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THE EFFECT OF THE SUMMER TRAINING PROGRAM ON MIDSHIPMEN CAREER CHOICE AT THE UNITED STATES NAVAL ACADEMY

by

Rodolfo Casáls

March 2004

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The main purpose of this study was to examine the effect of the Summer Training Program (STP) on vocational development of midshipmen at the United States Naval Academy. To test this a sample of 615 first-class midshipmen and 615 second-class midshipmen from the classes of 2002-2004 completed a survey regarding their experiences on summer cruise. Survey answers were grouped into several factors derived from a review of the literature in vocational psychology. The relationship between these factors and their final warfare community preferences were analyzed using several cross-tabulations, univariate tests and multivariate models.

Cross-tabulations showed that only 25% of midshipmen change their warfare community preference during the last two years at the Academy. Independent Pearson Correlation (*r*) showed the affect of each of the different factors on warfare community selection. Of the different variables identified: gender, academic major, running-mate qualification/experience, and ship morale were found to have an impact on the desire to select surface warfare at the conclusion of the summer training experience. The multivariate models (logit) verified that the above variables were significant in determining the choice of warfare community and also showed that observed ship morale was the dominant factor above all others in helping to form career interests.

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THE EFFECT OF THE SUMMER TRAINING PROGRAM ON MIDSHIPMEN CAREER CHOICE AT THE UNITED STATES NAVAL ACADEMY

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ABSTRACT

The main purpose of this study was to examine the effect of the Summer Training Program (STP) on vocational development of midshipmen at the United States Naval Academy. To test this relationship a sample of 615 first-class midshipmen and 615 second-class midshipmen from the classes of 2002-2004 completed a survey regarding their experiences on summer cruise. Survey answers were grouped into several factors derived from a review of the literature in vocational psychology. The relationship between these factors and warfare community preferences of the respondents were analyzed using cross-tabulations, univariate tests and multivariate models.

Cross-tabulations showed that only 25% of midshipmen change their warfare community preference during the last two years at the Academy. Independent Pearson Correlations (*r*) showed the effect of each of the different factors on warfare community selection. Of the different variables identified gender, academic major, running-mate qualification/experience, and ship morale were found to have an impact on the intention to select surface warfare at the conclusion of the summer training experience. The multivariate models (logit) verified that the above variables were significant in determining the choice of warfare community and also showed that observed ship morale was the dominant factor above all others in helping to form career interests.

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I. INTRODUCTION

A. BACKGROUND

The choice of which warfare community to join following graduation from the Naval Academy is perhaps the most important and lasting career decision midshipmen make while at the Academy. While some midshipmen choose to enter Marine Corps, the majority continue to serve in the Navy, graduating as Ensigns and entering one of several unrestricted-line (URL) communities: Aviation, Submarines, Surface Warfare, Special Warfare. For these newly commissioned Ensigns, these URL communities impact all aspects of their professional and personal lives. The selected community determines an individual's occupation, initial duty assignments, pay, promotion and the future of their military service. In essence, midshipmen are asked to choose an entire lifestyle within the Navy before graduating from the Academy.

The process of formally pairing midshipmen to individual warfare specialty begins six months before graduation. In the second semester of their last year at the Academy, midshipmen must make their final selection of service branch and warfare specialty. From these preferences, the Naval Academy assigns warfare specialty based in part on: Midshipmen desires, individual qualifications, and of course, the needs of the Navy. While several Academy instructions delineate the determination of individual qualification (USNA INSTRUCTION 1531.51A) and expand on the "needs of the Navy" (COMTMIDNINST 1301.1B), little is known regarding the process midshipmen use to determine their individual service assignment desires. What is known is that throughout their time at the Academy, midshipmen are influenced by a variety of factors in deciding which unrestricted-line (URL) community to join following graduation. Parents, friends, mentors, academic performance, previous experiences, and career aspirations all combine in varying degrees to sway midshipmen toward one career path or another.

Previous research on Naval Academy Midshipmen has already studied the impact of some of the determining factors such as academic major (Arcement, 1998; Rehak, 1999; Hafner, 2000) and, most recently, the influence wielded by the Company Officer (Gille, 2002). While some headway has been made by these studies in understanding this aspect of midshipmen vocational

development, the volume of research conducted on the Brigade of Midshipmen is limited in comparison with the numerous studies conducted on civilian college students. Outside the Academy, there have been numerous theoretical and experimental advances made in understanding the career relevant decisions and vocational interests of students at different stages of development.

The most significant stage of career development is the period in life between 15 and 23 known as late adolescence or young adulthood. In this yeasty period individuals establish a self-identity as they transition away from home and into college or the workforce. The debate whether this period in life is a unique stage in and of itself or simply a transitional period between two stages, and whether this is a cross-cultural stage or simply a product of a highly technological society are questions beyond the scope of this work. This study will concentrate exclusively on midshipmen. Over the last 60 years the theories grounded in studies of observed human behavior, have evolved into an independent field of applied psychology called vocational psychology. While it would be impossible to present the reader all these theories of vocational psychology in the context of this work, this study will survey the most salient models in the field. Thus the goal in this review is both to expose the reader to the ongoing research in vocational psychology and to extrapolate from the findings of these studies to present a cohesive theoretical framework with which to understand the Midshipman decision-making process.

As will be detailed in Chapter II, student's vocational interests are influenced by their exposures to experiential learning outside the classroom such as work-study programs or summer jobs. At the Naval Academy, the Summer Training Program is the main form of experiential learning for midshipmen. During the Summer Training Program, midshipmen are sent into the Fleet and exposed to the different warfare communities from which they must choose before graduation. Given the similarities in age and developmental stage between midshipmen and civilian college students, one would suspect that the Summer Training Program experiences of midshipmen and the civilian work-study programs have a similar impact on the formation of vocational interests. Although widely accepted, this conclusion is not based on any study or research but rather on past individual experiences of senior officers and anecdotal information from midshipmen.

There are several reasons why research has been lacking in this area. For one thing, there has been a lack of a unified theoretical framework from which to draw, few hypotheses, and a lack of data to test these hypothesis. Until 2001, no formal survey nor feedback system had been implemented to quantitatively measure midshipmen experiences on summer cruise. This study will use the survey data gathered at the Academy after 2001 and the conceptual theories from vocational psychology to test hypotheses concerning the effect of the Summer Training Program on midshipmen career interests.

B. PURPOSE

The primary objective of this work is an understanding of midshipmen vocational development. To these ends two immediate questions arise in the investigation of this decision-making process, specifically both *how* and *when* midshipmen arrive at a particular choice of warfare-community. Logically these choices are based on experiences and information gathered throughout the time at the Naval Academy. Each summer midshipmen go into the Fleet for four to six months for an all-encompassing immersion into Navy life. Some midshipmen go to sea on submarines, some on surface ships, and others with aviation squadrons. Additionally, each ship, submarine, and aviation squadron is different. Different commanding officers have different command climates and different wardrooms have very different perspectives of their own ship. Different platforms are also assigned different mission which impact the operational tempo of the ship, submarine, or aviation squadron. The platform missions today include homeland defense, power projection, strategic deterrence among others. Given the potential for all of these different experiences, deriving any meaningful conclusions about the Summer Training Program on midshipmen choices is a seemingly intractable task. To distill these experiences into data that can be analyzed this study will rely on data derived principally from the Summer Training Program survey. Additionally the study will include demographic information on individual midshipmen drawn from the data warehouse at the US Naval Academy. A statistical analysis of this data will yield insight into when midshipmen choose their careers and which factors of the Summer Training Program influence career choice.

A secondary, but no less important, objective of the study is the development of hypotheses founded on a theoretical framework derived from vocational psychology and Naval-Academy-specific research. This framework will be used to satisfy the statistical model to analyze the effect of the Summer Training Program and then place these findings into the existing body of knowledge regarding vocational development during late adolescence and young adulthood.

C. BENEFITS OF THE STUDY

Individual midshipmen, the Academy and the Fleet all stand to gain a great deal from an analysis of the Summer Training Program. The application of vocational development theories to Naval Academy Midshipmen may help produce a better match between warfare community choices and individual midshipmen needs, capabilities, and aptitudes. This compatibility match could potentially increase the performance of Junior Officers in the Fleet by minimizing the stress commonly associated with the school-to-work transition (Lent, Hackett, and Brown, 1999; Blustein, Junsunen, and Worthington, 2000; Phillips, Blustein, Jobin-Davis, and White, 2002). For the Academy, an understanding of the Summer Training Program may assist in identifying improvements in and reveal which aspects of the program are most influential in a Midshipman's decision making process. Secondly, these factors of the Summer Training Program can then be compared to those factors identified in previous studies (Arcement, 1998; Rehak, 1999; Hafner, 2000; Gille, 2002; Bowers, 2002) predicting midshipmen service assignment preferences.

Additionally, Company Officers, would also benefit from an improved understanding of vocational development. This study, especially the research documented in Chapter II, The Literature Review, can help Company Officers who are often asked for career advice and actually perform the role of de-facto career-counselors for midshipmen without formal training in this area. Often Company Officers can often do little more than relay to midshipmen seeking guidance, their own experiences in selecting a warfare community. A deeper understanding of the mechanisms by which midshipmen make their decisions may help these Company Officers identify and resolve the conflicting factors that impact this process.

