outside source to complete their learning endeavors.

Validity and Reliability of SDLRS. Guglielmino (1977) reports a reliability estimate using the Cronbach alpha as .87. Content validity was established with the expert panel during the Delphi technique. Criterion validity has been established through

item-total analysis. Reliability estimates are generally strong across all studies. Based on a population of 3,151 individuals from the United State and Canada, a split-half Pearson product moment correlation with a Spearman-Brown correction produced a reliability coefficient of .94 (Guglielmino & Guglielmino, 1991). Test-retest reliability coefficients are reported at .82 (Finestone, 1984) and .79 (Wiley, 1981) respectively. However, there has been debate over the SDLRS's content validity in the literature.

Delahaye and Smith (1995) established the convergent validity of both the SDLRS, also referred to as the Learning Preference Assessment, and the Student Orientation Questionnaire (SOQ) during this study. There was a statistically significant relationship between the two similar constructs.

Harriman (1990) validated the internal consistency with an item analysis of the results of the 170 student sample. Shokar et al. (2002) supported the construct and convergent validity in their study that revealed a high correlation with clinical instructor ratings of students and the self-reported SDLRS scores provided by the students.

Long and Agykeum (1983, 1984) supported the content and construct validity of the SDLRS with some reservations due to the convergent validity of a teacher rating instrument. Delahaye and Choy (2000) examined the content, construct, and criterion-related validity as well as its reliability with internal consistency and test-retest and produced the affirmation for the SDLRS/LPA.

Field (1989) conducted a factor analysis and an item-total correlation and determined that only four factors existed and did not fit the model. He also provided discussion on the negatively scored items causing invalidity to the analysis. In the end, Field proposed that the SDLRS should not be used and that it only measured the one

construct of a love and enthusiasm for learning. This point was contested by Delahaye and Smith (1995) as well as Delahaye and Choy (2000).

Hoban, Lawson, Mazmanian, Best, and Seibel (2005) conducted a factor analysis with a sample population of 972 first-year medical students over a six-year period. The factor analysis also produced only four factors and did not fit the sample.

Bonham (1991) wrote in opposition of the construct validity of the SDLRS. Bonham's belief is that the instrument is more accurately measuring motivation rather than self-direction in learning. Bonham extended the criticism of the construct to indicate that the negative SDLRS scores may be a dislike for learning rather than a need for other-directed learning.

In summary, the literature provided some conflicting positions regarding the validity and reliability of the SDLRS. Research criticizing the validity and reliability of the SDLRS were reviewed. However, the SDLRS appears to have the preponderance of support for its reliability and validity in the literature.

Personality Type in Occupation

Personality is defined as somebody's set of characteristics: the totality of somebody's attitudes, interests, behavioral patterns, emotional responses, social roles, and other individual traits that endure over long periods of time (Encarta, 2009). The connection between personality and vocation were extensively studied by Holland beginning in the 1950s. Holland (1958) defined personality as the "person's personal adjustment, values, attitudes, and vocational motivation" (p. 336). Holland's research suggests that individuals could be grouped into one of six personality types; realistic, investigative, artistic, social, enterprising, and conventional, respectively. The evolution

of Holland's work developed into a theory of congruency between personality and the environment associated with specific vocations (Holland & Gottfredson, 1976). A brief summary is presented in Table 1 demonstrating the relationship between individual personality type and vocational or environment.

Holland and Gottfredson (1976) suggest that the more congruent the relationship between personality and environment, the more attractive the vocation. In other words, a better match between personality and the actual environment results in people that are satisfied with their vocation resulting in less turnover and more productivity. In contrast, individuals with personalities that are not congruent with the environment are uninvolved, dissatisfied, and unsuccessful. The majority of people manage to find work that is congruent with their type (Holland & Gottfredson, 1976). This study utilized the Myers-Briggs Type Indicator (MBTI) to measure personality or psychological types.

Consistent with the MBTI, Holland did not suggest that individuals are wholly in one type to the exclusion of another. Therefore, it is expected that each person will have a dominant personality type, but may also have attributes in other types as well. This study not only identified specific clusters of personality types among executive fire officers, but also examined the relationship of the personality type to self-directed learning readiness. A primary construct of this study is that there is a direct relationship between leadership and learning. Kouzes and Posner (2010) suggest that the best leaders turn out to be the best learners.

In summary, the literature supports the construct that there is a connection between personality and vocational choice. Therefore, it is reasonable to postulate that

Table 1

Descriptions of Personality and Environmental Preferences by Occupational Type

Occupational Type	Personality Preference	Environmental Preference
Realistic	Manipulation of machines, tools, and things	Manual and mechanical competencies, interaction with machines, tools, and objects
Investigative	Exploration, understanding and prediction or control of natural and social phenomena	Analytical, technical, scientific, and verbal competencies
Artistic	Literary, musical, or artistic activities	Innovation or creative ability, emotionally expressive interaction with others
Social	Helping, teaching, treating, counseling, or serving others through personal interaction	Interpersonal competencies, skill in mentoring, treating, healing, or teaching others
Enterprising	Persuading, manipulating, or directing others	Skills in persuasion and manipulation of others
Conventional	Establishing or maintaining orderly routines, application of standards	Clerical skills, skills in meeting precise standards for performance

Source: Holland, 1996, pp. 398-399.

specific personality types may cluster in vocations that are congruent with personality. This study included personality as a variable to statistically control for personality as it relates to SDLRS scores and to examine the relationship between personality and self-directed learning readiness.

Myers-Briggs Type Indicator

The Myers-Briggs Type Indicator (MBTI) was created to measure personality preferences or psychological type. The authors, Briggs and her daughter Myers, built upon earlier work by Jung. The MBTI is the most widely used personality assessment in use in the United States as it is administered over two million times annually (Myers, 1998). In addition, it has been translated into more than 30 languages for international use.

Jung suggested that people utilize two mental processes: taking in information or *perceiving* and organizing information and coming to conclusions or *judging* (Myers, 1998). He identified two opposite ways that people perceive; sensing and intuition, and two opposite ways that people judge; thinking and feeling (Myers, 1998). Each of these processes could be used with an extraverted or introverted orientation yielding Jung's eight mental functions. Myers and Briggs expanded Jung's earlier work to include an auxiliary function that formulates the 16 MBTI types of the four dichotomous scales. The MBTI utilizes four dichotomous scales (E/I) Extroversion/Introversion, (S/N) Sensing/Intuition, (T/F) Thinking/Feeling, (J/P) Judging/Perceiving.

According to Myers (1998), people who prefer Extroversion are attuned to the external environment, prefer to communicate by talking, work out ideas by talking them through, learn best through doing or discussing, have broad interests, are sociable and

expressive, and readily take initiative in work and relationships. People who prefer Introversion are drawn to the inner world, prefer to communicate in writing, work out ideas by reflecting on them, learn best by reflection, focus in depth on their interests, are private and contained, and take initiative when the situation or issue is very important to them.

People who prefer Sensing are oriented to present realities, are factual and concrete, focus on what is real and actual, observe and remember specifics, build carefully and thoroughly towards conclusions, understand ideas and theories through practical applications, and trust experience. People who prefer Intuition are oriented to future possibilities, are imaginative and verbally creative, focus on the patterns and meaning in data, remember specifics when they relate to a patter, move quickly to conclusions and follow hunches, want to clarify ideas and theories before putting them into practices, and trust inspiration (Myers, 1998).

People who prefer Thinking are analytical, use cause-and-effect reasoning, solve problems with logic, strive for an objective standard of truth, reasonable, and see fairness as everyone being treated equally. People who prefer Feeling are empathetic, guided by personal values, assess impacts of decisions on people, strive for harmony and positive interactions, compassionate, and see fairness as wanting everyone to be treated as an individual (Myers, 1998).

Finally, people who prefer Judging are scheduled, organized in their lives, systematic, methodical, make both short and long-term plans, like to have things decided, and try to avoid last-minute stress. People who prefer Perceiving are spontaneous,

flexible, casual, open-ended, adapt and change course easily, like things loose and open to change, and feel energized by last-minute pressures (Myers, 1998).

The MBTI identifies 16 distinct personality types based on available combinations of each of the four dichotomous scales; see Table 2 for a full list categorized by Introversion and Extroversion.

Table 2

The 16 MBTI Psychological Types Categorized by Introversion and Extroversion

Introversion	Extroversion
ISTJ*	ESTP
ISTP	ENFP
ISFP	ESFP
INFJ	ESFJ
ISFJ	ESTJ
INFP	ENFJ
INTJ	ENTP
INTP	ENTJ

Note: E=extroversion; I=introversion; N=intuition; S=sensing; F=feeling; T=thinking; J=judging; P=perceiving.

Consistent with the discussion of personality and vocation, each of the mental processes are available to and are used by everyone. The difference is what is preferred, suggesting that individuals may exhibit primary and secondary preferences for mental processing with no judgment as to right, wrong, better, or worse. However, with regards

to this study, the investigation sought to identify if clusters of personality preferences existed that suggest more congruency between personality and environmental preferences within a sample of executive fire officers.

Validity and Reliability of MBTI. Prior to the development of Form M, Hoover and Kadunc (1983) criticized the MBTI reliability estimates and report the value of .37. They proposed that if "subjects of a given sample have strong personas which mask and are incongruent with their psychological type, then their MBTI scores will be discrepant" (p. 13). In other words, the social or personal desirability of the respondent could mask or overcome the true measure of the MBTI. However, Hoover and Kadunc also recognized that the true type would be reported by the MBTI when the persona is congruent with the true type, or in the most natural state.

The manual states that there has been improvement in reliability estimates with the development of the Form M and utilized the national sample of over 3,000. Reliability estimates for internal consistency on the MBTI Form M range from .89 to .94 using the split-half reliability procedure and corrected by the Spearman-Brown formula (Myers, McCaulley, Quenk, & Hammer, 2009).

The validity of the four preference scales is well supported. Myers, McCaulley, Quenk, and Hammer (2009) report several exploratory factor analyses that confirmed the four factor model of the MBTI Form M (Harvey, Murry, & Stamoulis, 1995; Thompson & Borrello, 1986; Tzeng, Outcalt, Boyer, Ware, & Landis, 1984; Tischler, 1994). Confirmatory factor analyses were conducted on the national sample of 3,036 utilizing Form M providing support for the four factor model. The adjusted goodness of fit is .949 and the non-normed fit is .967.

Another measure of validity for the MBTI Form M is the correlation with other personality instruments. Statistically significant correlations exist between the MBTI Form M and the FIRO-B, Adjective Check List, and the Strong Interest Inventory (Myers, McCaulley, Quenk, & Hammer, 2009).

In summary, the reliability and validity evidence for the MBTI Form M appears sufficient for continued use. The MBTI, as any other self-report instrument, is open to socially desirable responses that may threaten internal consistency. The consequential validity of this research is low and therefore the risk versus benefit of utilizing the MBTI supported selection of the MBTI Form M.

Self-Directed Learning Readiness Scale and the Myers-Briggs Type Indicator

Few studies have attempted to provide predictive capabilities between the personality typology of the MBTI and the overall score of the SDLRS. Once again, the literature is silent on utilizing the MBTI to predict SDLRS scores in the executive level fire officer population. However, three studies are presented that specifically utilize the MBTI to predict SDLRS scores in undergraduate and graduate college students.

Leitsch and Van Hove (1998) found that in a sample of 161 students that the extraversion (E) and intuition (N) traits were both statistically significant in predicting higher SDLR scores. Similarly, Johnson, Sample, and Jones (1988) found significant correlations for the intuition (N) and judging (J) types and higher scores on the self-directed learning readiness scale. The sample was a total of 76 undergraduate and graduate college students. Johnson (2001) found that extraversion (E) and the judging (J) indicators were statistically significant as predictors of the SDLR scores for the sample of 63 members of a college cohort. Overall, the extraversion (E), intuition (N), and judging

(J) were prevalent in the available literature, although not exactly consistent across the samples studied.

The methods utilized by all three research articles used the dichotomous scale items as individual variables. For example, the units of measurement were the traits of extraversion, introversion, sensing, intuition, feeling, thinking, judging, or perceiving as individual variables. In other words, combinations of traits were not used thereby eliminating the possibility of interaction effects of trait combinations that may be not surface utilizing individual variables. This study intended to overcome the monolithic approach to variables by also examining combinations of traits. However, the reality is that it would be very difficult to obtain a sample of sufficient size to secure adequate power and effect size with all 16 psychological types identified by the MBTI. The assumptions made for this study concerning the clustering of specific personality types may render the even distribution and representation of all 16 psychological types impossible.

Kreber (1998) utilized the PET instrument to attempt to construct a model that would explain variance in SDLR from personality. However, the PET instrument does not separate the variables and forces combinations such as extraverted intuition (EN) rather than extroversion (E) or intuition (N). Kreber's sample was 142 undergraduate students. The model predicted 36% of the variance in SDLR scores, but is difficult to make comparisons to studies utilizing the MBTI that did not combine variables. Notwithstanding, the construct lends credibility to this research effort.