D. SCOPE AND METHODOLOGY

There are several implicit limitations in the scope of this study. The first of these limitations is imposed by the nature of the Summer Training Program itself. While all midshipmen participate in some form of summer training, the Summer Training Program is divided into different blocks for First-class and Second-class Midshipmen. Some blocks provide exposure to the different URL communities, others provide an overview of the different communities in one block (Professional Training for midshipmen or Naval Tactical Training) or attempt to teach a particular skill (Weapons Detail, Plebe Summer, Command Seamanship and Training Squadron). The research presented here is an analysis of only Submarine, Surface, and Aviation cruises; all other blocks as mentioned above have been excluded from the analysis. Also omitted is any training for the smaller URL communities: Special Warfare (BUDS) and Marine-specific training (Leatherneck). Since only two years of survey data is available, and only a small number of midshipmen choosing the smaller warfare specialties, there is an insufficient number of observations from which to draw any meaningful conclusions for these specialty areas.

Secondly, the study presented here focuses on vocational development only at the Naval Academy. Career-relevant decisions of midshipmen before entry into the Academy are not considered in this study. Midshipmen application data derived from high school or prior college experiences are not included in the statistical analysis of career development. While some studies have shown that vocational development extends beyond simply the college years into high school and even junior high school, these factors are beyond both the control of the Academy and outside the focus of this study.

Since the population of this study is limited to midshipmen at the Naval Academy, the generalizations drawn from an analysis of this population may be limited to Naval Academy Midshipmen. Because of the selective admissions process all midshipmen must undergo prior to entering the Academy, the population studied is not necessarily representative of all college juniors and seniors. The Brigade represents a unique subset of the college students in the United States. Although the literature review in this study draws from research conducted at a variety of civilian colleges, no other service academies (the Military Academy, the Coast Guard Academy, or the Air force Academy) or

civilian universities were directly surveyed. For this reason, any findings and conclusions of the study may not generalize beyond the Brigade of Midshipmen.

Survey and administrative data from the 2002 and 2003 academic years and the class of 2003 will be used in the preliminary analysis of the Summer Training Programs.

E. ORGANIZATION OF STUDY

As previously discussed, the literature review presented in the following chapter places this study in the larger context of vocational psychology. The application of Bandura's (1986) work in psychology has lead to the development of several new models for vocational development. Among these, the Social Cognitive Career Theory (SCCT; Lent, Brown, & Hackett, 1994) has enjoyed a great deal of attention and empirical verification, and will be used extensively in this work. Super's (1996) notion of vocational self-concept and Holland's (1994) most recent work with personality influences and environmental models are also discussed and incorporated. Other landmark studies explaining demographic effects such as gender (Richie et al., 1997), race or ethnicity (Fitzgerald and Betz, 1994; Leung, 1995) and socioeconomic status (SES; Brown, 2002; Grabowski, Call & Mortimer, 2001) will be summarized. Chapter II presents the Summer Training Program in detail, discusses the strengths and weaknesses of the administered survey, and reviews all pertinent Naval Academy instructions regarding the administration of the Summer Training Program. A copy of the survey used in the study is included as Appendix A.

Chapter III presents the quantitative analysis of the Summer Training Program. The chapter is divided into four parts. The first three parts are dedicated to the three warfare communities listed above. Each of these three parts is self-contained and can be read exclusively without loss of continuity with the rest of the study. For each warfare community a preliminary ordinary least squares (OLS) regression and a more in-depth nonlinear logistic (logit) model are estimated to determine whether aspects of the major training programs offered at the Academy affect community selection. In each of these three parts we calculate the marginal effects of several of the variables. The fourth part of Chapter III describes a statistical regression combining the previous three warfare communities. The survey data is used extensively to isolate which

aspect of the Summer Training Program experience is most influential. The study then combines these results with previous factors identified in previous Naval Academy specific studies and controls for their predicted effects. The results of the analysis are presented in Chapter IV. Conclusions and recommendations for future study and survey administration are included in Chapter V.

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II. LITERATURE REVIEW

This chapter presents an overview of several models explaining career development and occupational choice. Emphasis has been given to those models with supporting independent empirical verification of their conclusions.

As already mentioned in the previous chapter, the theoretical foundations for this study are drawn from works in the field of vocational psychology. This chapter expands that foundation in vocational psychology by presenting several landmark theories and their supporting empirical studies. The landmark theories help establish a framework from which to understand observable human behavior; the empirical studies presented in this chapter lend credibility to the supporting theory and provide a model for future research. This balance between the theories and the empirical studies has helped keep the field of vocational psychology alive and grounded making it an applied science. The same tension between the abstract and the pragmatic has also guided the selection of theories to be presented in this study.

In this work, preference has been given to theories with strong empirical support especially studies conducted on students in high school or college in the area of work experience and subsequent vocational decisions. Even with this selection criterion, it is not possible for a work of this size and scope to present a comprehensive overview of the prominent theories in the field nor is it possible to give a full presentation of any one theorist's model. In these cases the reader is commended to the original works, listed in the bibliography, for a complete presentation of a particular model.

To organize this chapter and our understanding of the different theories in the field, this study follows the precedent already established in the literature (Hackett, Lent, and Greenhaus, 1991; Swanson and Gore, 2000; Brown, 2002) which provides three accepted traditions or groupings within vocational psychology: trait-factor, learning theory, and social constructionism. It is important to note that the specific names of the traditions and the theories they contain vary from author to author. For example, some authors prefer to use trait-factor, social learning, and developmental, others substitute social cognitive for social learning and keep the others unchanged. These differences are not

merely semantics but help to identify the subtle shift in prioritization of one theorist over another in each group. This level of detail is superfluous to the objectives of this study which is simply to provide a foundation in the different theories. It is also important to note that few authors attempt to explicitly define these different traditions in vocational psychology nor do they establish selection criteria to determine which theories to include in each tradition. Instead, they allow the theories themselves to define the specific characteristics of each tradition. We shall do the same in this study.

A. TRAIT-FACTOR

Trait-factor theory is perhaps the oldest of the three traditions. The earliest work in this area (Parsons, 1909) actually predates the formation of vocational psychology as a formal field of study. Parsons approach to career development was straightforward and systematic.

> In the wise choice of a vocation there are three broad factors: (1) a clear understanding of yourself, your attitudes, abilities, interests, ambitions, resources, limitations, and knowledge of their causes; (2) a knowledge of the requirements, compensation, opportunities, and prospects in different lines of work; (3) true reasoning on the relationship of these two groups of facts. (Parsons, 1909, p. 5)

At the heart of his plan was the application of the scientific method to the career decision-making process. Parsons provides his readers a lengthy survey of interests and personality traits. Since an objective assessment of one's personality traits was the goal of the survey Parsons recommends to his readers that they then ask family and friends for an assessment of the reader using the same questions. Following this self-assessment phase, Parsons then recommends research into the career field of interest and finally a decision to peruse the explored career or not. This rational and almost detached approach gives the work the feel of a self-help guide rather than a model of career choice. Although clumsy by today's standard, Parson's use of a survey and a scientific approach to this process of career selection gave this new field an initial direction for future study. Elements of Parsons triadic approach can still be seen employed in several trait-and-factor models today (Holland, 1997; Super, Super, & Savickas, 1996; Roe & Lunneborg, 1990).

Almost a century later Holland (1997) presents a model based on the idea that behavior is a result of an interaction between the individual and the environment or this P–E interaction. The goal of career counselors in this view becomes to help "persons seek environments that will allow them to implement the characteristics of their work personalities" (p. 4). Through years of research and experience Holland developed six scales and five concepts that form the core of a typology based approach to career choice. These six scales could be used to classify both individuals and the work environment (Holland, 1997; Gottfredson and Richards, 1999). The five different concepts would then be used to develop the practical aspects of the theory.

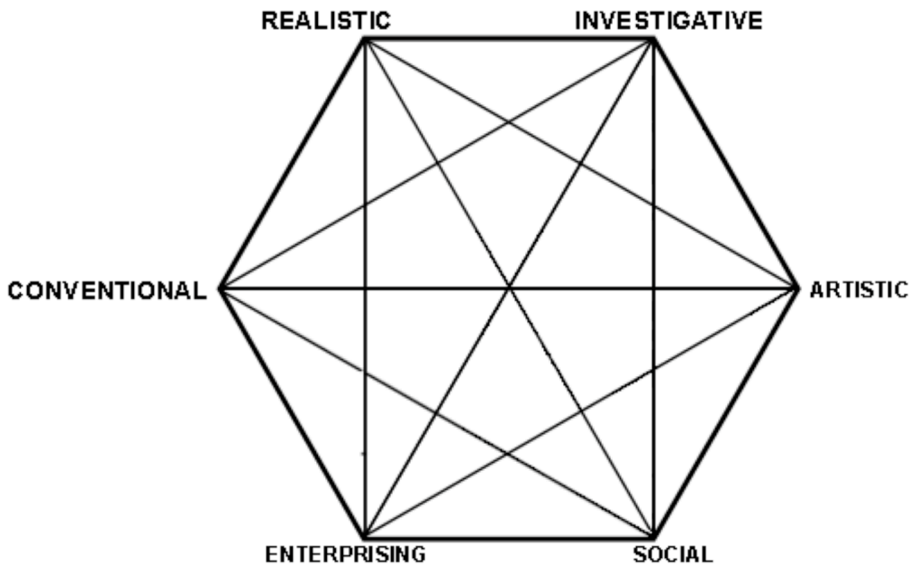
For individuals, the six scales are Realistic, Investigative, Artistic, Social, Enterprising, and Conventional (RIASEC). The personality of the individual will favor one of these scales, but may have aspects of the other scales. Holland (1997) describes the typical characteristics of an individual whose personality type is dominated by each of the scales and their "Vocational and Avocational Preferences, Life Goals and Values, Self-Beliefs, and Problem Solving Style" (p. 21-28) For example, an individual high on the Realistic scale would prefer structured activities, hold traditional values, and develop concrete solutions to problems. The Investigative type is open to new ideas, but values a systematic logical approach, seeks challenging problems and relies on careful analysis for the solution. Artistic types value creativity, are comfortable with abstract ideas and solve problems using originality. Social individuals prefer interactions with others such as teaching, views the human dimension to problems. Enterprising types aspire leadership roles and can solve problems using people but prefer to remain in control. The Conventional individual also prefers structure, enjoys computational work, and uses established procedure to formulate solutions to new problems. These scales manifest themselves in the personality of each individual. Using several interest and personality surveys each person can be grouped into a particular type or combination of types.

Work environments can also be described using the same scales already introduced. The difference in the work environment is that these scales reflect the physical characteristics of the work and the personality of the individuals that comprise the work place. Different occupations are more or less suited to one of the six scales over another simply by the nature of the work requirements. For

example, factory work and teaching each require different skills that rank at various points along the different RIASEC scales. The second factor in determining the type for the environment is the individual personalities of those in the work field. Because types recruit and produce the same types, these personalities impact the environment of the work force.

The RIASEC scales, used to describe both the individual and the work environment are not independent. The relationship between the different scales is best illustrated geometrically by the hexagon in Figure 1 and Holland's concept of Calculus.

Figure 1
Showing the Theoretical Relationship Between the Different Holland Scales.



In this model, Calculus gives meaning to the spatial arrangement of the scales. Thus, the placement of each scale in the hexagon is given a theoretical significance, specifically: "the distances among the types or environments are inversely proportional to the theoretical relationships between them" (p. 5). For example, the distance between Conventional and Artistic is larger than the distance between Conventional and Realistic. Applying Holland's definition of Calculus we logically conclude that the greater the distance the less the commonality between the types; in this case Conventional and Realistic are more

closely related than Conventional and Artistic, because they share more characteristics in common.

The second concept of the model, Congruence, describes the relationship or level of fit between the person and the environment. The underlying assumption is that the greater the Congruence, the greater the job satisfaction for the individual. Given the equilateral arrangement of the types in the hexagon, there are only four possible distances between the person and the environment, or the P–E, interaction as discussed above. These different distances correspond to the different levels of Congruence between the P–E.

In the first level the trivial case is considered, maximum congruence, where the person and the environment are both of the same type. This level would naturally have the greatest Congruence and produce the greatest job satisfaction for the individual. The next level is the distance between two adjacent types such as enterprising and social. This second level would contain less Congruence than the first. The third level would include the distance between Realistic and Artistic. The fourth level, and the one of least Congruence, includes the relationships between the types farthest across from each other, such as the distance between the Conventional and the Artistic types. While Calculus explains the relationship between the different scales in the model, Congruence explains the degree of compatibility between the person and the work environment.

The three remaining concepts of the theory: Differentiation, Consistency, and Identity are all measures of the clarity and stability of vocational goals. These variables have been difficult to operationalize and measure, but Holland postulates that the impact of the environment on the individual is related to the concept of consistency. For people, increased consistency takes the form of "integration of similar interests, competencies, values, traits and perceptions" (p. 19). For the environment, consistence is a product of the expectations and reward-system established. Thus, inconsistent people are less productive; inconsistent environments are less influential. Holland himself alludes to the possible colinearity of the three variables: "they probably represent three techniques for assessing the same concept" (p. 5). One idea related to these three concepts that has received great empirical attention is vocational stability.

Since late adolescence and early adulthood is a period of intense changes, vocational stability is of particular interest to this study. There are several methods of measuring vocational stability over time. Previous empirical research using the Strong-Campbell Interest Inventory (Lubinski, 1995; Mullis, 1998; Swanson and Gore, 2000) and the Occupational List (Leung, Collie, and Scheel, 1994) support this idea that vocational interest stabilize over time. However, these studies also show that the process does not occur uniformly for all high school and college students. There are interest variations along the different RIASEC scales. For example, for high school students in the best case, the Realistic type, 70% showed a stable interest pattern; in the worst case, the Enterprising type, less than 50% of the students remained consistent between freshman and senior year.

Interest stability has also been found to occur sooner with gifted high school students when compared to the national average. Differences have also been found along sociocultural and SES boundaries (Dinklage, 1968; Place, Payne, & Rinehart, 1996). These cultural influences would become more pronounced in a full-time college where the parental influence is substituted with a social culture of peers and teachers. Specific research of students and the influence of the academic environment (Smart, 1997; Smart and Feldman, 1998; Thompson and Smart 1999) have found this to be a significant factor overall. Previous work experience has also been found to affect the expected congruence of a new occupation (Thompson, Flynn, and Griffth, 1994).

The concept of congruence and the six types continues to impact the literature and the practice of career counseling. Despite any poor empirical results of the last three concepts, research efforts continue in these areas and have already yielded verification of the link between congruence and job satisfaction, as well as the process of individuals moving towards careers of higher congruence over time.

B. DEVELOPMENTAL

The developmental tradition expands on the concept of the P–E interaction already introduced but with a different focus that explains how this interaction develops over time and its consequences. These theories fill in the gaps left from Holland's theory by explaining vocational development during

the late adolescent stages of human devlopment. Developmental theories draw from the traditional psychological learning theory and include the latest research in neuroscience and genetics. This research in genetics and biology are leading to conclusions about human nature and development that have implications for theories in vocational psychology.

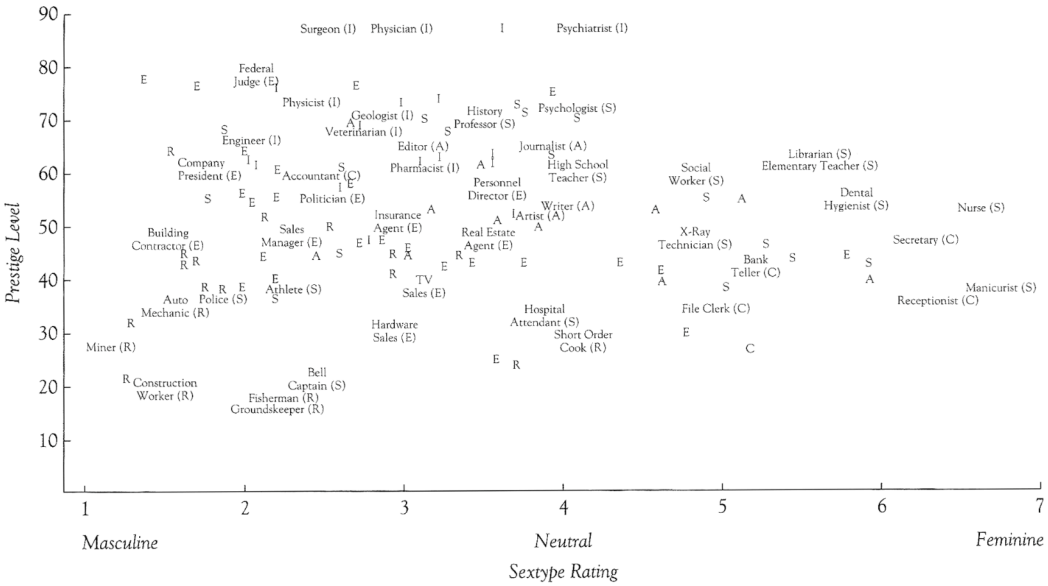
Gottfredson's (1981, 1996) theory of circumscription and compromise draws from several disciplines to present a coherent vision of vocational development. Originally intended to explain why vocational expectations of children, with relatively little experience, vary by sex, race, and social class, the explanation has evolved into a full developmental theory. The main part of the theory is a four-stage model and the idea of a cognitive map of career alternatives that forms in individuals over time.

Gottfredson's developmental theory claims that the first way we learn about different occupations is by comparison. Children do not simply learn about each career choice one at a time, but instead learn about one, usually their parents, and begin to compare what they know of different career alternatives along different dimensions. The most distinctive of these dimensions are: Masculinity-femininity, occupational prestige, and field of work. The masculinity-femininity dimension is self-explanatory. This dimension rates different occupation according to its appropriateness for each gender. Occupational prestige is a more complicated concept that has been linked to the intellectual complexity of the occupation (Gottfredson, 1997). Fields of work cluster around the different RIASEC scales introduced in the Holland model (Gottfredson 2000). Using the prestige and sex type dimensions, each occupation can be plotted relative to each other. Figure 2 illustrates different occupations along these scales.