In summary, the MBTI is the most used personality inventory and is delivered over two million times per year in the United States annually. The MBTI is very

versatile in that it provides 16 distinct psychological types, but also has the ability to collapse categories based on dominant and auxiliary functions. In addition, the MBTI has implications for leadership, communication style, and education. Several studies have provided results that suggest predictive ability from personality to SDLRS.

Self-Directed Learning Readiness and Learning Styles

Kouzes and Posner (2010) believe that the best leaders are the best learners. They have conducted a series of empirical studies to discover if leaders could be differentiated by the range and depth of learning tactics employed. Their findings suggest that the individual style does not have sufficient bearing since there is no one best style for learning over all content areas. Kouzes and Posner suggest that the most important thing is the extent to which the learner is engaged in her/her style. They reported that the more engaged the leader was in their respective style, the higher the score on the Five Practices of Exemplary Leadership instrument. Therefore, with regards to the construct of this study, it was believed that executive level fire officers would have a higher SDLRS scores than the population norm.

Self-directed learning readiness is not a learning style in and of itself. The readiness of self-directed learning consists of a complex of attitudes, values, and abilities that create the likelihood than an individual is capable of self-directed learning (Guglielmino, 1977).

Field (1989) and Bonham (1991) both have suggested that the SDLRS more accurately measures the degree of motivation to learn rather than the ability to be self-directed. Considering Kouzes and Posner's (2010) research, the potential deviation from Guglielmino's original construct, if any, should not threaten the internal validity of this

research if, as suggested, that all learning is ultimately self-directed (Tobin, 2000). This position is supported by the lack of statistical significance in research attempting to establish a relationship between learning styles and self-directed learning readiness.

Olds (2006) examined the relationship between the Group Embedded Figures Test and the SDLRS in a sample of traditional and non-traditional undergraduate students. There was no significant relationship between the field independence–dependence and self-directed readiness in this sample of 41 students.

Anderson (1993) investigated the relationship between the SDLRS scores and Kolb's Learning Style Inventory (LSI). This sample of 123 students did not provide any statistically significant differences in mean SDLRS scores across learning styles as identified by Kolb's LSI. Similarly, Barrett (1991) conducted a study that examined the relationship between Kolb's LSI and SDLRS scores for 194 students finding no statistically significant results were reported demonstrating a relationship between learning style and SDLRS scores. Similarly, no significant relationship between Kolb's LSI and Guglielmino's SDLRS could be found by Canipe (2001) in a sample of 240 students.

Of the studies reviewed, only Adenuga (1989) could provide partial substantiation of the premise that a statistically significant relationship existed between learning styles and self-directed learning readiness. Adenuga suggested that accommodators and convergers who also share a preference for active experimentation might be more ready for self-directed learning than divergers utilizing Kolb's LSI.

James and Maher (2004) categorize learning style instruments into three areas: physiological, cognitive, and affective, respectively. The preponderance of research

attempting to identify a relationship between SDLRS scores and learning styles has used Kolb's LSI, which is a cognitive instrument (Adenuga, 1989; Anderson, 1993; Barrett, 1991; Canipe, 2001; Olds, 2006). In other words, it measures the information-processing habits of the learner.

The MBTI is also utilized as a measure of learning style and is categorized as affective since it incorporates the influence of personality on learning methods (James & Maher, 2004). Several studies have been able to provide some statistically significant relationship between personality and SDLRS scores (Johnson, 2001; Johnson, Sample, & Jones, 1988; Kreber, 1998; Leitsch & Van Hove, 1998). Therefore, it is reasonable to postulate that indeed a relationship may exist between learning styles and SDLRS scores in at least the affective domain.

However, Lawrence (2000) points out that motivation is interrelated with both psychological type as well as learning style. Therefore, the psychological type that predisposes an individual with a motivation to learn may influence successful learning more than the specific learning style. Lawrence (2007) also suggests that learning styles can be changed, but reinforces that psychological types do not. Lawrence's contributions may be the best explanation for the success in identifying relationships between personality traits (affective learning styles) and SDLR where the cognitive and physiological learning domains have had difficulty. Lawrence's explanations are consistent with Kouzes and Posner (2010).

The literature associated with the MBTI and learning styles provide several applications. Three primary approaches prevail that utilize the four mental functions, eight learning styles, or the use of all 16 types as an individual and specific learning style.

Myers (1998) suggests that each of the MBTI functions has a specific learning style associated: ST, SF, NF, and NT, respectively. The ST functions will learn best by doing hands on activities. The SF functions learn best by doing hands on activities with others. The NF functions learn best by imagining, creating with others, and writing. Lastly, the NT functions learn best by categorizing, analyzing, and applying logic.

Dunning (2008) organizes all 16 MBTI types into eight pairs based on the dominant function. The eight pairs of dominant functions are presented in Table 3. Responders want to make connections between relevant real life situations and the topic at hand in their learning. Explorers go beyond the face value of information and make connections from multiple information sources. Expeditors are motivated by results and like to be in control of their learning environment. Contributors focus on personal interactions, values, and opinions and seek inclusion for all involved. Assimilators build connections from what they already know and enjoy concrete detailed example. Visionaries like to take their time, think, and find meaning in data. Analyzers like to make connections to principles of reason, science, or technology and conduct a cost benefit analysis for each situation. Lastly, Enhancers develop personal relationships with mentors and focus on how the information is affecting others.

Lawrence (2000, 2007) provides descriptions of learning styles associated with each of the 16 MBTI types by label. Upon further examination, the approach of utilizing the dominant function to collapse learning styles from 16 to eight has some merit. While Lawrence provides the full 16 types, there are more similarities between the pairs of dominant functions than there are subtle differences by utilizing the full 16 learning styles.

Table 3

Eight Learning Styles by Dominant Function with Corresponding Full Types

Learning Style Title	Dominant Function	Full Type	
Responders	ES	ESTP	ESFP
Explorers	EN	ENTP	ENFP
Expeditors	ET	ESTJ	ENTJ
Contributors	EF	ESFJ	ENFJ
Assimilators	IS	ISTJ	ISFJ
Visionaries	IN	INTJ	INFJ
Analyzers	IT	ISTP	INTP
Enhancers	IF	ISFP	INFP

Notes: Dunning (2008).

While Lawrence's approach is more detailed and descriptive when exploring learning styles, the benefits of eight distinct learning style categories was beneficial for this research. First, the increased sample size required to adequately evaluate 16 categories is difficult. Second, Lawrence (2007) suggests that the learner has the ability to shape their own learning styles and that they may change over time and topic. Therefore, the slightly broader approach utilizing the eight dominant functions served to limit variability in the relationship between type and style.

In summary, the purpose of this research was to evaluate the contribution of personality on self-directed learning readiness and not specifically designed for learning style. This review of learning style was provided due to the duality that the MBTI

provides and to afford future discourse and provide new knowledge and as it pertains to learning style research and self-directed learning readiness.

Firefighters

This portion of the literature reviews relevant research conducted in a firefighter population. Specifically, firefighters and self-directed learning, personality and firefighters, MBTI and firefighters, and firefighters and learning styles are addressed.

SDLRS and firefighters. The only empirical research measuring the degree of self-directed learning readiness in a firefighting population was conducted by Clark (1989). This descriptive study measured self-directed learning readiness using the Self-Directed Learning Readiness Scale (SDLRS) in a convenience sample of 30 male fire executives in an executive development course. Mean SDLRS scores were compared with those of the adult population norm and that of previous research for public managers (Johnson, Sample, & Jones, 1987). Statistically significant results were reported as the fire executive sample means were higher than those of either of the comparison groups. The research has limited generalizibility to the chief officer (fire executive) population at large due to the sampling strategy. This convenience sample were all males, fire executives, and had recently participated in an active competitive process for voluntary acceptance into a highly competitive executive fire officer program offered by the National Fire Academy (NFA) and the United States Fire Administration (USFA). This study will include a larger and more diverse sample of chief officers with a specific subgroup of designated executive fire officers that should mitigate threats to internal validity and improve generalizibility from Clark's foundational research.

Personality and firefighters. Research has consistently reported that firefighters fall in the Realistic type (Clarke, 2004) suggesting that the firefighting profession may attract specific personality types. Clarke (2004) found that 68.5% of a sample of 200 career and volunteer firefighters were classified as Realistic according to Holland's codes. This same sample had significantly higher frequencies of three Myers-Briggs Typologies than the Australian population norm.

It is not clear if the Realistic personality and vocational type translates to the executive fire officer. The Realistic type has specific aspects of manual and mechanical competencies that attract entry level firefighters, but may no longer be congruent at the executive level. According to Holland's codes, executive level leadership may be more congruent with Enterprising. Traditionally, executive fire officers are promoted through the ranks beginning with the rank of firefighter. This may suggest that firefighter's that make it to management may serve some period of time in their career less congruent than others. For example, a firefighter who is more Enterprising may be somewhat incongruent during the career prior to promotion and "blossom" once promoted into a position that is highly congruent. It is not uncommon to hear criticism of supervisors from previous work groups stating that "you have changed". Holland and Gottfredson (1976) provide some explanation that the individual has an increased opportunity to fulfill the Enterprising role or "to assume the enterprising role more completely, with more power, more resources, etc. The person has not changed–the environment has" (p. 24). Likewise, it may be possible that an individual who is a Realistic type may promote out of the Realistic environment and into an Enterprising environment. In the

enterprising environment, the person may be less congruent causing ineffective or unsatisfactory performance as a supervisor and not make it to the executive level.

Three studies were evaluated as they attempted to identify personality traits in the firefighter population but did not choose the MBTI. These studies were provided to provide insight into the need to empirically research personality and psychological types across firefighters.

Holborn (2002) identified specific behavioral patterns and auxiliary traits of individuals who choose a career as a Firefighter/Paramedic. A sample size of 272 firefighter/paramedics identified a dominant personality type of aggressive-dependent behavior pattern with the compulsive auxiliary trait utilizing the Long-Dziuban Checklist Survey.

McCall (2001) measured personality traits utilizing the Personality Assessment Inventory (PAI). Findings did not evaluate clustering of personality traits and only reported the relationship to burnout inventory scales. Results indicated that 14 of the 18 scales of the PAI were statistically related to burnout either positive or negatively for this sample of 76 firefighters.

Leckband (2005) utilized three instruments to develop a personality profile of a firefighter. The Hogan Personality Inventory (HPI), Hogan Development Survey (HDS), and the Motives, Values, Preferences Inventory (MVPI) was delivered to a sample of 98 Southeastern Florida fire department personnel. Personnel were divided into three groups including firefighters, firefighter paramedics, and firefighter paramedics who were required to hold and utilize the certification of paramedic as a condition of employment. The breadth of scales and the limited sample size did not serve to limit the personality

profile to specific traits that are similar to the psychological types identified by the MBTI or other Jungian instruments. Results found that personality was a predictor of limited performance data.

In summary, some research has been completed concerning personality type and the firefighting population. However, little empirical research was found utilizing similar populations as executive level fire officers and the MBTI.

MBTI and firefighters. Clarke (2004) utilized a sample of 200 career and volunteer firefighters and found statistically significant higher frequencies of ESTJ, ESTP, and ESFP typologies than the Australian population norm. Similarly, Geyer (1995) found that in a sample of over 300 Australian firefighters the majority presented with an ST combination and also strongly J. The statistically significant frequency of the ST combination is also found in a study of a sample of 200 Chicago Fire Department firefighters and cadets. The most frequent presentation of firefighters in this sample is ESTJ, ESTP, ISTP, and ISTJ, respectively (Pappas, 2001).

Attempts to measure fire department managers have found that the most frequent personality types to be ESTJ and ISTJ (Seeley & Seidler, 1985; Platts, 2000; Pretz, 1999). Pretz utilized a sample of 50 fire officers of various ranks in his research. The operational definition is not synonymous with this research as the entire sample was not exclusively at the executive fire officer level. However, Pretz's (1999) research has the closest approach to this research of all the studies reviewed as well as the most respectable sample size of 50. Platts (2000) utilized a sample of 32 in this descriptive study of which only five were titled Fire Department Administration. The results for administration only were split evenly between ISTJ, ISFJ, INTP, ESFP, and ENTP, each

at 20% respectively. Seeley and Seidler (1985) utilized a sample of 23 “top managers” in their research. Top managers were not operationally defined and neither of the studies presented utilized statistical methodology to evaluate frequencies in relation to population norms.