As children are exposed to new occupations the number of points on the cognitive map grow and as they become aware of new information about old occupations these points shift. Eventually the cognitive map of adolescents comes to resemble a more balanced and objective view of an adult. This cognitive map of occupations is a tool used to compare different occupations and order our understanding of the world around us.

Figure 2

Cognitive Map of Occupations According to Prestige and Sextype Rating



Note: Occupations are denoted by a letter indicating their Holland types: R = Realistic, I = Investigative, A = Artistic, S = Social, E = Enterprising C = Conventional.

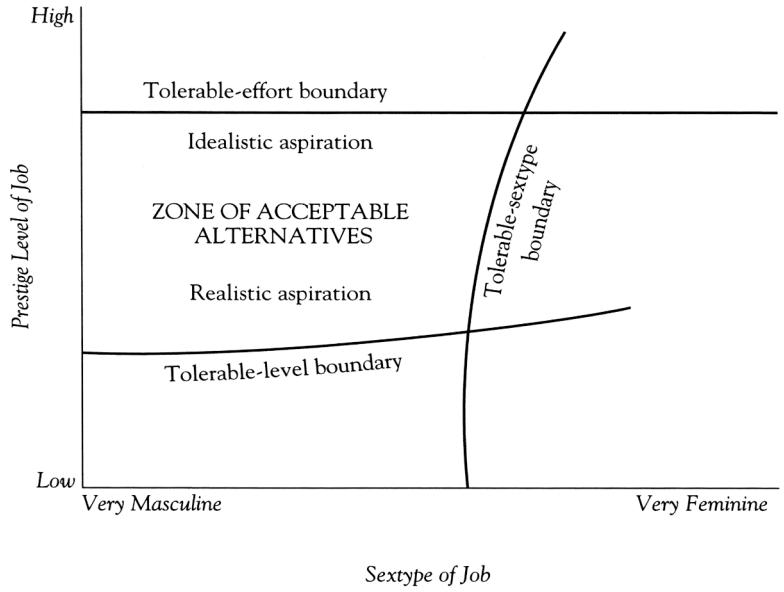
Figure 2 is from Gottfredson, 1981; Copyright © 1981 by the American Psychological Association and reprinted in Gottfredson, 2002.

The development of self-concept and levels of acceptability toward each occupation takes place over different stages of development. Stage one spans ages three to five. Stage two covers ages six to eight. During these first two stages thinking is dominated by a dichotomous view of the world. Actions and events are good or bad; here children establish the limits of acceptable behavior. Through simple observation of adult behavior and same-sex bonds with adults they develop their tolerable sex type boundaries. In stage three (ages nine to thirteen) they develop a concept of prestige and status of different careers. During this third stage children develop limits on these dimensions, eliminating from further consideration jobs that are unacceptably low in prestige and those that require too much effort to obtain. This process of narrowing their choices of alternatives is called "circumscription." The plot of these "limits" on the cognitive map form two lines indicating the "tolerable-effort" and "tolerable-level" boundaries, as illustrated in Figure 3.

Stage four (ages fourteen and up) is of particular interest to this study for obvious reasons. During this time young adults continue the development towards their internal and unique self. Here they learn of their values and beliefs from exposure to various personal experiences. As they assume different roles in society, they become aware of a public-self that they project towards others and this in turn influences the type of career they might pursue. Vocational development shifts in this stage from setting acceptable limits on different dimensions to choosing from among the remaining alternatives. The limitations on different occupations come from external sources such as career accessibility. Simultaneously vocational aspirations are formed from these perceptions of accessibility and compatibility. Deviation from the most preferred alternative, whether because of accessibility or other environmental barriers and limitations, is called "compromise".

"Compromise" forces the individual to accept less attractive alternatives. These alternatives can be less attractive because they deviate from the preferred sex type level or level of prestige or field of interest. Each individual will accept different degrees of compromise along each dimension depending on the level of concern for each dimension. This level of concern is related to the identity of the individual or their self-concept. For each degree of compromise, individuals prioritize the three dimensions. Specifically for a situation of low compromise the different dimensions would be rated as field of interest, prestige, and sex type as shown in Figure 3. For moderate compromise prestige overcomes field of interest and sex type remains low in interest. However in a situation of high compromise sex type dominates the concern of the individual followed by prestige and field of interest.

Figure 3
Circumscription of Aspirations According to Perceptions of Job-Self Compatibility



Note: This example represents a hypothetical middle-class boy of average intelligence.

Figure 2 is from Gottfredson, 1981; Copyright © 1981 by the American Psychological Association and reprinted in Gottfredson, 2002.

In the end, most individuals settle for the "good enough" choice in life rather than the most preferred choice. Gottfredson (2002) points out that her concepts of circumscription and compromise do not explain all the variability among individuals. Most career theorist strive to explain group differences along sex and racial lines, but few look at the variations inside the group such as that of individuals. What causes different people to circumscribe their choices more narrowly or compromise them less wisely? To what extent did these individuals encounter – or create – the different opportunities in their life? Are circumscription and opportunities a function of nature or part of the environment in which we develop? These questions begin to address more the nature of man and the different factors that affect reality rather than strictly vocational psychology. Regardless of the scope of the questions this issue plagues the science of vocational psychology and present an obstacle to arriving at a grand unified theory of vocational psychology. A theorist's view of this

debate has a profound impact on the subsequent vocational theory and its ability to be incorporated with other theories favoring a different explanation.

Since science has failed to provide a definitive answer to the nature-nurture debate, vocational theories have been presented on both sides of the issue. The traditional view has been that genetics provide the individual with certain traits and that the rest of the self-concept is formed by experiences in society. Gottfredson (2002) draws from the work of Eysenck (1998) on genetic family studies, and advocates a more balanced perspective on the question of nature-nurture.

In this theory, the individual's genetics plays an *increasing* role in their development over time. Genetics actually shape our life by providing us the elements of our personality and an internal compass, which influences our experiences (Funder, 2001; Lykken, Bouchard, McGue, & Tellegen, 1993). Experiences are merely data points that help the individuals define themselves or discover the importance of values.

Most theories in the field, approach vocational development from a nurture aspect, claiming that vocational choices are a result of our exposure to different occupations over time. Gottfredson's recent work attempts to strike a balance between the debate of nature vs. nurture. Her work acknowledges the role of genetics in people's life and their psychological development to include vocational development.

As with any new theory, relatively little empirical verification is available to support the validity of the theory, but in time, independent research will yield the results that can validate the theory. Perhaps the most important contribution of her approach is forcing vocational physiologists to examine the research beyond the traditional fields of psychology and explore the research in Biology and Genetics to better understand the factors involved in vocational development.

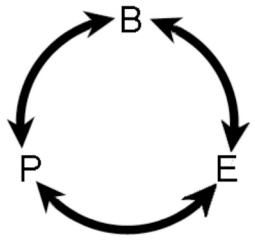
C. SOCIAL-COGNITIVE

Although originally introduced as a model for unifying several career development theories into one, SCCT actually introduces several new concepts in vocational psychology. The first of these new concepts is a novel view of the individual as an active agent in the career development process. While previous

theories tended to view people as the subject of inquiry or driven by a series of external factors, SCCT emphasizes the free will or cognitive nature of individuals. The social cognitive perspective is not in itself new but its application to career development has lead to new constructs. These constructs can be used to explain previous theories and extend the field of vocational psychology into new directions for study.

The social-cognitive tradition draws from Bandura (1986) and his work in psychology. According to Bandura, human behavior is not the result of a P–E interaction but rather the result of the interaction between the person (P), the environment (E), and previous behavior (B). These three elements are co-determinants of behavior and bidirectionally influence each other in a method called "reciprocal determinism". Figure 4 best illustrates this relationship. Here we see that behavior, the person, and the environment all have equal weight and that they can all influence each other as shown by the bidirectional arrows. In essence our actions determine our environment and can even create our environment. Bandura (1977) claims that, to a certain extent, we make our own reality: "We are all acquainted with problem-prone individuals who, through their obnoxious conduct, predictably breed negative social climates wherever they go. Others are equally skilled at bringing out the best in those whom they interact" (p. 196).

Figure 4
Graphical Representation of Reciprocal Determinism



For Bandura, human behavior is mostly self-regulated through several factors but primarily by self-efficacy. Self-efficacy or the belief concerning one's ability to perform a particular task is formed over time by a variety of sources. The first and obvious source of self-efficacy comes from the accomplishments or

failures of the past. Humans form an assessment of the ability to perform an event by extrapolating form the outcome of similar events in the past. These direct experiences in the past have the most powerful influences on our self-efficacy. Successful accomplishment of a task will lead to higher self-efficacy towards that task; similarly a previous failure will reduce our self-efficacy toward similar future tasks. The second source of self-efficacy is vicarious experience. Observations of the success and failures of others who are similar or close to you provide vicarious experience. The impact of vicarious experience on self-efficacy depends on the perceived relatedness of the observer and the observed. The final source self-efficacy is verbal persuasion. The advice from and conversations with others weigh on our self-efficacy. Similarly the importance given to these conversations depends on the closeness or perceived closeness of the person administering the advice. These sources of self-efficacy: direct, vicarious, and verbal, take into consideration the different ways humans learn about the environment around them.

SCCT applies tridactic determinism and self-efficacy concepts to explain interest development, career choices, and even performance. As in Bandura's theories, SCCT views the individual as an active agent in their own career development. Instead of modeling career choice as the result of a series of environmental factors, SCCT recognizes the role of the individual as central to the process of vocational development. The selection of one career over another is viewed as a conscious act of the individual and an expression of self-determination. This is not to imply that career choices are made in a vacuum. SCCT acknowledges that people *are* influenced by a variety of factors, but all these factors operate not only on the person directly, but also on a person's belief system and outcome expectations which in turn has a influence on their actions. Thus two persons with identical experiences may make different career choices based on different self-efficacy beliefs and outcome expectations. The goal in SCCT is an understanding of the foundation or "cognitive and experiential precursors" (Lent and Hackett, 1994) of a person's belief system.

The structure and and organization of SCCT has changed over the years since its initial publication. Originally SCCT was introduced to unify several prevalent theories in vocational psychology (Lent, Brown, and Hackett, 1994). Through the use of 12 propositions and 35 hypotheses, the theory offered an

alternative explanation of vocational development. In the most recent revision, Lent, Brown, and Hackett (2000) divide SCCT into three models: interest, choice, and performance. This study will concentrate on the interest and choice models. In each model the theoretical constructs of self-efficacy, outcome expectations, and goal representation have a slightly different function and interpretation. To understand these subtle differences it is helpful to define a baseline for the three variables.

The foundation of self-efficacy has already been outlined above and continues to play a central role throughout this theory as the dominant social cognitive mechanisms. Self-efficacy addresses "people's judgments of their capabilities to organize and execute courses of action required to attain designated types of performances" (Bandura 1986, p. 391). In SCCT: "Self-efficacy beliefs derive from performance accomplishments, vicarious learning, social persuasion, and psychological reactions (e.g., emotional arousal) in relation to particular educational and occupationally relevant activities" (Lent et. al., 1994, Proposition 10). Unlike any trait or genetic endowment, self-efficacy is a dynamic variable that is influenced by learning through exposure to various experiences. For SCCT, experiences are not simply a tool of self-discovery, but rather the foundation of self-efficacy.

Outcome expectations are an evaluation of the benefits or consequences of the end state. The anticipation of various types of rewards (monetary, self-gratification, increased power, increased honor, prestige, or improved social standing) will often influence career choices. Negative outcome expectations can also be a powerful influence on career decisions. "As with self-efficacy beliefs, outcome expectations are generated through direct and vicarious experiences with educational and occupationally relevant activities" (Lent et. al., 1994, Proposition 11).

For example, an individual who enjoys drawing will choose not to take an elective art classes based on the anticipation of negative outcomes such as difficulty finding a future job or the non approval of friends or family. In a sense, the limits on tolerable outcome expectations are similar to the determination of the "tolerable effort and tolerable-level boundaries" in Gottfredson's (2000) theory. An important difference in the two constructs of the models is that outcome expectations are limited to the specific occupation

considered rather than a boundary derived from experience and then applied to all new careers. Both self-efficacy and outcome expectations share similar sources but they result in different concepts in an individual's mind. Self-efficacy concerns would be expressed as estimations of: How good would I be at doing this type of work? Outcome expectation questions: What would I get out of this type of work? One is a question of personal ability and the other is a question about the environment.

Goals also have a direct influence on the decisions individuals make concerning career choices. Goals motivate, empower and help translate experiences into success and failure. They help the individual break the influence of the deterministic forces in life. They provide direction for individuals, sustain behavior over time even in the absence of external reinforcement increase the probability of attaining a desired outcome (Lent et. al., 1994). Goals also establish the benchmark by which we determine what is a success and a failure in our past and future.

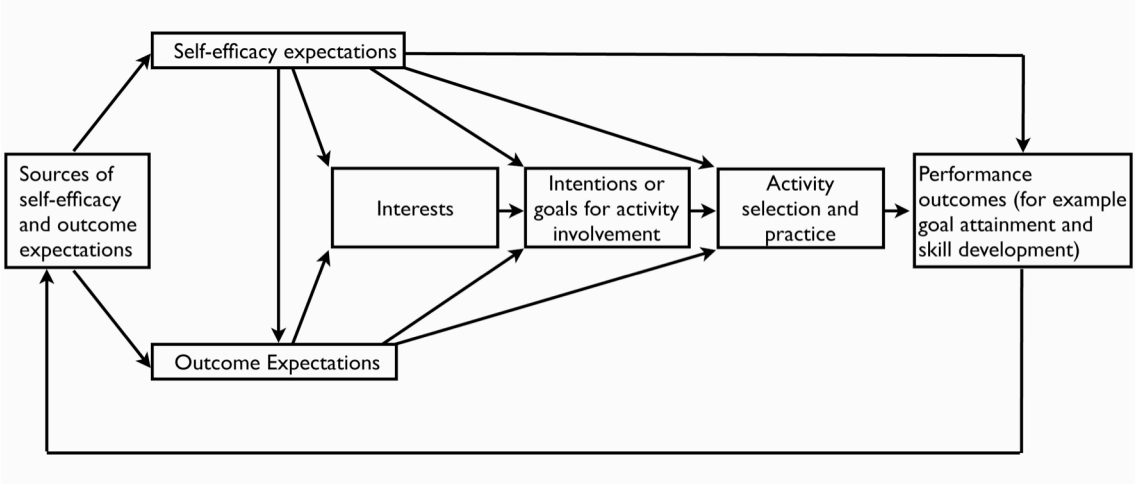
These three social cognitive variables: self-efficacy, outcome expectations, and goal formulation, interact differently in each of the three models of SCCT. The interest model explains the relationship between vocational ability and interest formation. The choice model explains the translation of interest into goals that subsequently influence behavior. The performance model shows how self-efficacy beliefs influence an employment of an individual's ability. The similarities between the models show that these models are actually part of a smooth developmental process. The focus of this study is midshipmen warfare community choice and thus the only part of the vocational development process of concern are the choice, and to a limited extent, the interest development models.

To remain true to the reciprocal nature of Bandura's Self-determinism, the three constructs developed in the theory influence eachother. Using the variables of the SCCT theory, goal attainment, or failure, can influence self-efficacy and can even moderate outcome expectations of future events. Likewise goal setting is a result of a cognitive evaluation of previous experiences in determining the outcome expectations for a current situation and finally employing the self-efficacy to express concrete career goals. Despite these bidirectional interrelationships among the different variables, SCCT postulates a

dominant progression or flow from one model to the next and between the three variables in each model. This directional flow is indicated in each diagram with arrows pointing in one direction but the relationship is bidirectional in nature.

The interest (Figure 5) and choice (Figure 6) models in SCCT each contain a linear component and a feedback element. The linear component of the interest model begins with interests in a particular career, these interests then become goal intentions and then activity selection. These blocks are the natural evolution of a cognitive thought process regarding a particular vocational interest. This is not a strict stage development theory, i.e. there is no specific time or age dictating when these interests form into activity selection. The process could take days or years but eventually this progression along the continuum eventually leads to performance outcomes. This part of the model provides the feed back that leads to self-efficacy and outcome expectations. These two variables already discussed above influence the each stage of the linear process and the cycle repeats.

Figure 5
Model of How Basic Career Interests Develop Over Time



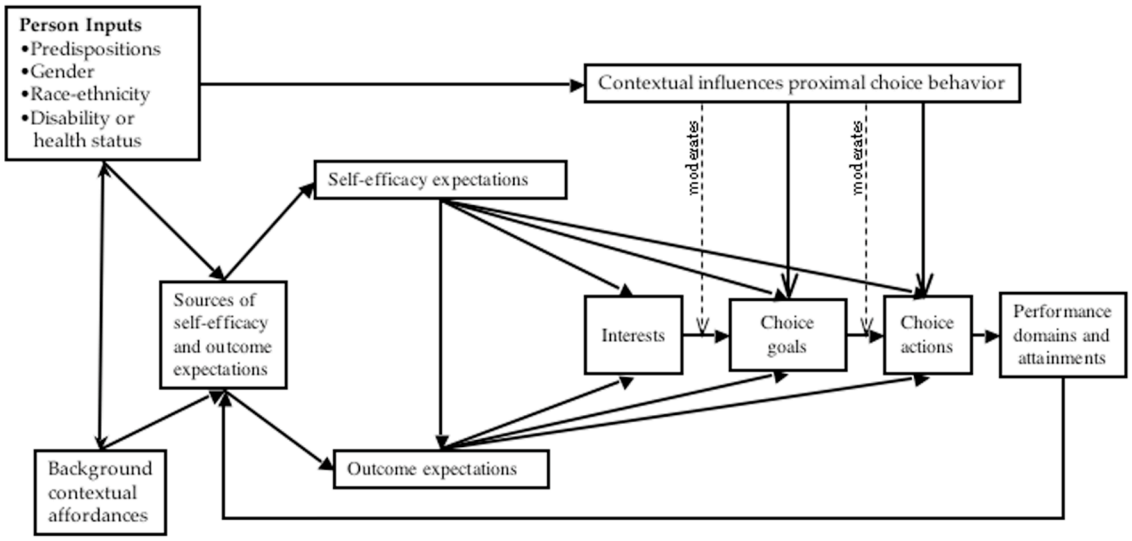
Source: Lent, Brown, and Hackett, 2000; Copyright © 1993 by R. W. Lent, S. D. Brown, and G. Hackett.