The United States’ population norms report that the general population is most frequently represented as ISFJ, ESFJ, ISTJ, and ESTJ, respectively (Myers, McCaulley, Quenk, & Hammer, 2009). Statistically, there is a distinct advantage to the approach utilized by Pappas (2001) and Clarke (2004). These studies examined the statistical proportionalities of their samples against the respective population norms. The remaining studies provided descriptive frequencies of the sample, but did not provide statistical significance to the representativeness of the typologies within the parent population.

Upon review of relevant literature for executive fire officers, it was found that little empirical research was available. Although each of the studies add to the discourse, the sample sizes were not sufficient for adequate power and effect. In addition, the operational definition of the sample was not synonymous with this study. Lastly, the samples in each of the studies reviewed were of singular fire departments that may have a distinct organizational culture or environment that attracts or filters out personality types that are not congruent. This study attempted to overcome such convenience samples by a regional approach of executive-level fire officers only as well as providing sufficient sample size for statistical relevance.

Learning styles and firefighters. Klingensmith (2006) conducted a study of learning style preferences in a population of emergency service responders utilizing the VARK, a physiological learning style instrument. This descriptive study utilized a

sample of 100 emergency responders (firefighters) enrolled at three separate institutions based on their academic level. Although Klingensmith did not investigate the SDLRS, it is provided as the only research found evaluating learning style theory and a firefighting population. Reported findings are that this sample preferred the multi-modal learning style. In other words, the sample preferred to use a blend of visual, aural, reading/writing, and kinesthetic modalities. This was relevant for this study, because it provided insight that learning styles may be distributed evenly over the entire sample.

Educational attainment. Educational attainment or the levels of education sample populations' possess have been investigated regularly with inconsistent results. Amey (2008) found that only the Bachelor's level had statistical significance between educational attainment and SDLRS scores in a sample of 185 undergraduate and graduate social work students. However, significance did not extend to the relationship between graduate education and SDLRS scores as the Master's or Doctoral levels did not have statistically significantly higher SDLRS scores than those of the Bachelor's level. Similarly, Alspach (1991) found that only the Bachelor's education outside of the nursing field provided statistical significant results between educational attainment and SDLRS scores in a sample of 357 nursing students and 86 faculty. Bachelors in nursing and other traditional students did not produce significant results.

Several other studies presented with statistically significant findings between educational attainment and SDLRS scores without any caveats (Harvey et al., 2003; Long & Agyekum, 1983). Harvey et al. utilized a sample of 250 medical students. Long and Agyekum reported a sample of 92 college students.

Frisby (1991) and Harriman (1990) found no statistical significance with SDLRS scores and educational attainment. Frisby (1991) utilized a sample of 479 medical students. Harriman (1990) reported a sample of 170 community college students.

In summary, studies of educational attainment and results from the SDLRS reported inconsistent results in the literature. However, of the literature reviewed, there appeared to be more support for the inclusion of this variable as a contributing factor to SDLRS scores. It is interesting to note, that there may be a ceiling effect to the educational attainment variable in the literature at the Bachelor level or after the first two years of intensive study. In other words, the degree of readiness for self-directed learning may positively correlate with SDLRS scores through the Bachelor level and then plateau at an above average or high level.

Professional designation. This independent variable is chosen in an effort to build off of the only foundational research utilizing the SDLRS and a firefighting population (Clark, 1989). Clark utilized a sample of executive fire officer (EFO) students in their first-year course. This population did not have the executive credential at the time of Clark's study. Historically, 66% of accepted students graduate from the program (C. Burkell, personal communication, May 23, 2011). Findings were that the fire executive students had a statistically higher mean SDLRS score than that of the comparison groups of the adult population and public managers.

LeBerre (1997) utilized the variable of professional certifications as well. LeBerre's findings demonstrate that a statistically significant relationship did not exist between professional certifications (designations) and SDLRS in a sample of 80 students.

However, the professional certifications utilized by LeBerre appeared to not be of the same caliber as the advanced professional designations operationalized for this study.

The generalizibility of Clark's sample group to chief officers in general is not recommended. There may be confounding behaviors and beliefs of chief officers that are voluntarily seeking enrollment in a prestigious four-year executive development program and/or that seek out the designation of CFO that do not exist in the chief officer population at large. In an effort to account for this potential confounding variable, professional designation was statistically controlled.

In summary, the literature supported the theoretical construct that executives may have a higher degree of self-directed learning readiness than the general adult population. The literature also supported a correlation between occupation and personality that would suggest specific personality types clustering in congruent work environments or occupations. While the literature reported a positive correlation between education and SDLRS scores, the literature was relatively silent on the impact of professional designations on SDLRS scores. The SDLRS and the MBTI are the most used instruments to measure self-directed learning readiness and personality type, respectively.

Chapter Three

Methods

The purpose of this study was to examine the self-directed learning readiness in executive fire officers in relation to the independent variables of personality type, educational attainment, and professional designation. First, this study examined the degree of self-directed learning readiness in executive level fire officers. Second, the SDLRS scores of executive level fire officers were compared to other population means. Third, the relationships between SDLRS scores and personality type, educational attainment, and professional designations were examined. This chapter will present the research design, population and sample, instrumentation, data collection procedures, and methods of data analysis.

Research Design

This research utilized a quantitative design utilizing descriptive statistics and tests of independent means, association, and correlation (Merriam & Simpson, 2000). Independent extraneous variables such as educational attainment, professional designations, and personality type were statistically controlled in the design of the study.

Research questions. Four research questions were used to guide this study.

1. What is the mean SDLRS score for executive-level fire officers?
2. How does the mean SDLRS score of the executive-level fire officers compare to the firefighters and the reported norms for the adult population?

3. Is there a difference between the frequency of MBTI personality type of the executive fire officers and that of the MBTI reported norms and of the firefighters?
4. What is the relationship between SDLRS scores and the independent variables educational attainment, professional designation, and MBTI personality type?

Population and Sample

The target population for this study was executive level fire officers in the Southeastern United States. The sampling technique used is that of convenience, the most prevalent sampling strategy employed in social science research (Gall, Gall, & Borg, 2007). Three sources for the target population were utilized: EFO graduates, CFO designees, and members of the International Association of Fire Chiefs Southeastern Association. Time and financial constraints were the major considerations to utilizing a convenience sample.

Executive level fire officers were operationally defined as battalion chiefs, district chiefs, division chiefs, deputy chiefs, assistant chiefs, and fire chiefs. Three sub-populations were utilized to fulfill the sampling strategy. The first were graduates of the Executive Fire Officer (EFO) Program provided by the National Fire Academy and the United States Fire Administration. There were approximately 3000 graduates since 1985, it is unclear how many are still actively employed; therefore, the larger estimate was utilized for considerations for generalizibility and sample size (USFA, 2011). The EFO program is a four-year program that requires both instruction and a self-directed applied research project for each year of enrollment. Successfully completing all coursework and satisfactory scores on each of the four applied research projects is necessary to graduate.

The second were members of the fire service community who have received the professional credential of Chief Fire Officer (CFO) bestowed by the Center for Public Safety Excellence (CPSE) and the Center for Professional Credentialing. The CFO designation is provided through a peer review process that is rated on professional development, professional contributions, community involvement, and 20 technical competencies (CPSE, 2011). There are currently 726 designated chief fire officers.

The third and final source for the target population was members of the IAFC's Southeastern Association. Operationally, the states that define the southeast are Alabama, Florida, Georgia, Kentucky, Virginia, West Virginia, Mississippi, North Carolina, South Carolina, and Tennessee. Currently, there are 858 members in the association. Each member of the IAFC that works within the states defined as the southeast is automatically placed as members in the regional association. Member dues and the requisite rank are the only requirements for membership.

The design of this study required three distinct statistical tests to answer the research questions: *t* tests for independent samples, Chi-square tests of association, and multiple regressions. Each testing method had a different associated value for medium effect size and the suggested sample size while holding the power constant at .80 (Cohen, 1992). The largest sample size (125) required was for the multiple regression analysis and therefore was utilized for this study. In addition, an equal sample of 125 firefighters was utilized as a control group. The firefighter sample was also a non-probability sample of convenience taken from the Southeastern United States. Therefore, the total sample size for this study was 250.

Instrumentation

The Self-Directed Learning Readiness Scale (SDLRS) and the Myers-Briggs Type Indicator (MBTI) were utilized as measures for the readiness for self-directed learning and psychological type, respectively.

Self-Directed Learning Readiness Scale. Self-directed learning readiness was measured by the instrument entitled the Self-directed Learning Readiness Scale (SDLRS) developed by Guglielmino (1977) as part of her dissertation. It is the most widely used instrument in the measurement of self-directed learning to date (McCune, 1988; Merriam, Caffarella, & Baumgartner, 2007; Redding, 1991). It is now also known as the Learning Preference Assessment (LPA). For the purposes of this research and consistency, it is referred to as the SDLRS.

The instrument was developed utilizing the Delphi technique with experts from the field of adult education. The Delphi technique was designed to get group consensus while limiting the social group dynamics associated with a face-to-face setting (Isaac & Michael, 1997). The instrument was designed to measure the learner's perceived readiness for self-direction in learning. The most up-to-date version of the SDLRS has 58 items that are scored on a five-point Likert-type scale. The Likert-type scale utilizes a one as an "almost never" response to a five as an "almost always" response with closed-ended prompts. The instrument has eight factors that were revealed in a principal component analysis. The eight factors are:

1. Openness to learning opportunities
2. Self-concept of an effective learner
3. Initiative and independence in learning
4. Informed acceptance of responsibility for one's own learning
5. Love of learning

6. Creativity
7. Positive orientation to the future
8. Ability to use basic study skills and problem-solving skills. (p. 62)

Guglielmino does not recommend using any of the domains independently and only recommends using the total score in research.

Scores are intended to fall on a continuum from 58 to 290. High scores closer to 290 are indicative of highly self-directed and scores closer to 58 are highly other-directed in their learning. In other words, they may require considerable direction from an outside source to complete their learning endeavors.

Validity and reliability of SDLRS. As previously discussed, the content validity was established with the expert panel during the development of the instrument utilizing the Delphi technique. Criterion validity has been established through the item-total analyses discussed in the literature review. Guglielmino (1977) reported a reliability estimate using the Cronbach alpha as .87. Reliability estimates are generally strong across all studies. Based on a population of 3,151 individuals from the United State and Canada, a split-half Pearson product moment correlation with a Spearman-Brown correction produced a reliability coefficient of .94 (Guglielmino & Guglielmino, 1991). Test-retest reliability coefficients are reported at .82 (Finestone, 1984) and .79 (Wiley, 1981), respectively.

In summary, the instrument appears to have the preponderance of support for its validity and reliability in the literature. In addition, there is low consequential validity present for use of the SDLRS with this population.

Myers-Briggs type indicator. The Myers-Briggs Type Indicator (MBTI) was created to measure personality preferences or psychological type.

The authors, Briggs and her daughter Myers, built upon earlier work by Jung. The MBTI is the most widely used personality assessment in use in the United States as it is administered over two million times annually. In addition, it has been translated into more than 30 languages for international use (Myers, 1998).

The MBTI sorts people by four dichotomous scales that will ultimately produce 16 distinct psychological types. Sixteen personality types can be identified using four dichotomous scales that measure mental processes. The extraversion/introversion (E/I) scale measures where one would prefer to focus their attention and get energy. An outward focus would be extraversion and an inward focus would be introversion. The sensing/intuition (S/N) scale measures how one would prefer to take in information. The thinking/feeling (T/F) scale measures how one makes decisions either through thinking or feeling. Lastly, the judging/perceiving (J/P) scale measures how one deals with the outer world (Myers, 1998).

Although a numerical value, called preference clarity categories, is provided for each of the dichotomous scales, it is not recommended to utilize the numeric values for purposes other than gaining insight into the strength of the preference. For example, on Form M preferences are sorted as follows: slight (1-5), moderate (6-15), clear (16-25), and very clear (26-30) (Myers, McCaulley, Quenk, & Hammer, 2009). This is only true on the computer scored version as the self-scored versions must be converted. As intended, this study only utilized the categorical alphabetical indicator of the dichotomous scale.

Form M was utilized as the MBTI instrument for this study. The instrument is separated into three parts for a total of 93 forced-choice questions with only two available

answers per question forming the dichotomous scales. Part I includes 26 questions, Part II has 47 questions, and Part III has the final 20 questions.

Validity and reliability of the MBTI. As previously discussed, the validity of the four dichotomous preference scales is well supported. Myers, McCaulley, Quenk, and Hammer (2009) reported several exploratory factor analyses that confirmed the four-factor model of the MBTI Form M (Harvey, Murry, & Stamoulis, 1995; Thompson & Borrello, 1986; Tischler, 1994; Tzeng, Outcalt, Boyer, Ware, & Landis, 1984). Confirmatory factor analyses were conducted on the national sample of 3,036 utilizing Form M providing support for the four factor model. The adjusted goodness of fit is .949 and the non-normed fit is .967.