The choice model offers the most comprehensive explanation of the three models. It begins with the linear progression from interest formation, the first

block, to choice goals, then choice actions and finally performance domains and attainments. It is important to note that this progression, similar to the interest model, is influenced in every step by self-efficacy and outcome expectations as illustrated in Figure 6. The feedback element of the model is provided by "learning experiences" which is a basis of self-efficacy and outcome expectations. In the theorists' own words:

> Conceptually, the choice process can be divided into three parts:
> 1. The expression of a primary choice (or goal)
> 2. Actions, such as enrolling in a particular training program that is designed to implement one's choice.
> 3. Subsequent performance attainments (successes, failures) that form a feedback loop, affecting the shape of future career behavior. (Lent, et al., 2000, p. 272-3)

Figure 6
Model of Person, Contextual, and Experiential Factors Affecting Career-Related Choice Behavior



Source: Lent, Brown, and Hackett, 2000; Copyright © 1993 by R. W. Lent, S. D. Brown, and G. Hackett.

As described above the basic process culminating in observable behavior is rather linear. But with the introduction of the cognitive variables the same process can now be described as not only iterative but cumulative and circular as well. Self-efficacy and outcome expectations directly influence interest formation and choice determination. Interests as well as self-efficacy and out come expectations again influence goals and finally these goals again with self-efficacy and outcome expectations influence the resultant behavior. The iterative nature of this process comes from the success or failure of the established goals. Knowledge of these experiences form the basis of future self-efficacy and outcome expectations and begins the entire process over again.

This progression in the theory assumes a supportive environment free of external barriers. In the most recent version the theorists introduce the idea of contextual influences that like self-efficacy and outcome expectations act on all parts of the model.

> The model also states, however, that choices are affected as well by contextual influences and by other person variables. For example, people will be more likely to have to compromise their interests in making career choices if they perceive that their environment is not supportive of their choice or if they perceive significant barriers to entering and prospering in careers that most interest them (Lent et al., 2000, p. 276).

Career decisions are based on the cognitive assessment of past experiences and a supportive environment free of obstacles. In such an environment, individual interests are translated into career goals, which in turn result in career relevant actions. Decision-making is an iterative process where decisions are actually the sum of past experiences and choices (Lent et. al., 1994). Specifically, the decision to engage in one career path over another is a result of the development of social cognitive variables and process of interest formation, goal intentions and finally behavior.

The power of this approach is the ability to explain how career interests are developed over time and how goals and personal determination are translated into observable behavior through their influence on a person's belief system.

Empirical verification of SCCT is vast. An entire issue of *Career Development Quarterly* (Volume 44, Number 4) and *The Journal of Career Assessment* (Volume 10, Number 2) has been dedicated to the application of this theory. Multiple studies have verified the relationships of the cognitive variables on each part of the behavioral process as described above. The direct relationship between positive self-efficacy and high academic performance has been well documented (Lent, Brown, Gore, 1997; Schafers, Epperson, & Nauta, 1997; Srsic, 2000; Fouad, Smith, & Zao, 2002) similarly, the effect of athletics on positive self-efficacy and outcome expectations has also been studied in detail(Parkerson, 2002; Kornspan and Etzel, 2001; Paa, 2000, 2001). Recent studies have found a relationship between gender and self-efficacy with regard to technical-scientific and aesthetic domains (Huang, 1999). Other studies support the idea that self-efficacy can be improved through successful performance experiences (Hackett, Betz, O' Halloran, & Romac, 1990; Hackette & Campbell, 1987) and counseling (Brown, 1996; Luzzo, 1996).

D. CONCLUSION

The central and pressing need emerging out of the review of the literature on vocational development was the necessity for empirical investigation as to the applicability of these theories to the military. Previously very little research had been conducted specifically on military personnel and career development. Some theorists such as Holland have had personal experiences counseling military clients, experiences that they have undoubtedly folded into their theories, but few specifically addressed military concerns much less Naval Academy programs. Even the handful of empirical studies that included the military in the list of viable career alternatives after high school, did not include subsequent career choices within the military.

This empirical gap of military careers diminishes the validity of any association between the established theories and practical applications. This is not to say that the factors identified in these theories do not apply to those in the military, but that simply its application is limited by the lack of statistical verification or rigor. As a unique profession the very nature of work in the Military is different and the individual members are screened and selected from the general population. Although a reflection of society, the military is a unique

subset. The high survey participation and stable environment at the Naval Academy make this an ideal place to commence empirical studies attempting to extend these theories to the military

The focus of the theories already presented and their supporting studies are written for career counselors who provide guidance for individuals with specific career concerns. These counselors are often forced to work only with the individual that comes to them seeking guidance. As such, the theories do not normally consider the perspectives of the educational organization. This study takes a more balanced perspective and gives recommendations for both the individual and the organization.

III. RESEARCH METHODOLOGY

This chapter presents an overview of the Summer Training Program (STP) and develops the conceptual linkages between the program and the theories of vocations psychology previously introduced. Also introduced in this chapter are the statistical tools used to analyze the data presented in subsequent chapters. A thorough understanding of the STP, its organization and execution, will serve as the foundation for the application of the different theories presented in the previous chapter. In the second part of this chapter outlines the logitudial study of career choice. The third part explains the influence of the STP on the career development of midshipmen. Finally the study introduces the mathematical formulation that will be used in the regression analysis of subsequent chapters. Throughout the different sections in this chapter, vocational stability of midshipmen will be examined, the salient factors associated with the summer training experience will be identified, and their impact postulated from the concepts introduced in the literature review. The empirical verification of these theories will then be presented in subsequent chapters of this study.

A. SUMMER TRAINING PROGRAM

Every year at the Academy, midshipmen spend eight weeks of each summer in a rigorous training program. Each summer is a multifaceted experience that provides midshipmen a developmental opportunity. The first of four summer training experiences begins before the first academic year with Plebe Summer Indoctrination. The following summer midshipmen participate in third-class training; the third summer, second-class training and during the fourth and final summer, first-class training. Each year the training program offers midshipmen different experiences in preparation for graduation and commissioning. While plebe summer indoctrination and third-class summer training help prepare midshipmen for the Academy and the fundamentals of seamanship, respectively, the second-class and first-class summers exposes midshipmen directly to several warfare communities in the Navy and Marine Corps. As will be demonstrated below, these cruises give midshipmen the opportunity to interact with enlisted sailors and officers that have the most impact on warfare community preferences. A thorough understanding of the organization and nature of the training programs during the second-class and

first-class summers is vital in understanding how these programs influence career choice.

First- and second-class summers are organized into three four-week blocks. These training blocks begin after graduation, usually in late May, and extend till the Brigade reforms for classes in late August. To meet the goal of eight weeks of training every summer, two of the three blocks are dedicated to summer training. Each training block is modular and independent; they can be inserted into any of the three training periods in any order. This leaves one empty block that can be used for leave, summer school, or some other optional training. A typical Midshipman summer could begin with a surface cruise on a ship out of Sasebo, Japan several days after graduation, followed by a leave period for four weeks and then a PROTRAMID block starting in Norfolk, Virginia.

The summer training experiences for each of the 2,000 first-and Second-class Midshipmen is a unique experience. Assigning midshipmen to different operational ships in the Fleet is no easy task. Ship and submarine operational schedules are constantly in flux and do not subscribe to the four-week training block organization. Different ship types can accommodate different number of midshipman for training each summer. Ships are requested to provide input of how many midshipmen they can accept each summer. For example, an Amphibious Transport Ship which can carry 1,000 Marines is not limited by berthing space, but limited by the number of personnel available to train the midshipmen. On a smaller Cruiser or Destroyer there are many qualified personnel but these ships have very little space for extra midshipmen. On larger ships it is not uncommon to have about 30 midshipmen reporting at the same time for a cruise block while smaller Destroyers have about seven.

The process of assigning each midshipman a specific ship or boat during a specific cruise block starts several months before the summer. Midshipmen are asked to submit their preferences for ship or submarine, home port, and training block preferences. These requests are taken into consideration along with ship schedule and a midshipmen's OOM. Once these factors are weighed together each midshipmen is give a unique assignment for the summer. By the end of their academic year, midshipmen are issued their orders and sent out to all parts of the world to begin the summer training adventure.

Although the structure of both first- and second-class summer training are similar in organization, the training options for each year are very different. Second-class Midshipmen must complete a required "gray-hull cruise" and one additional training program to complete the eight weeks of required training. The "gray-hull cruise" gets its name from the time midshipmen spend onboard either a submarine or a ship, both of which are considered gray-hulls. Here, Second-class Midshipmen spend their four weeks in dungarees alongside an enlisted member of the crew or running-mate. This running-mate is assigned to help midshipmen adapt to shipboard life. Normally the running-mate is chosen from the division to which a midshipman is assigned and one running-mate is assigned to each midshipmen. This process is not unlike the running-mate assigned to any new sailor reporting to a ship for the first time. The goal of this process is to make these newly reported midshipmen members of the crew. Midshipmen are expected to work alongside their running-mates in the performance of their daily duties. The method of reporting to the ship and the type of work done on cruise is meant to provide midshipmen a unique perspective of the men and women they will eventually be leading after graduation as well as exposure to the Fleet.