Another measure of validity for the MBTI Form M is the correlation with other personality instruments. Statistically significant correlations exist between the MBTI Form M and the FIRO-B, Adjective Check List, and the Strong Interest Inventory (Myers, McCaulley, Quenk, & Hammer, 2009).

Reliability estimates for internal consistency on the MBTI Form M range from .89 to .94 using the split-half reliability procedure and corrected by the Spearman-Brown formula (Myers, McCaulley, Quenk, & Hammer, 2009). In summary, the validity and reliability evidence for the MBTI Form M was supported.

Data Collection Procedures

Data were collected during a four-month period beginning in the summer of 2011 during three conferences held in the Southeastern United States designed to attract the target population. The three conferences were the Florida Fire Chiefs Executive Development Conference, Fire Rescue International, and the National Society of

Executive Fire Officers' Polishing the Gold Conference. The SDLRS and the MBTI Form M were administered by pencil-and-paper format. All MBTI responses were scored manually. All SDLRS results were entered into an Excel spreadsheet and provided to Guglielmino and Associate's for scoring. Results were returned to the researcher for further analysis.

All respondents in the sample were voluntary. Each participant was provided a folder that was anonymously coded that included a release, a demographic information sheet, the SDLRS, and the MBTI. Each of the items, excluding the release form, also had the appropriate anonymous coding as the folder to ensure proper data entry for analysis. The release and the demographic information sheet are provided as Appendices A and B, respectively.

Data for the firefighter group were collected during the same four-month period beginning in the summer of 2011. However, data were collected by visiting regional fire and emergency service organizations in the Southeastern United States. The participation rate for executive-level fire officers was not sufficient during the conferences. Therefore, data collection was supplemented by making direct contact with regional organizations similar to the firefighter process for data collection. Ultimately, 100% of firefighter data and 50% of the executive fire officer data were collected by directly contacting the regional organizations.

Data Analysis

The purpose of this study was to conduct empirical research examining the self-directed learning readiness in executive-level fire officers as well as the relationships to other group norms and the independent variables of personality type, educational

attainment, and professional designation. Explanations of the data analysis are provided following each of the four research questions.

Variables. The dependent variable was the total score from the SDLRS, a continuous variable. There were three independent variables of educational attainment, professional designations, and personality type, respectively. All independent variables were categorical. The independent variables were further divided into multiple levels. The MBTI was sorted by dominant function yielding eight levels. The independent variable professional designations had three levels for those who have either the EFO, CFO, or no professional designations (N/A). Cases only occupied one level within an independent variable. For example, if a case has both EFO and CFO, only one was categorized. In this case, the EFO took precedence. Lastly, the independent variable educational attainment utilized three levels ranging from high school diploma through graduate degree.

The following are the four research questions answered by this study followed by a brief explanation of the data analysis method. All statistical analyses were conducted within Cohen's recommended values for effect and power (Cohen, 1992).

1. What is the mean SDLRS score for executive-level fire officers?

This question was answered by mathematically calculating the mean SDLRS score from the executive-level fire officer sample and the associated confidence intervals.

2. How does the mean SDLRS score of the executive-level fire officers compare to the firefighters and the adult population?

This question was answered by calculating the mean SDLRS scores from the executive-level fire officer sample and the firefighter sample and comparing the means between

each other as well as with the population norm. The most suitable test for this was the analysis of variance (ANOVA) (α=.025, f=.25, power=.80). However, limited access to norm group data required two separate tests comparing means; a one-sample t test and a one-way ANOVA, respectively. Therefore, the alpha level was reduced (p<.025) to account for the increased risk to the Type 1 error rate. In addition, confidence intervals were calculated and reported.

3. Is there a difference between the frequency of MBTI personality type of the executive fire officers and that of the MBTI reported norms and of the firefighters?

This question was answered by measuring the observed frequencies of the eight dominant functions of the MBTI within the firefighter and executive level fire officer samples and the expected population norms provided by the MBTI. The most suitable test for this was the Chi-squared test of association (α=.05, ω=.30, power=.80).

4. What is the relationship between SDLRS scores and the independent variables educational attainment, professional designation, and MBTI personality type?

This question was answered by conducting a series of multiple linear regression analyses. The SDLRS scores are continuous and served as the dependent variable. All independent variables were categorical and were dummy coded for analysis. Inclusion of predictors were determined at the .05 level as well as the overall model fit (α=.05, χ^2=.15, power=.80). All levels of each independent variable were utilized to create three independent multiple regression models. A fourth model was created that included all variables. Finally, R^2 was compared from each model to identify the most parsimonious model with the greatest explanatory power for the variability of SDLRS scores.

Chapter Four

Presentation of Findings

The purpose of this study was to examine the self-directed learning readiness in executive fire officers in relation to the independent variables of personality type, educational attainment, and professional designation. First, this chapter provides a description of the respondents. Second, reliability estimates with this group of individuals are provided for the MBTI and the SDLRS. Third, results for each of the four research questions are provided in sequential order. Finally, a brief summary is provided at the conclusion of this chapter.

Description of the Respondents

The total number of respondents used for this research was 250 members of the professional fire service. Respondents were divided evenly between the executive-level fire officers and the control group of entry-level firefighters at 125 each. Demographic information was collected utilizing the information sheet provided as Appendix B. The data are described as an aggregate as well as independently for executive fire officers and firefighters. A description of the respondents is presented in Table 4. When considering the respondents, the majority was white males between the ages of 40 years and 60 years, who had earned an undergraduate degree. A description of the executive fire officers and firefighters are presented in Table 5.

Table 4

Demographic Characteristics of Respondents

Characteristic	*n*	%
Gender		
Male	233	93.2
Female	17	6.8
Race/Ethnicity		
White	220	88.0
African American	15	6.0
Hispanic or Latino	9	3.6
American Indian	5	2.0
Pacific Islander	1	0.4
Age Range		
18–29 years	29	11.6
30-39 years	49	19.6
40-49 years	82	32.8
50-59 years	79	31.6
60 years and over	11	4.4
Educational Attainment		
High School	82	32.8
Undergraduate	131	52.4
Graduate	37	14.8

Note: *N*=250

Table 5

Demographic Characteristics of Executive Fire Officers and Entry-Level Firefighters

Characteristic	EFO*		ELFF*				
	n	%	*n*	%	x^2	*p*	*ω*
Gender					.568	.451	.20
Male	118	94.4	115	92.0			
Female	7	5.6	10	8.0			
Race/Ethnicity					4.335	.363	.21
White	114	91.2	106	84.8			
African American	7	5.6	8	6.4			
Hispanic or Latino	2	1.6	7	5.6			
American Indian	2	1.6	3	2.4			
Pacific Islander	0	0.0	1	0.8			
Age Range					85.002	<.001	.88
18–29 years	0	0.0	29	23.2			
30-39 years	8	6.4	41	32.8			
40-49 years	45	36.0	37	29.6			
50-59 years	62	49.6	17	13.6			
60 years and over	10	8.0	1	0.8			
Educational Attainment					81.782	<.001	.86
High School	11	8.8	71	56.8			
Undergraduate	78	62.4	53	42.4			
Graduate	36	28.8	1	0.8			

Note: *N*=250; *n*=125 for each group of *executive fire officers (EFO) and *entry-level firefighters (ELFF), respectively.

The demographic distribution for gender and ethnicity was similar between the executive-level fire officers and the entry-level firefighters. The demographic variable age was more evenly distributed across each of the age ranges of the firefighter sample when compared to the executive-level fire officers. Differences existed in the level of educational attainment between the two groups as well. The majority of firefighters did not earn a degree higher than the high school diploma or equivalent while the majority of executive fire officers had a minimum of an undergraduate college degree. Consistent with the observed frequencies, Chi Square tests supported that there are statistically significant differences in educational attainment and age with a large effect size and no evidence of differences in the variables of gender and race/ethnicity (Table 5).

Descriptive statistics for SDLRS scores for the all respondents, executive fire officers, and the entry-level firefighter group are presented in Table 6. Each of the subgroups is approximately normally distributed as indicated by values for skewness and kurtosis within plus or minus one. In addition, the Shapiro-Wilk test of normality failed to achieve statistical significance ($p \leq .05$) indicating no significant departure from normality with this sample.

Measures of variability suggested that the data for this sample vary considerably across the sub-groups as indicated by the standard deviation, variance, and range. Finally, differences in results existed between the measures of central tendency such as the mean and the median. The executive fire officer group had a mean that is 12 points higher and a median that is 10 points greater than the firefighter control group.

Table 6

Descriptive Statistics for SDLRS Scores for All Respondents and Sub-Groups

Statistic	Total Sample	Exec. Fire Off. *n*=125	Firefighters *n*=125
Mean	227.64	233.70	221.59
Median	228.00	232.00	222.00
Standard Deviation	24.23	21.13	25.65
Variance	586.86	446.60	658.00
Skewness	-.22	.17	-.24
Kurtosis	.20	.00	-.12
Range	152.00	105.00	144.00
Minimum	137.00	184.00	137.00
Maximum	289.00	289.00	281.00
Shapiro-Wilk	.99	.99	.99

Note: Shapiro-Wilk test of normality of .99 indicated no significant departure from normality. *N*=250.

Reliability of Myers-Briggs Type Indicator

The Myers-Briggs Type Indicator (MBTI) consists of four dichotomous scales measuring extroversion/introversion, sensing/intuition, thinking/feeling, and judging/perceiving. Reliability estimates for internal consistency measure how consistently respondents answer items on a given scale that measure the same construct (Crocker & Angina, 2008). In classical test theory, a respondent's score to any test item is the sum of the true score and error. The true score is the intended measure and the error is the variability introduced through question-specific factors.

Cronbach's Alpha is the correlation between this scale and all other hypothetical scales containing the same number of items and measuring the same construct (Norusis, 2008). The split-half reliability estimates are also measures of internal consistency. The split-half procedure divides each scale into two halves and measures the correlation between the two halves as they measure the same construct. One disadvantage is that the resulting coefficient may be influenced by how the scale is split (Norusis, 2008). For example, fatigue on part of the test taker may skew results. However, the MBTI manual states that the method for splitting the scales did not introduce variability in the estimates in the norm group (Myers, McCaulley, Quenk, & Hammer, 2009).

The reliability estimates for this sample indicate good reliability for each of the four scales, respectively. Consistent with the literature, the thinking/feeling scale estimates were the lowest when compared to the other three scales. Although the literature did not reveal an agreed upon cutoff point for reliability estimates, values of greater than 0.7 are considered acceptable (Nunnally, 1978). In other words, greater than 70% of the observed score's variance measures the true score and no more than 30% of the observed score is a measure of error. Reliability estimates for internal consistency for this study are presented in Table 7.

Reliability of the Self-Directed Learning Readiness Scale (SDLRS)

The SDLRS consists of 58 items measuring the degree to which an individual is ready for self-direction in their learning activities. The creator of the instrument, Guglielmino (1977) suggested that eight factors or subscales existed. As previously discussed, the literature is divided on the construct validity of the instrument, specifically as it relates to the eight factors. West and Bentley (1990) conducted a confirmatory

factor analytic study of the SDLRS and found that the underlying factor structures were highly correlated. Therefore, the overall score is the most interpretable measure and the underlying factors or subscales should not be utilized. The instruments creator has consistently recommended only using the overall score.

Table 7

Reliability Estimates for All Respondents Utilizing the MBTI Form M

Test	Reliability Estimates			
	E/I	S/N	T/F	J/P
Cronbach's Alpha	.913	.904	.850	.910
Cronbach's Split-Half Correlation	.822	.817	.740	.847
Spearman-Brown Coefficient	.903	.899	.850	.917
Guttman Split-Half	.900	.898	.850	.914
Items per Scale	21	26	24	22

Note: N=250. Total items = 93. E/I = extroversion/introversion; S/N = sensing/intuiting; T/F = thinking/feeling, and J/P = judging/perceiving.

This research attempted to add to the conversation in the literature concerning the reliability and validity of the SDLRS by providing reliability estimates for each of the eight suggested subscales with this sample. The creator of the instrument was reluctant to provide the items assigned to each subscale due to the consequential validity of the use of the subscale scores (L. Guglielmino, personal communication, November 7, 2011). An exploratory factor analysis revealed 22 factors with an eigenvalue of ≥ 1. However, no conclusions should be drawn since the sample size is insufficient to properly identify

any underlying structures. The recommended number of subjects for a factor analysis is approximately 10 per item or 580 (Nunnally, 1978).

Overall, the reliability estimates for this sample were good. Considering only one construct for self-directed learning readiness, the reliability estimate of .929 suggests that approximately 93% of the variability in observed scores is attributable to the true score and approximately 7% to error. The reliability estimates for internal consistency for the 58-item SDLRS with this sample is presented in Table 8.