First-class midshipmen also complete two four-month training blocks, but for first-class there are many more training options available. First-class do not have the "gray-hull cruise" requirement as in second-class year; instead, they are given another training period. For this period, First-class Midshipmen are asked to submit their preferences for summer cruise assignment. The choices range from a cruise on another surface ship or submarine, to an aviation cruise, Marine training, introductory Basic Underwater Demolition School (mini-BUDS) and several others. Although midshipmen are asked to submit a preference, not all midshipmen receive their first choice. Some summer training, such as BUDS, are very competitive, requiring a physical fitness test and admitting less than 10% of midshipmen who request the training. Other training programs, such as surface and submarine cruises, are less selective and open to both males and females. Regardless of the type of cruise, the focus of the training is different. For example, if a midshipmen chooses to return to a surface ship or submarine they are treated like a new junior officer vice a junior enlisted sailor. Their assigned running-mate is usually a junior officer or senior enlisted on the ship or boat.

These running-mates help midshipmen become part of the wardroom on a ship. The focus of the summer training during first-class year is on providing midshipmen a preview of life as an Ensign in these different warfare communities.

First-class and second-class training give midshipmen a balanced perspective of life in the Fleet. Regardless of which permutation of training programs and blocks, midshipmen gain an an appreciation of the men and women they will lead and serve alongside with shortly after graduation. Additionally this exposure to different platforms in the Navy also helps develop an understanding of Fleet operational capabilities which serve graduates well throughout their careers.

B. VOCATIONAL DEVELOPMENT OF MIDSHIPMEN

To understand *how* midshipmen develop their individual vocational preferences at the Academy, this study begins with an analysis of *when* midshipmen make these choices. Vocational stability as been addressed in several longitudinal studies discussed in the previous chapter. This study uses service assignment choice preferences for the class of 2001-2004 to explore the vocational choices of midshipmen.

Throughout their careers at the Naval Academy, midshipmen are asked to make their service assignment choices at three different times. At each choice-point (initial, tentative, and final), midshipmen are asked to select five different warfare communities in preferential order. The first choice-point or initial choice comes at the end of Second-class year. The last two "choice points" occur during the first-class academic year. The tentative choice is made shortly after retuning from first-class cruise; the final choice is made several months later in the middle of the first semester of first-class year. At each choice-point midshipmen are asked to select up to five different warfare communities in preferential order. In this study the first choice is used for each midshipmen at each choice-point.

The time interval (Δt) between the initial, tentative and final choice points are different. The time interval between the initial and tentative "choice points" (Δt_1) is about three months; the time between the tentative and final "choice points" (Δt_2) is about four months. The maximum time between "choice points" is between initial and final (Δt_3) or about seven months. Since midshipmen are

given several weeks to enter their preferences into the computer the time intervals given are approximate. We would expect changes in career choices to more pronounced during longer periods of time such as that between the initial and final choices (Δt_3) when compared to those with shorter time intervals Δt_1 and Δt_2.

Calculating the percentage of midshipmen that change their preferences between choice points we can measure the vocational stability of midshipmen. Since the initial and tentative choice-points span the First-class Summer cruise experience, the vocational stability of midshipmen across the initial and tentative choices (Δt_1) is of particular interest in determining the influence of the STP on vocational development.

C. INFLUENCE OF THE SUMMER TRAINING PROGRAM

Previously the influence of the STP had been assumed based on parallels of superficial similarities between civilian work-study programs and the STP. Armed with the concepts presented in the literature in vocational psychology, the validity of this assumption first introduced in Chapter I can be demonstrated. Similarly, using these same ideas the reason for limiting the scope of this work to first- and second-class, surface, submarine and aviation cruises can be justified. While different training blocks during third-class summer provide a similar opportunity for self-discovery it does not provide the direct ability to determine congruence between the warfare community and a midshipmen's personality traits. Alternately, using SCCT it was noted that first and second-class cruises provided an occupationally relevant activity which has been shown to have a positive effect on self-efficacy (Lent et. al., 1994; Bandura 1997). Time spent underway on an operational platform is more occupationally relevant than time on a Yard Patrol Craft.

For Holland, the experiences of the STP are seen as a tool for self-discovery. Full immersion into the different warfare communities allow midshipmen to develop personal opinions regarding these warfare communities and in turn learn about their own personal preferences. As Holland points out, the environment is not only composed of the physical surroundings but also the different personality types that operate in that environment. The time spent in the different communities allows each midshipmen to interact with the different

junior officers on the ship or submarine that form part of the environment described by Holland. With a better understanding of both P and E, midshipmen are in a better position from which to accurately asses their P–E congruence for each particular warfare community.

The STP also helps the individual define their cognitive map of all the different warfare communities and keeps midshipmen from drawing their "zone of acceptable alternatives" too narrowly around one option. Some midshipmen arrive at the Academy with a preconceived idea of which warfare community they want to select after graduation. These individuals usually desire high prestige type communities, as has been shown in several studies (Prediger, 1982). The summer cruise experience can serve to expand the zone of possible career alternatives to include all possible choices and thus prevent circumspection of viable career options. Summer cruise can serve to confirm or conflict with previously held sex-type or prestige-level ratings from different communities. For minorities, exposure to other minority officers in the Fleet could expand the perceptions of accessibility of the different warfare areas.

From a social-cognitive perspective, the STP is a particularly powerful experience. The time spent on cruise impacts all sources of self-efficacy and outcome expectations perviously discussed. The different tasks midshipmen perform on cruise such as standing watches alongside their running-mate, damage control drills, taking readings on machinery in the engine room, or simply driving the ship, provide performance accomplishments. These "direct personal performance experiences will account for more variance in self-efficacy than will vicarious, social persuasion, or physiological reaction experiences." (Lent et. al., 1994, Hypothesis 10B) Similarly, outcome expectations are formed from the basis of these experiences. Running-mate interactions also have an impact, although to a lesser extent than direct experience, on self-efficacy. The most influential interaction would be between a junior officer running-mate and a First-class Midshipmen. This relationship could influence self-efficacy through vicarious learning and social persuasion sources. The lifestyle and experiences of the different junior officers and especially the running-mate provide midshipmen a vicarious source of self-efficacy. Conversations about career decisions with junior officers provides a social persuasion source of self-efficacy and outcome expectations, that would be more powerful than recommendations from more

senior officers. The perceived ship morale also influences both self-efficacy and outcome expectations. Midshipmen extrapolate from a perceived morale to an expectation of their own morale if they were to select that warfare community. Finally, physiological reactions such as sea sickness on a ship, claustrophobia on a submarine, the inability to equalize in a jet can also provide an impact on self-efficacy. However, these reactions tend to occur on an individual level and are difficult to detect from a macroscopic view of the STP. Outcome expectations are shaped by self-efficacy and past experiences. Because of the complexity of the summer cruise experience, SCCT provides the most robust explanation for how all the different experiences become factored into a final service assignment choice.

Summer cruise also allows midshipmen to develop their cognitive map of the different warfare communities by providing personal experiences that confirm or conflict with perceived reality. SCCT argues that occupationally relevant experiences (accomplishments and failures) will have a positive effect on self-efficacy beliefs. Thus a good cruise experience on a submarine will lead to increased self-efficacy about choosing submarine as a final warfare choice.

Whether through P–E congruence, a cognitive map, or self-efficacy and outcome expectations, the STP can be shown to influence career decisions of midshipmen. Of course, the same can be said of any experience provided over the course of the four years. However, given the unique nature of the program, and the number of midshipmen that participate in the program yearly this is the single most influential event in the four years at the Academy.

D. FACTORS IN SURFACE WARFARE CRUISES

Thus far the influence of the STP has been examined from a global perspective. Now it is necessary to examine the different components of the overall experience of the STP. To organize the investigation into the STP, this study identifies those factors that are platform-dependent and those factors that are midshipmen-specific. Platform-specific factors would include operational tempo, ship morale and platform type; midshipmen-specific factors include running-mate characteristics.

A ship's operational schedule dictates her daily routine; ships function differently while in port and at sea. While ships cannot stay deployed

indefinitely, the summer training office attempts to give midshipmen a balance by selecting ships that spend some time at sea and some time in port during the midshipmen's stay onboard. At sea there is a larger amount of time devoted to watch standing and operational training; in port, ship routine is dominated by maintenance or repair issues and training is usually done with simulators and lectures. Administrative demands also increase in port making it more difficult to gain an understanding of how the ship accomplishes its mission while pier side. The ship's schedule should obviously influence midshipmen perception of the surface navy. Additionally the Navy tracks the operational tempo of each service member for retention and pay purposes. Historically, this factor has been found to have a significant and positive impact on a midshipman's perception of the Surface Warfare (SWO) Community.

Running mates are expected to show the midshipmen around the ship and ease their transition into shipboard routine. The knowledge and ability of this person can play a significant role in a midshipman's summer cruise experience. Normally, most commands choose running mates that will help steer a midshipman down the right path and help make a positive first impression of the ship.