Table 8

Reliability Estimates for All Respondents Utilizing the SDLRS

Test	Reliability Estimate
Cronbach's Alpha	.929
Cronbach's Split-Half Correlation	.820
Spearman-Brown Coefficient	.901
Guttman Split-Half	.891

Note: N=250. Number of items = 58.

Findings for Research Question 1

1. What is the mean SDLRS score for executive-level fire officers?

The SDLRS scores are continuous with a range from 58 to 290. Scores closer to 58 indicate that a subject is less ready to be self-directed in their learning. Conversely, scores closer to 290 indicate that the subject is more ready for self-directed learning activities. The executive-level fire officers' mean score was approximately 233.7. A

confidence interval was developed indicating that there is a 95% chance that the population mean, μ, would exist between 229.96 and 237.44. Results for research question number one "What is the mean SDLRS score for executive-level fire officers?" are presented in Table 9.

Findings for Research Question 2

2. How does the mean SDLRS score of the executive-level fire officers compare to the firefighters and the adult population?

The executive-level fire officers' mean score of 233.7 on the SDLRS was higher than both the firefighter control group and the adult population norm group at 221.6 and 214.0, respectively. When considering the 95% confidence intervals, the lower bound of the executive-level fire officers were higher than the upper bound of the other groups. In other words, there is a 95% chance that the population mean, μ, for either the firefighter or the population norm groups would be different than that of the executive fire officers. Results for question 2, "How does the mean SDLRS score of the executive-level fire officers compare to the firefighters and the adult population?" are presented in Table 9. The SDLRS interpretation material suggests that the executive fire officers' mean score was in the *above average* range of 227-251. The firefighters and the population norm groups' mean scores fall into the *average* range of 202-226.

A one-way analysis of variance (ANOVA) was performed. The F value was 16.579 ($df = 1, 248$, $\alpha = .025$, $p < .025$). Therefore, a statistically significant difference was found between the means of the SDLRS scores by grouping (executive fire officer and entry-level firefighter).

Table 9

Means and Confidence Intervals for SDLRS by Group

Sample	*N*	Mean	*SD*	95% Confidence Interval
Executive-level Fire Officers	125	233.696	21.13292	229.9548 to 237.4372
Entry-Level Firefighters	125	221.592	25.65154	217.0509 to 226.1331
All Respondents	250	227.644	24.22513	224.6264 to 230.6616
Population Norm	3,151	214.000	25.59000	213.1060 to 214.8940

Note: The sample size, mean, and standard deviation for the population norm were provided by Guglielmino.

In other words, the executive fire officer group had a statistically significantly higher mean SDLRS score than that of the firefighters. The effect size, *f*, was .25 or a medium effect. ANOVA results for question 2, "How does the mean SDLRS score of the executive-level fire officers compare to the firefighters and the adult population?" are presented in Table 10.

There are three assumptions that must be met for parametric tests such as the ANOVA to provide unbiased results. The first is that data are normally distributed. The data did not significantly depart from normal as suggested by the findings of the Shapiro-Wilk ($p>.05$) test presented in Table 7. The second assumption is that there is homogeneity of variances. This sample's data failed the Levene test for homogeneity of variances ($p<.05$) indicating that the variances were not equal. However, the sample sizes were equal and thus the ANOVA is robust to violations of this assumption with equal sample sizes. The third is that of independence of samples. The study design insured independence. Therefore, there is no evidence that assumptions were violated.

A one-sample *t* test was conducted to compare the executive fire officers' SDLRS score with the mean score of the adult population norm. It would be preferable to utilize a three-way comparison ANOVA to control for Type I error. However, access to the original data that formed the adult norm group was not available (L. Guglielmino, personal communication, November 7, 2011). Therefore, the alpha level was adjusted from .05 to .025 to attempt to control for the increase in the probability of committing a Type I error. This corrected alpha was applied to both the ANOVA and the one-sample *t* test. The assumptions for the one-sample *t* test have been met as described previously.

Table 10

ANOVA Comparison of Means Between Executive Fire Officers and Entry-level Firefighters

Source	*df*	*MS*	*F*	*p*
Between Groups	1	9156.676	16.579	<.025
Within Groups	248	552.301		
Total	249			

Note: α=.025, *f*=.25.

The executive-level fire officer's mean score is 19.696 points higher than the adult population norm of 214. The results of the two-tailed *t*-test are that a statistically significant difference in means exist between the executive-level fire officers and the adult population norm ($t = 10.420$, $df = 124$, $\alpha = .025$, $p < .025$). In other words, the executive fire officers had a statistically significant higher mean SDLRS score than the adult population norm. The effect size, *d*, was .93 or a large effect. The one-sample *t*-

test results for question 2, “How does the mean SDLRS score of the executive-level fire officers compare to the firefighters and the adult population?” are presented in Table 11.

Table 11

Comparison of Means Between Executive Fire Officers and Adult Population Norm

Source	*df*	Mean Difference	*t*	*p* (2-tailed)
SDLRS	124	19.696	10.420	<.025

Note: α=.025, *d*=.93.

Findings for Research Question 3

3. Is there a difference between the frequency of MBTI personality type of the executive fire officers and that of the MBTI reported norms and of the firefighters?

This sample was sorted by their personality type’s dominant function as identified by the MBTI. There are eight dominant functions: introverted-sensing (IS), extroverted-sensing (ES), introverted-intuition (IN), extroverted-intuition (EN), introverted-thinking (IT), extroverted-thinking (ET), introverted-feeling (IF), and extroverted-feeling (EF); respectively. The distribution frequency of dominant functions across the executive fire officers, firefighters, and MBTI norm groups are presented in Table 12.

The sample (*N*=250) for executive fire officers and entry-level firefighters consists of approximately 7% female respondents. The national representative sample provided by the MBTI has greater than 50% females. Therefore, the most appropriate gender to compare across groups was the male subset of the national representative sample

(*n*=1478). Direct observation of the data indicated that there was variance in the data when comparing group-wise. Statistical tests of association were conducted to identify if the observed variance was of any significance.

Table 12

Percentages of Within Group Frequencies for Each Dominant Function

Dominant Function	Executive Fire Officers %	Entry-Level Firefighters %	MBTI Norm Group %
Introverted/Sensing	29.6	16.8	24.4
Extroverted/Sensing	4.8	22.4	12.5
Introverted/Intuition	6.4	3.2	4.6
Extroverted/Intuition	12.0	8.8	10.4
Introverted/Thinking	8.0	7.2	13.3
Extroverted/Thinking	28.8	22.4	13.9
Introverted/Feeling	4.0	8.0	11.7
Extroverted/Feeling	6.4	11.2	9.1
Sample Size (*n*)	125	125	1478

Notes: MBTI Norm Group is for Males.

Results of the Chi-square omnibus tests for question three, "Is there a difference between the frequency of MBTI personality type of the executive fire officers and that of the MBTI reported norms and of the firefighters?" is presented in Table 13.

Results of the Chi-square procedure demonstrated a significant difference in the representativeness of the dominant functions between executive fire officers and

firefighters (x^2 = 24.953, *df* = 7, *p*<.05) and executive fire officers and the MBTI male norm (x^2 = 34.813, *df* = 7, *p*<.05), respectively.

Table 13

Omnibus Chi-Square Tests of Association Comparing Executive Fire Officers to Entry-Level Firefighters and the MBTI Male Norm

Comparison	x^2	*df*	*P* (2-sided)	ω
Firefighters	24.953	7	.001	.90
MBTI Male Norm	34.813	7	<.001	.64

Notes: α = .05

In other words, the null hypothesis that the populations are identical was rejected. The omnibus test does not provide detail to describe which dominant functions were statistically significantly different. Individual Chi-square tests were conducted for each dominant function and are presented in Table 14. The alpha level was adjusted from .05 to .00625 to attempt to control for the increase in the probability of committing a Type I error with eight pair-wise comparisons.

Statistically significant findings included a lower representation of extroverted-sensors in the executive fire officers than found in the firefighter group (x^2 = 16.476, *df* = 1, ω=.82, *p*<.00625). These findings were consistent with the observed frequencies presented in Table 11. Similarly, there was one dominant function that had statistical significance when comparing the executive fire officers and the MBTI male norm. There was a statistically significant concentration of extroverted-thinkers in the

executive fire officer group as compared to the MBTI norm group (x^2 = 20.111, *df* = 1, ω=.32, p<.00625). All findings of significance represented approximately a medium effect size (ω=.30) or greater.

Table 14

Chi-Square Tests for Association by Dominant Function Comparing Executive Fire Officers and Entry-Level Firefighters and the MBTI Male Norm

Dominant Function	Entry-Level Firefighters		MBTI Male Norm	
	p (2-Sided)	x^2	*P* (2-sided)	x^2
Introverted/Sensing	.017	5.747	.198	1.654
Extroverted/Sensing	.000[a b]	16.476	.011	6.539
Introverted/Intuition	.237	1.401	.363	0.826
Extroverted/Intuition	.407	0.687	.581	0.305
Introverted/Thinking	.811	0.057	.088	2.910
Extroverted/Thinking	.246	1.344	.000[a c]	20.111
Introverted/Feeling	.183	1.773	.008	6.932
Extroverted/Feeling	.180	1.794	.303	1.060
Sample Size (*n*)	250.0		1603.0	

Notes: a. statistically significant at p≤.00625. b. ω=.82. c. ω=.32.

A statistically significant difference in the representativeness of one dominant function was present between the executive fire officer sample and that of both the firefighters and the MBTI male population norm, respectively. A comparison of the

executive fire officer sample to another sample of top managers provided by MBTI provided validity to these findings. The data were collected by Lynch (1983) from top-level city, county, and state managers attending the Institute of Government at the University of North Carolina (Macdaid, McCaulley, & Kainz, 1986). Comparisons of dominant functions are presented in Table 15. A chi-square test of association was conducted testing the null hypothesis that no differences exist in the representativeness of personality type between populations. The results of the omnibus test required a failure to reject the null hypothesis (x^2 = 12.984, df = 7, p>.05). In other words, overall there were no differences between the frequency of dominant types between the samples of executive fire officers and other top public managers.

Individual analysis of each dominant function found one statistically significant variable, EN (x^2 = 10.315, df = 1, p<.00625). Therefore, a significantly greater number of EN's existed in the executive fire officer group than the top managers. The effect size was approximately medium (ω=.26). However, results are attenuated by the overall lack of significance between the two populations. Results are presented in Table 15.

Findings for Research Question 4

1. What is the relationship between SDLRS scores and the independent variables educational attainment, professional designation, and MBTI personality type?

Data from all respondents (N=250) were utilized to answer question four. Separate multiple regression models were developed for each independent variable: educational attainment, professional designation, and MBTI personality type, respectively.

Table 15

Percentages of Within Group Frequencies for Each Dominant Function

Dominant Function	Executive Fire Officers (*n*=125) %	MBTI Top Public Managers[b] (*n*=257) %
Introverted/Sensing	29.6	37.0
Extroverted/Sensing	4.8	3.1
Introverted/Intuition	6.4	9.3
Extroverted/Intuition	12.0[a]	3.5[a]
Introverted/Thinking	8.0	8.6
Extroverted/Thinking	28.8	29.2
Introverted/Feeling	4.0	2.7
Extroverted/Feeling	6.4	6.6

Notes: a. Extroverted/Intuition (EN) statistically significant difference $p<.00625$.
b. MBTI Sample for Top Public Managers (Non-Federal).

Multiple regression analyses require that several assumptions are met in order to draw conclusions about the population based on sample results. First, that the observations are independent. This assumption was satisfied with the study design and verified by the Durbin-Watson statistic. If the residuals are not correlated with each other, the Durbin-Watson statistics will be close to 2 (Norusis, 2008). The values for the three independent variables were 1.973, 1.933, and 1.904 for educational attainment, professional designation, and MBTI personality type, respectively.

Second, that within the population there is a linear relationship between the dependent variable and the independent variables. A plot of the standardized residuals, presented as Figure 1, did not provide evidence of a non-linear relationship between the variables.

Third, there is a normal distribution of the data for each combination of independent variables with equal variances. The Shapiro-Wilk test was utilized to test for normality for each level of the independent variable. All independent variables had significance values, $p>.05$, requiring a failure to reject the null hypothesis that the data come from normally distributed populations.

The Levene test was used to test for homogeneity of variances. The independent variables for professional designations and MBTI personality type has significance values, $p>.05$, requiring a failure to reject the null hypothesis of equal variances. The independent variable educational attainment had a significance value less than .05 ($p=.010<.05$) requiring the rejection of the null hypothesis for equal variances. However, Moore (1995) suggested that the test results would continue to be approximately correct if the ratio of largest to smallest variance is within 4:1. The ratio for the educational attainment variable was less than 3:1. Overall, the assumptions for normality, variability, and independence were appropriate.

Educational Attainment. The independent variable of educational attainment had three levels that were entered into a multiple regression model in order to describe the relationships between educational attainment and the dependent variable SDLRS score. The three levels were diplomas at the high school or equivalent, undergraduate, and graduate levels. However, since the independent variable was

categorical, it was dummy coded for regression analysis. One of the levels was excluded since failure to be classified in either of the remaining levels would equate the third. The variable excluded was high school because it represented the lowest mean SDLRS score among educational attainment. Results for question four, "What is the relationship between SDLRS scores and the independent variables educational attainment, professional designation, and MBTI personality type?" are presented in Tables 16 and 17. The ANOVA is presented in Table 16 and the regression coefficients are provided in Table 17.

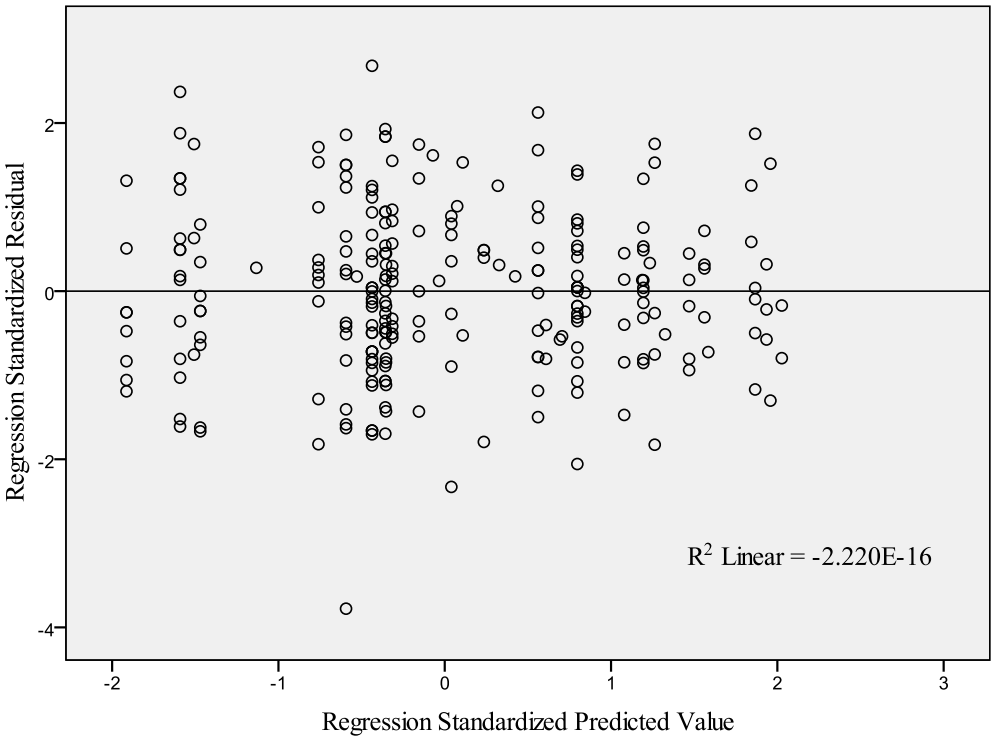

Figure 1. Scatter-plot of standardized residuals and predicted values for the dependent variable SDLRS scores and independent variables educational attainment, professional designation, and personality.

Table 16

ANOVA F Test for Independent Variable Educational Attainment

Source	*df*	*MS*	*F*	*p*
Regression	2	7492.922	14.113	<.05
Residual	247	530.937		
Total	249			

Note: Predictors included in educational attainment were Graduate and Undergraduate, respectively.

Table 17

Summary of Multiple Regression Analysis for Educational Attainment

Variable	*B*	*SE(B)*	ß	*t*	*p*
Constant	218.207	2.545		85.754	.000
Undergrad	11.411	3.245	.236	3.517	.001
Graduate	23.360	4.563	.343	5.119	.006

Note: α=.05, f^2=.12. *N*=250.

Partial results of the ANOVA concerning the independent variable educational attainment provided statistical significance that the variable is correlated to SDLRS scores. The *F* value was 14.113 ($df = 2, 247$, $\alpha = .05$, $p < .05$). Therefore, the independent variable educational attainment had statistically significant predictive value for SDLRS scores in this sample. The effect size for the model was $f^2 = .12$ or approximately a medium effect. Further analysis was necessary to describe the specific relationships for each variable included, since the ANOVA is an omnibus test.

A multiple regression analysis was performed to identify specific contribution to the model by variable. Tests for multicollinearity indicated that a low level of multicollinearity was present (VIF = 1.236 for both undergraduate and graduate). A statistically significant relationship existed between both undergraduate education (t = 3.517; $p < .05$) and graduate education (t = 5.119; $p < .05$) and the dependent variable SDLRS scores. There was a direct positive relationship between undergraduate education and SDLRS scores. In other words, an 11.411 increase is expected in the SDLRS score with the possession of an undergraduate degree, as compared to holding a high school diploma, holding all other variables constant. The variable graduate degree had a positive relationship with the SDLRS as the proportion of the sample that had a graduate degree goes up so does the SDLRS scores. Specifically, a 23.360 change in the SDLRS score is expected with the possession of a graduate degree, as compared to holding a high school diploma, holding all other variables constant. The R^2 value was .103 and the adjusted R^2 value was .095. Therefore, educational attainment explained 9.5% of the variability in the SDLRS scores.

Professional Designation. The independent variable of professional designation had three levels that were entered into a multiple regression model in order to describe the relationships between professional designation and the dependent variable SDLRS score. The three levels were the possession of the executive fire officer diploma, designation as a chief fire officer, and no professional designation. However, since the independent variable was categorical it was dummy coded for regression analysis and the level of no professional designation was excluded from the model. Partial results for question four, “What is the relationship between SDLRS scores and the independent

variables educational attainment, professional designation, and MBTI personality type?" are presented in Tables 18 and 19. The ANOVA is presented in Table 18 and the regression coefficients are provided in Table 19.

Table 18

ANOVA F Test for Independent Variable Professional Designation

Source	*df*	*MS*	*F*	*p*
Regression	2	2443.193	4.273	<.05
Residual	247	571.826		
Total	249			

Note: Predictors for variable professional designation were CFO and EFO.

Table 19

Summary of Multiple Regression Analysis for Professional Designation

Variable	*B*	*SE(B)*	ß	*t*	*p*
Constant	225.642	1.665		135.559	.000
CFO	6.696	6.098	.085	1.098	.273
EFO	7.772	4.979	.120	1.561	.120

Note: α=.05, f^2=.03. N=250.

Results of the ANOVA concerning the independent variable professional designation provided statistical significance that the variable is correlated to SDLRS scores. The F value was 4.273 (df = 2, 247, α = .05, p < .05). Therefore, the independent

variable professional designation had statistically significant predictive value for SDLRS scores in this sample. The effect size for the model was $f^2 = .03$ or a small effect. Although, the significant overall F indicated statistically significant predictive value exists with this independent variable, the small effect was less than desirable and thus reduced the tenability of using professional designation in the model.

However, further analysis was completed to describe the specific relationships for each variable included, since the ANOVA is an omnibus test.

A multiple regression analysis was performed to identify specific contribution to the model by variable. Tests for multicollinearity indicated that a low level of multicollinearity was present (VIF = 1.515 for both EFO and CFO). All levels of the independent variable professional designation failed tests of significance; EFO ($t = 1.561$; $p > .05$) and CFO (t 1.098; $p > .05$). The R^2 value was .033 and the adjusted R^2 value was .026. In other words, the independent variable professional designation did not provide sufficient explanatory power for the variance in SDLRS scores.

MBTI Personality Type. The independent variable of MBTI personality type had eight levels that were entered into a multiple regression model in order to describe the relationships between personality type and the dependent variable SDLRS score. The eight levels are introverted-sensing (IS), extroverted-sensing (ES), introverted-intuition (IN), extroverted-intuition (EN), introverted-thinking (IT), extroverted-thinking (ET), introverted-feeling (IF), and extroverted-feeling (EF); respectively. Partial results for question four, "What is the relationship between SDLRS scores and the independent variables educational attainment, professional designation, and MBTI personality type?"

are presented in Tables 20 and 21. The ANOVA results are presented in Table 20 and the regression coefficients are provided in Table 21.

The variables for personality type were categorical and therefore dummy coded for analysis. Introverted-thinking (IT) represented the absence of a data point in any of the remaining seven dominant functions. The variable introverted-thinking (IT) was excluded because it was the lowest mean SDLRS score of the dominant functions and the closest mean to the mean of the adult population norm.

Results of the ANOVA concerning the independent variable personality type provided statistical significance that the variable is correlated to SDLRS scores. The F value was 4.092 ($df = 7, 242$, $\alpha = .05$, $p < .05$). Therefore, the independent variable personality type had statistically significant predictive value for SDLRS scores in this sample. The effect size for the model was $f^2 = .12$ or approximately a medium effect. Further analysis was necessary to describe the specific relationships for each variable included, since the ANOVA is an omnibus test.

A multiple regression analysis was performed to identify specific contribution to the model by variable. Tests for multicollinearity indicated that a low level of multicollinearity was present (VIF = 3.112 for IS, 2.410 for ES, 1.553 for IN, 2.112 for EN, 3.250 for ET, 1.682 for IF, and 1.968 for EF). A statistically significant relationship existed between ES ($t = -2.053$; $p < .05$), IN ($t = 3.209$; $p < .05$), EN ($t = 3.505$; $p < .05$), ET ($t = 3.163$; $p < .05$), and the dependent variable SDLRS scores.

There was a direct positive relationship between the extroverted-sensors, extroverted-thinkers, those who use intuition both extroverted and introverted, and the SDLRS scores.

Table 20

ANOVA F Test for Independent Variable MBTI Personality Type

Source	*df*	*MS*	*F*	*p*
Regression	7	2209.531	4.092	<.05
Residual	242	539.920		
Total	249			

Note: Predictors included in the variable MBTI personality type were EF, IN, IF, EN, ES, IS, ET.

Table 21

Summary of Multiple Regression Analysis for MBTI Personality Type

Variable	*B*	*SE(B)*	ß	*t*	*p*
Constant	214.421	5.331		40.223	.000
IS	6.872	6.142	.120	1.119	.264
ES	13.667	6.656	.194	2.053	.041
IN	27.496	8.568	.243	3.209	.002
EN	24.579	7.013	.310	3.505	.001
ET	19.204	6.071	.347	3.163	.002
IF	8.512	8.026	.084	1.061	.290
EF	7.277	.062	.729	.467	.467

Note: α=.05, f^2=.12. *N*=250.

In other words, a 13.667 change in the SDLRS score is expected with an extroverted-sensor as compared to an introverted-thinker, holding all other variables constant. A

27.496 change in the SDLRS score is expected with someone with the characteristic of introverted-intuition, as compared to introverted-thinkers, holding all other variables constant. Likewise, a 24.579 increase in the SDLRS score is expected with someone with the characteristic of extroverted-intuition, as compared to introverted-thinkers, holding all other variables constant. Finally, a 19.204 change in the SDLRS score is expected with someone who is an extroverted-thinker, as compared to an introverted-thinker. The R^2 value was .106 and the adjusted R^2 value was .080. Therefore, personality type explained 8.0% of the variability in the SDLRS scores.

All Independent Variables. All of the independent variables of MBTI personality type, educational attainment, and professional designation were entered into a multiple regression model consistent with their respective independent regressions. A comparison of change in R^2 values was conducted to find the most parsimonious model that explained the greatest variability in SDLRS scores. Partial results for question four, "What is the relationship between SDLRS scores and the independent variables educational attainment, professional designation, and MBTI personality type?" are presented in Tables 22, 23, and 24. The three-model ANOVA is presented in Table 22, tests of significance for changes in R^2 in Table 23, and the regression coefficients are provided in Table 24.

Results of the three-model ANOVA provided statistical significance that the variables were correlated to SDLRS scores. The F values for Model 1 was 14.113 (df = 2, 247, $\alpha = .05$, $p < .05$); Model 2 was 6.031 (df = 9, 240, $\alpha = .05$, $p < .05$); and Model 3 was 4.949 (df = 11, 238, $\alpha = .05$, $p < .05$).

Table 22

ANOVA F Test for All Independent Variables

Model	Source	*df*	*MS*	*F*	*p*
1	Regression	2	7492.922	14.113	<.05[a]
	Residual	247	530.937		
	Total	249			
2	Regression	9	2994.607	6.031	<.05[b]
	Residual	240	496.566		
	Total	249			
3	Regression	11	2472.850	4.949	<.05[c]
	Residual	238	499.689		
	Total	249			

Notes: a. Predictors for Model 1 were Undergrad and Graduate.
b. Predictors for Model 2 were all included in Model 1 and ET, IF, EF, IN, EN, ES, IS.
c. Predictors for Model 3 were all included in Models 1 and 2 and CFO, and EFO.

Therefore, the independent variables personality type, professional designation, and educational attainment cumulatively have a statistically significant predictive value for SDLRS scores in this sample. Further analysis was necessary to describe the specific relationships for each variable included, since the ANOVA is an omnibus test. A multiple regression analysis was performed to identify specific contribution to the model by variable. Tests for multicollinearity indicated that a low level of multicollinearity was present (VIF = 1.316 for undergrad representing the low and 3.343 for ET representing the high) across all three models. The null hypothesis (H_o: $\Delta R^2 = 0$) was tested to find

the model that best explained the variability in SDLRS scores. Results show that Model 1 had an adjusted R^2 value of .095 with the variables from educational attainment.

Model 2 had an adjusted R^2 value of .154 with variables from both educational attainment and personality type. This represented a statistically significant change in F from 14.113 to 3.442 (p<.05). Model 3 added the variables for professional designation and had an adjusted R^2 value of .149 without reaching significance. Therefore, Model 2 was the most parsimonious model explaining 15.4% of the variability in SDLRS scores in this sample. The effect size for Model 2 was f^2= .23 or approximately a large effect. A summary of the change statistics for the three models are presented in Table 23.

Table 23

Summary of Change Statistics Comparing Models 1, 2, and 3.

Model	R	R^2	Adj. R^2	SE(Est.)	ΔR^2	ΔF	$df1$	$df2$	p
1	.320[a]	.103	.095	23.04207	.103	14.113	2	247	.000
2	.429[b]	.184	.154	22.28376	.082	3.442	7	240	.002
3	.431[c]	.186	.149	22.35372	.002	.250	2	238	.779

Notes: a. Predictors for Model 1 were Undergrad and Graduate.
b. Predictors for Model 2 were all included in Model 1 and ET, IF, EF, IN, EN, ES, IS.
c. Predictors for Model 3 were all included in Models 1 and 2 and CFO and EFO.

A statistically significant relationship existed between ES (t = 2.222; p < .05), IN (t = 2.536; p < .05), EN (t = 2.987; p < .05), ET (t = 2.840; p < .05), undergrad (t = 3.871; p < .05), graduate (t = 4.263; p < .05) and the dependent variable SDLRS scores. There was a direct positive relationship between all of the significant independent variables and

SDLRS scores. In other words, a 12.319 change in the SDLRS score is expected when someone possesses an undergraduate degree, and a 19.654 change is expected when someone has a graduate degree, as compared to a high school diploma, holding all other variables constant. A 14.208 (ES), 21.306 (IN), 20.452 (EN), and 16.684 (ET) change in the SDLRS score is expected when someone presents the aforementioned personality type, as compared to the introverted-thinking (IT) type, holding all other variables constant. The R^2 value was .184 and the adjusted R^2 value was .154. Therefore, this model explained 15.4% of the variability in the SDLRS scores. Results for Model 2 are presented in Table 24.

Table 24

Summary of Multiple Regression Analysis for Model 2

Variable	*B*	*SE(B)*	ß	*t*	*p (sig)*
Constant	207.641	5.434		38.145	.000
Undergrad	12.319	3.183	.254	3.871	.000
Graduate	19.654	4.610	.289	4.263	.000
IS	3.986	5.924	.070	.673	.502
ES	14.208	6.395	.201	2.222	.027
IN	21.306	8.402	.188	2.536	.012
EN	20.452	6.847	.258	2.987	.003
ET	16.684	5.874	.301	2.840	.005
IF	4.811	7.736	.047	.622	.535
EF	4.825	6.982	.057	.691	.490

Note: α=.05, f^2=.23. Adjusted R^2 = .154. *N*=250.

Further examination was necessary to determine if the explanatory model developed is consistent within the executive fire officer respondents, specifically. Therefore, a duplicate regression analysis for Model 2 was employed with the executive fire officer sample (n=125). Results are presented in Tables 25 and 26.

The ANOVA F test was statistically significant with an F value of 2.449 (df = 9, 115, α = .05, p < .05) indicating a correlation between these variables and the dependent variable SDLRS scores. The effect size for the model was f^2= .19 or approximately a medium effect.

Table 25

ANOVA F Test for Model 2 Within Executive Fire Officer Group

Source	*df*	*MS*	*F*	*p (sig)*
Regression	9	989.592	2.449	<.05
Residual	115	404.105		
Total	124			

Notes: Predictors: Constant, Undergrad, Graduate, ET, IF, EF, IN, EN, ES, IS.

A multiple regression analysis was performed to identify specific contribution to the model by variable. Tests for multicollinearity indicated that an acceptable level of multicollinearity was present (VIF = 3.357 for IS, 1.551 for ES, 1.833 for IN, 2.401 for EN, 3.424 for ET, 1.488 for IF, 1.693 for EF, 3.135 for undergrad, and 3.407 for graduate). A statistically significant relationship existed between IN (t = 2.387; p < .05), EN (t = 2.499; p < .05), ET (t = 1.976; p =.05), and the dependent variable SDLRS

scores. There was a direct positive relationship between the independent variables and the dependent variable SDLRS scores. In other words, a 23.743 change in the SDLRS score would be expected if someone presented as an IN, as compared to an introverted-thinker, holding all other variables constant. Likewise a 21.425 (EN) and a 14.521 (ET) change in the SDLRS score would be expected with someone who preferred either of the aforementioned, as compared to introverted-thinkers, holding all other variables constant. No other independent variables were significant. The R^2 value was .161 and the adjusted R^2 value was .095. Therefore, Model 2 explained 9.5% of the variability in the SDLRS scores among the executive fire officers.

Table 26

Summary of Multiple Regression Analysis for Model 2 in Executive Fire Officers Group

Variable	*B*	*SE(B)*	ß	*t*	*p (sig)*
Constant	222.344	8.249		26.983	.000
Undergrad	-1.555	6.572	-.036	-.237	.813
Graduate	4.793	7.329	.103	.654	.514
IS	4.286	7.217	.093	.594	.554
ES	9.320	10.476	.095	.890	.376
IN	23.743	9.945	.276	2.387	.019
EN	21.425	8.574	.331	2.449	.014
ET	14.521	7.347	.312	1.976	.050
IF	9.072	11.193	.084	.810	.419
EF	9.223	9.559	.107	.965	.337

Note: α=.05, f^2=.19. Adjusted R^2 = .095. *n= 125.*

In summary, this chapter provided summary descriptive statistics about the sample, provided reliability estimates for both instruments used, and provided results for the four research questions. Reliability estimates for both instruments supported the use of the instruments with this sample. Data for the four research questions were primarily derived from the two instruments.

Results for Question 1 and Question 2 found that the mean SDLRS score for the executive-level fire officers was 233.7 and statistically significantly higher than the means of both the firefighters (221.6) and the adult population norm (214). Results for Question 3 found that the frequency of representation across the eight dominant functions of the MBTI were statistically significantly different between the executive fire officer group and both the firefighter and the MBTI male norm group. Specifically, executive fire officers had a lower concentration of ES than the firefighter group at a significant level. When compared to the MBTI male norm group, the executive fire officers were overrepresented in the ET function at a statistically significant level. When the executive fire officers were compared to a similar population of top public managers at the state, county, and local level, tests of association confirmed that the samples came from a similar population with 95% confidence.

Results for Question 4 indicated statistically significant relationships between education, personality type, and the dependent variable SDLRS scores. In addition, a model was developed that explained 15.4% of the variability in SDLRS scores with statistically significant positive correlations for the variables undergraduate, graduate, ES, EN, ET, and IN. When examining the same model exclusively for executive fire officers,

the model explained 9.5% of the variability in SDLRS scores utilizing statistically significant positive correlations for personality type: IN, EN, and ET, respectively.

Observations

Several observations became evident during the data collection of this research that may be useful for future research. First, the method of data collection at fire executive conferences was cumbersome. Second, the commonality of the MBTI instrument caused some difficulties. Third, it was helpful to have membership in the fire and rescue community to obtain participation at the local organizational level, but that participation differed by organization.

The conferences chosen to collect data were educational settings for executive fire officers. Although there was a concentration of the target audience in attendance, the length of the surveys required sufficient time, approximately 30 minutes, to complete that they either detracted from the educational presentations or required commitment of their own time after the day of classes. Also, attempting to ask for assistance with a brief explanation was cumbersome. If assistance was requested before a class setting, then participants would fill it out during the class rather than listening. When the researcher attempted to get individuals to complete the forms at the end of the class sessions, the members would leave at the conclusion of the speaker only allowing for a few requests for assistance in the compressed time interval.

The commonality of the MBTI instrument resulted in many requests to just provide their specific personality type based on previously taken versions of the instrument. The commitment to complete the instrument again was problematic if the participant had completed it within recent history. However, actual data acquired from

the instrument was necessary to perform tests for reliability of the sample utilizing the instrument chosen and to insure that they took the same version of the instrument.

Finally, the researcher had to contact individual fire and emergency service organizations to have enough respondents to meet the rigor of the study design and to account for appropriate sample, effect size, and power. Variability of support and response from individuals and organizations existed during the data collection process. Specifically, when dealing with organizations, the fire chief set the tone and commitment for participation from the membership, yielding either successful or unsuccessful outcomes. Membership in the fire service community was vital to the success of acquiring sufficient sample size, at least in the time frame allocated for data collection.

Chapter 5

Summary, Conclusions, Implications, and Recommendations

The purpose of this study was to examine the self-directed learning readiness in executive fire officers in relation to the independent variables of personality type, educational attainment, and professional designation. First, this chapter provides a brief summary of the research. Second, a discussion of the conclusions derived from the results of this research is presented. Third, implications for use of the results of this research are discussed. Finally, recommendations for further research are stated.

Summary

The purpose of this study was to examine the self-directed learning readiness in executive fire officers in relation to the independent variables of personality type, educational attainment, and professional designation. First, this study examined the degree of self-directed learning readiness in executive level fire officers. Second, the SDLRS scores of executive level fire officers were compared to other population means. Third, the relationships between SDLRS scores and personality type, educational attainment, and professional designations were examined.

This research utilized a quantitative design using a combination of descriptive statistics and tests of independent means, association, and correlation. The independent variables educational attainment, professional designation, and personality type were incorporated into the study design to provide statistical control as they were deemed extraneous variables. Four research questions were used to guide this study.

1. What is the mean SDLRS score for executive-level fire officers?
2. How does the mean SDLRS score of the executive-level fire officers compare to the firefighters and the reported norms for the adult population?
3. Is there a difference between the frequency of MBTI personality type of the executive fire officers and that of the MBTI reported norms and of the firefighters?
4. What is the relationship between SDLRS scores and the independent variables educational attainment, professional designation, and MBTI personality type?

This study utilized the Myers-Briggs Type Indicator (MBTI) and the Self-Directed Learning Readiness Scale (SDLRS) with a sample of 250 professional firefighters. The total sample was divided equally between executive-level fire officers and firefighters at 125 each from professional departments in the Southeastern United States. Results for Question 1 and Question 2 found that the mean SDLRS score for the executive-level fire officers was 233.7 and statistically significantly higher than the means of both the firefighters (221.6) and the adult population norm (214). Results for Question 3 found that the frequency of representation across the eight dominant functions of the MBTI were statistically significantly different between the executive fire officer group and both the firefighter and the MBTI male norm group on one function each, respectively. When the executive fire officers were compared to a similar population of top public managers at the state, county, and local level, tests of association confirmed that there was no statistically significant evidence to reject the null assumption that the populations were identical. In other words, the populations appeared to be the same between executive fire officers and other executive level managers in local and state governments.

Results for Question 4 indicated statistically significant relationships between education and personality type and the dependent variable SDLRS scores. The model that was developed explained 15.4% of the variability in SDLRS scores with statistically significant positive correlations for the variables undergraduate, graduate, ES, EN, ET, and IN. When examining the same model exclusively for executive fire officers, the model explained 9.5% of the variability in SDLRS scores utilizing statistically significant positive correlations for personality type; IN, EN, and ET, respectively. Overall, the results of this study supported the theoretical construct that a high degree of self-directedness in learning was necessary at the executive fire officer level.

Conclusions

In conclusion, the results of this study supported the theoretical construct that executive fire officers would have a high degree of self-directed learning readiness. It could be implied that self-directed learning is a primary contributor to membership and retention at the executive level for fire officials. Influence from concentrations of specific personality types, different education levels, and the possession of professional designations could not explain the above-average level of self-directed learning readiness found in this sample of executive-level fire officers.

The executive fire officers had a higher degree of self-directed learning readiness than either the firefighter control group or the adult population norm. In fact, there were statistically significant differences in means between all groups. The executive fire officers mean scores were determined to fall into the above range as defined by Guglielmino. The control groups both fell into the average range even though statistical

significance existed as the firefighters had a higher degree of self-directed learning readiness than the reported norm.

Educational attainment did not influence SDLRS scores in executives and had minimal influence across the entire sample. The level of educational attainment was found to have a direct positive relationship with SDLRS scores where the possession of an undergraduate or graduate degree would result in a higher SDLRS score than if the individual had a high school diploma or equivalent. Although significant, the independent variable of educational attainment had limited explanatory power as it only explained about a tenth of the variability in SDLRS scores. In addition, when analysis was conducted within the executive fire officer group exclusively, there appeared to be no relationship between educational attainment and SDLRS scores. The level of educational attainment (bachelors and higher) required for executive positions may have moderated findings in the executive fire officer group.

Differences in the distribution of personality types provided limited influence on the overall SDLRS scores in this sample. The literature supports the notion that specific personality types are attracted to specific occupations (Holland, 1996, Myers, et.al., 2009). Results of this research found that similar to the findings of the mean SDLRS, there were statistically significant differences in the representativeness of the dominant functions reported by the MBTI across all three groups. However, only extroverted-sensors had a significant difference between the executive fire officers and the firefighters and only extroverted-thinkers had a significant difference between executive fire officers and the reported male norm, respectively.

Similarly, the executive fire officer sample was compared to a sample of top public managers and found that there were no differences in the representativeness of the two samples. Overall, there were no substantive differences in representativeness of dominant functions between groups.

Personality type was incorporated into the study for statistical control as it was treated as an extraneous variable. The results of this research found that there were significant relationships between personality and SDLRS scores. Specifically, the extroverted-sensing (ES), extroverted-intuition (EN), extroverted-thinking (ET), and the introverted-intuition (IT) had a positive correlation with SDLRS scores. When examining the executive fire officer group exclusively, all variables remained significant with the exception of ES. However, the overall explanation of SDLRS scores by personality type is less than 10% for the entire sample and for the executive fire officers.

In summary, the results of this study supported the theoretical construct that executive fire officers would have a higher degree of self-directed learning. The extraneous variables of educational attainment and personality type could only explain 15% of the variability in SDLRS scores overall and less than 10% in the executive fire officers. In conclusion, the data may lend support to the assertion that self-directed learning is a factor in achieving executive status. In other words, it was implied that self-directed learning might be a primary indicator for membership and retention at the executive level.

Implications

Several implications for practice flow from the results of this research. First, the development of programs that assess the degree of self-directed learning readiness in

professional firefighters that would assist in identifying the baseline necessary for the development of specific curriculum and teaching strategies that support self-directed learning. Second, the development of programs that foster or improve the level of self-directed learning readiness in professional firefighters providing greater opportunity to all members of organizations. Finally, the development of programs that continue to support a high-degree of self-directed learning in executive fire officers would assist in combating regression towards the adult population norms after successfully obtaining executive status.

The results of this research supported that self-directed learning readiness may be a contributing factor to the acquisition and retention of executive status in the fire service. Executive fire officers had a higher degree of self-directed learning readiness than the firefighters. Once all of the control variables were accounted for, one obvious remaining element is the level of self-directed learning that separates executives from firefighters. Therefore, a strategic commitment to assessing self-directed learning readiness early in one's career would be beneficial for both employees and employers to identify potential for learning autonomously.

Similarly, programs could be developed that foster or improve self-directed learning readiness in professional firefighters. Since all members of the executive fire officer rank came from the parent population of professional firefighters, dedication to improving self-directed learning readiness in the firefighters may have an exponential benefit to organizations. In other words, the pool of potential candidates could be greatly improved that may assist in overcoming shortfalls in minority membership at the executive fire officer level. Potentially, curriculum may be developed that would nurture

and improve self-directed learning potential. Finally, a measure of self-directed learning may be appropriate in organizational promotional processes as a tool to identify executive potential.

This research did not account for the number of independent learning projects or any other measure that would indicate the degree to which self-directed learning readiness was put into action. Therefore, an implication for practice is to develop programs and curricula that support the continued use and development of self-directed learning. In other words, if self-directed learning readiness is in part related to the acquisition of membership at the executive status, then effort should be expended to maintain and improve those knowledge, skills, and abilities.

Recommendations

Several recommendations for future research flow from the results. The recommendations fall into two general areas of discussion. The first general area is for research in learning and, specifically, for the Executive Fire Officer Program at the National Fire Academy. The second general area is the refinement or expansion of the SDLRS.

An important finding is that there may be a relationship between an affective learning style, self-directed learning readiness, and membership and retention at the executive fire officer level. Little research was found that attempted to predict self-directed learning readiness with an affective learning style instrument such as the MBTI and no research was found that attempted to use the dominant functions. In general, learning style instruments did not provide many findings of statistical significance in the literature. If specific personality types/learning styles are more highly adept at self-

directed learning and self-directed learning has a direct correlation to obtaining and retaining executive status, then a new body of knowledge could be developed. This research included the MBTI as an extraneous variable and did not provide sufficient detail in the design of the study to make conclusions about results of the MBTI and learning style. Therefore, further research in affective learning style instruments and self-directed learning is recommended.

The design of this study did not adequately account for making conclusions about the influence of the Executive Fire Officer Program (EFOP) at the National Fire Academy on SDLRS scores. Possessing a graduate diploma from the program was included as an extraneous variable with the belief that executive fire officers who completed the program would be more highly self-directed in their learning. There was no statistically significant difference in the mean SDLRS score of the EFO group and that of non-EFOP graduates in the executive fire officer sample. However, the selection process for the EFOP has a high degree of membership in the executive fire officer group prior to beginning the program as well as educational requirements. The lack of significance may be related to the competitive process in place for candidate selection. It is recommended that further research is conducted as a longitudinal study by giving the SDLRS and the MBTI at the beginning and the SDLRS again at the end of the four-year program to evaluate the impact the curriculum has on self-directed learning. In other words, is the EFOP improving skills in self-directed learning and what correlation is there to personality and learning style?

Self-directed learning is such a broad concept that it could encompass all learning activities. For example, a highly self-directed individual can determine what he/she

desires to learn and develop a learning plan that includes enrolling in a university and selecting specific courses in a tract or specific professors of prominence.

Self-directed learning can also mean autonomous learning activities outside of formal academia that are designed and brought to fruition individually. Self-directed learning has the appearance of a valid latent construct that may include many factors such as motivation for learning, motivation for success, or critical thinking. It is recommended that the SDLRS is refined or expanded to fully develop underlying factor structures so that subscales may be used to accurately determine factors that enhance self-direction in learning.

Similarly, it is recommended that research be conducted utilizing a similar population of executive fire officers studying the correlation between a valid motivational instrument and the SDLRS. A similar design to this recommendation could add validity to both the SDLRS and the theoretical concept posited in this research. For example, if motivation to excel in the executive role, and the speed of change, drives continuous learning that is other than self-directed, the concept that the best leaders are the best learners may not be violated. Is there a difference in obtaining and retaining executive status and/or leadership outcomes depending on the proximal cause of the continuous learning?

Finally, it is recommended that further research be conducted to build on these findings. This research has supported that self-directed learning is a contributing factor to obtaining and retaining executive status in the professional fire service and is a step in filling the void in academic research concerning executive fire officers. A similar study

that had a greater representation of minority and female respondents may provide more information.

In addition, a qualitative study is recommended that evaluates the number of autonomous and/or forced learning projects conducted by executive fire officers within one year in relationship to their respective SDLRS score. However, self-directed learning readiness is only one factor of a theoretical model that explains success as a leader in the fire service.

It is recommended that future research explore a model that can predict and explain successful executive leadership as well as identify factors for entry into the professional fire service and the executive ranks. Suggested factors may include tenure, motivation, critical thinking, self-directed learning, and number of annual learning projects, organizational structure, and the political environment.

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Appendices

Appendix A

Informed Consent

UNIVERSITY OF SOUTH FLORIDA

Informed Consent to Participate in Research
Information to Consider Before Taking Part in this Research Study

IRB Study # _____

You are being asked to take part in a research study. Research studies include only people who choose to take part. This document is called an informed consent form. Please read this information carefully and take your time making your decision. Ask the researcher or study staff to discuss this consent form with you, please ask him/her to explain any words or information you do not clearly understand. We encourage you to talk with your family and friends before you decide to take part in this research study. The nature of the study, risks, inconveniences, discomforts, and other important information about the study are listed below.
Please tell the researcher or study staff if you are taking part in another research study.
We are asking you to take part in a research study called:

An Examination of Self-Directed Learning Readiness in Executive-Level Fire Officers.

The person who is in charge of this research study is Steven Knight, Division Chief**.** This person is called the Principal Investigator. However, other research staff may be involved and can act on behalf of the person in charge. He is being guided in this research by Dr. Waynne James.

The research will be conducted at your current location where you received this consent form.

Purpose of the study
The purpose of this study is to:

- The purpose of this study is to examine the self-directed learning readiness in executive-level fire officers in relation to the independent variables of personality type, educational attainment, and professional designation.
- This study is being conducted by a student as a doctoral dissertation in partial fulfillment of the requirements for the degree of Doctor of Philosophy at the University of South Florida.

Study Procedures
If you take part in this study, you will be asked to:

1. Complete the *Informed Consent to Participate in Research* form
2. Complete the *Self-Directed Learning Readiness Scale*
3. Complete the *Myers-Briggs Type Indicator*
4. Complete the *Demographics Information Sheet*

All information will be anonymously coded and the researcher will not have access to specific participants' results. The total combined time should be approximately 30 minutes.

Total Number of Participants

A total of 250 individuals will participate in the study at all sites.

Alternatives

You do not have to participate in this research study.

Benefits

We are unsure if you will receive any benefits by taking part in this research study.

Risks or Discomfort

This research is considered to be minimal risk. That means that the risks associated with this study are the same as what you face every day. There are no known additional risks to those who take part in this study.

Cost

There will be no additional costs to you as a result of being in this study.

Consent to Take Part in this Research Study

It is up to you to decide whether you want to take part in this study. If you want to take part, please sign the form, if the following statements are true.

I freely give my consent to take part in this study and authorize that my health information as agreed above, be collected/disclosed in this study. I understand that by signing this form I am agreeing to take part in research.

_____ _____

Signature of Person Taking Part in Study Date

_____

Printed Name of Person Taking Part in Study

Statement of Person Obtaining Informed Consent

I have carefully explained to the person taking part in the study what he or she can expect from their participation. I hereby certify that when this person signs this form, to the best of my knowledge, he/ she understands:

- What the study is about;
- What procedures/interventions/investigational drugs or devices will be used;
- What the potential benefits might be; and
- What the known risks might be.

I can confirm that this research subject speaks the language that was used to explain this research and is receiving an informed consent form in the appropriate language. Additionally, this subject reads well enough to understand this document or, if not, this person is able to hear and understand when the form is read to him or her. This subject does not have a medical/psychological problem that would compromise comprehension and therefore makes it hard to understand what is being explained and can, therefore, give legally effective informed consent. This subject is not under any type of anesthesia or analgesic that may cloud their judgment or make it hard to understand what is being explained and, therefore, can be considered competent to give informed consent.

_____

Signature of Person Obtaining Informed Consent / Research Authorization Date

_____

Printed Name of Person Obtaining Informed Consent / Research Authorization

Appendix B

Demographic Information Sheet **#_____**

What is your gender? Male _____ Female_____

What is your Race/Ethnicity? Please circle all that apply.

American Indian or Alaska Native; Asian; Black or African American; Native Hawaiian or Other Pacific Islander; White; Some Other Race; Hispanic or Latino; Not Hispanic or Latino.

What is your age? Please circle only one.

18–29 years 30-39 years 40-49 years 50-59 years 60+ years

What is your current fire department rank? Please circle all that apply.

Executive-Level Fire Officer Firefighter

Fire Chief Firefighter/Paramedic

How many years of service do you have in the current rank you provided above?

Years in current rank _____

How many years of service do you have in the fire service?

Years of fire service _____

What is your highest educational degree earned? Please circle only your highest degree held.

HS Diploma GED AA AS AAS BA BS BAS Master's Ed.D. Ph.D.

Other (please specify) _____

Please check the appropriate professionals credential below only if you currently hold the designation.

Chief Fire Officer (CFO) by the Center for Public Safety Excellence _____
Chief Medical Officer (CMO) by the Center for Public Safety Excellence _____
Executive Fire Officer (EFO) by graduate diploma from the National Fire Academy _____

About the Author

Steven G. Knight is an Assistant Chief with St. Petersburg Fire & Rescue, Florida. He has a Master's degree in Public Administration from Troy State University and a Bachelor's degree in Fire and Safety Engineering from the University of Cincinnati. Steve has won the A. Don Manno Award from the National Society of Executive Fire Officers for Outstanding Research as well as earned recognition for Excellence in Research from the National Fire Academy/United States Fire Administration in 2007. Chief Knight was honored as the Fire Officer of the Year in 2009. Steve is also employed as an adjunct instructor St. Petersburg College.