Each ship platform can be subdivided into one of four types: Cruiser, Destroyer, or Frigate; Carrier; Amphibious ship and Auxiliary ship. It is unclear which ship type will produce a specific experience – positive or negative – about the surface warfare community.

The command climate or morale of the ship is another aspect of shipboard life that midshipmen evaluate shortly after reporting aboard. This feeling is something difficult to measure and even harder to explain, but this climate permeates the attitudes of the sailors, officers and eventually the midshipmen. The crew's attitude toward their jobs speaks volumes about the community. As midshipmen spend time on their ships and gain the confidence of their divisions and wardrooms, they will gain an appreciation for the command climate of each ship.

Obviously, better summer cruise experience would be one that motivates midshipmen to choose SWO at the end of their four years at the academy. A statistical study of these summer training issues could be used to determine which factors, if any, in the training experience influenced midshipmen in their

decision to select Surface Warfare as a primary service assignment. This information can then be used to formulate policy in the summer training office of the Naval Academy and also be used in generating general fleet guidance to give midshipmen the most statistically favorable ship assignments and running mates for their summer cruise training.

E. STATISTICAL FORMULATION

The best statistical tool for understanding the complex relationship between the Summer Training Program and warfare community selection is a multivariate regression model. Multivariate models are designed to estimate the behavioral relationships between a set of independent and dependent variables. Each model has associated underlying assumptions and limitations in explaining the relationship between the variables.

When the dependent variable (DV) is modeled as a binary outcome the necessary assumptions about the error term in a linear probability model are not satisfied and researchers must resort to more complex nonlinear models (Bowman, 1998). The logistic regression model of the form

$$\ln\left(\frac{P_i}{1-P_i}\right) = \beta_k X_{ik} \tag{3.1}$$

transforms a binary or dichotomous outcome into a continuous outcome, bounded between zero to one. In Equation 3.1 P_i is probability number constrained to zero and one and β_0 is the error term.

Solving 3.1 for P_i we obtain:

$$P_{\mathrm{i}} = \frac{1}{1+e^{-(\beta_k X_{ik})}}. \tag{3.2}$$

This allows the researcher to study the impact of the independent variables on the probability of an outcome occurring. The advantage of this approach is that it presents a more accurate picture of the nature of the relationship being studied.

The logit parameters are estimated using Maximum Likelihood Estimation (MLE). While not shown here the $\hat{\beta}_k$ estimators are given by the area bound by P_i from $-\infty$ to $\beta_k X_{ik}$. Both regression types will be used in the analysis.

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IV. DATA SET AND METHODOLOGY

This chapter presents the study's empirical design and methods used in investigating midshipmen vocational development. From the factors previously identified, and the statistical tools already introduced, this chapter specifies a model that will be empirically tested in the following chapters. The supporting data for the model was obtained from several sources. The data from each source had to be modified to ensure compatibility and accuracy before being consolidated for analysis. This section describes the data as obtained from the original sources and gives a detailed account of all modifications made to obtain the analysis data set. Finally, descriptive statistics are calculated for each of the variables derived from the consolidated data sets.

A. HYPOTHESIS

As previously discussed, the primary objective of this study was to improve understanding of the vocational development of midshipmen at the US Naval Academy. This study has been shaped in large part by the data available and the literature review. The empirical research of this study uses both a longitudinal approach for measuring career interests and survey data on the STP to examine the influence of different factors associated with the program. The first portion of the study, the longitudinal approach, will help answer the question of *when* midshipmen make their career choices; the survey data will help explain *how* midshipmen make these choices.

In the literature, the repetition of the same vocational preference over a period of time (Δt) is commonly referred to as vocational stability. The more often students select the same career choice, the higher their vocational stability. Examining the career interest of midshipmen at different points during the last two years at the Academy will determine the vocational stability of midshipmen and answer the posed question of *when* midshipmen make career choices. For example, a significant change in inventoried career interests before and after a summer cruise would provide a measure of midshipmen vocational stability and help isolate which experiences during the last two years are the determining factors in the decision process. Additionally, this analysis will also test the conclusions of previous researchers (Hansen & Stocco, 1980; Lubinski, Benbow,

and Ryan, 1996; Swanson, 1999; Paa, 2000) who have measured vocational stability of civilian students. Specifically, the following hypothesis will be examined.

> *H_{0a}: Midshipmen warfare community interests are stable during the last year at the Naval Academy.*
>
> *H_{1a}: There is a significant change in the warfare community interests of midshipmen over the last year at the Naval Academy.*

These hypothesis can be tested by comparing the warfare community preferences at different points in a midshipman's time at the Academy. A simple cross tabulation of the number of midshipmen who changed their warfare preferences during the last two years at the Academy will prove or disprove the above hypothesis.

To answer the question of *how* midshipmen make their career choices is a bit more complicated. Based on the survey data and the literature review, the potential factors that influence a midshipman's warfare community choice were identified and operationalized. Using the statistical models already introduced this study examines the following postulated relationships among the variables:

> *H_{0b}: There is no relationship between a midshipmen's propensity to select Surface Warfare and their demographics, academic background, and the experiences of the STP*
>
> *H_{1b}: A midshipmen's propensity to select Surface Warfare is a function of demographics, academic background, and the experiences of the STP.*

To operationalize the above statements and test the relationships postulated, a dependent variable is created that reflects a midshipmen's propensity to select surface warfare. The independent variables were categorized into the following groups: demographics (represented by gender and ethnicity); academics (represented by major, gpa, and varsity athletics); and STP experiences (represented by ship operational tempo, running mate, ship morale and ship type). Using these variables, several statistical models will be estimated to predict the probability of a midshipman expressing a preference for the surface warfare community at the conclusion of the Summer Training Experience. Once the different factors have been operationalized into specific

variables, the regression models will yield estimators of the effect of each independent variable on the probability of selecting surface warfare.

B. DATA SOURCES AND PREPARATION

The data for both the longitudinal study and the survey analysis originated from two sources within the Naval Academy: the Office of Institutional Research (IR) and the Department of Professional Development (PRO DEV). IR contributed several data sets: the first contained the results of two summer training surveys conducted during the 2001-2002 and 2002-2003 academic years; the second included demographic information for each midshipman; and the third included the warfare community preferences for each midshipmen in the classes of 2000-2004. PRO DEV provided an Excel spreadsheet listing the summer training assignments for each Midshipman during the summers of 2001 and 2002. Table 1 lists a summary of the different data and their sources.

The longitudinal study used the demographic data, including academic information, and warfare community preferences for each Midshipman in the Classes of 2001-2004. Each type of information was combined using SPSS. Only the Classes of 2001-2004 were included in the analysis. Prior to the class of 2001, only the final warfare preferences for each midshipmen were obtained. This information prior to the Class of 2001 does not track the possible warfare preference changes for each midshipmen, and thus cannot provide any insight into this part of the study.

The survey analysis also uses various data sets, the most important of which is the survey data set. The information in the survey data set is based on self-reported data. Because the survey asked for each midshipman's opinions on several aspects of the summer training experience, midshipmen answers to the survey questions were based solely on their opinions and experiences. These questions did not attempt to assess any knowledge obtained from the training experience nor determine proficiency at any particular task.

Each summer cruise survey consisted of two parts: the first used 17 multiple-choice questions tailored specifically for First and Second-class Midshipmen but not specific to warfare area or training program; the second addressed each training program separately. For example, a first-clas or second-

class midshipmen who participated in a surface cruise would answer the same questions in the first part of the survey as any other midshipmen, but in the second part they would be asked questions tailored to their surface cruise. In this study only identification information is used from the first part of the survey, all other data are from the cruise specific portion of the survey. A copy of the full survey is included as Appendix A.

The first survey administered to the Brigade of Midshipmen was after the summer of 2001 during the 2001-2002 academic year. Thus, survey data before the 2001-2002 academic year was simply not available for this study. Similarly, the survey given after the summer of 2002 during the 2002-2003 academic year were not analyzed in this study. Table 1 shows the different Academy classes that participated in the summer 2001 and 2002 surveys.

Table 1
Summary of data sources by Naval Academy Class Year

	Naval Academy Class of				
Data	2000	2001	2002	2003	2004
First-class Cruise	Data not available	Data not available	2001 survey	2002 survey	Data not available
Second-class Cruise	Data not available	Data not available	Data not available	2001 survey	2002 survey
Community preference	Data Warehouse*	Data Warehouse	Data Warehouse	Data Warehouse	Data Warehouse*
Ship Class Type	Professional Development	Professional Development	Professional Development	Professional Development	Professional Development
Demographics	Data Warehouse	Data Warehouse	Data Warehouse	Data Warehouse	Data Warehouse
Academic Major, GPA	Data Warehouse	Data Warehouse	Data Warehouse	Data Warehouse	Data Warehouse
Varsity Athletic Status	Data Warehouse	Data Warehouse	Data Warehouse	Data Warehouse	Data Warehouse

* Denotes that only partial data was available at the time of this report.

While both the summer 2001 and 2002 surveys consisted of two parts, a common and cruise-specific part, there were several differences in the questions for each survey. The 2001 survey had different questions and different multiple-

choice answers than the survey given in 2002. The resulting data sets had to be coded such that data from one year could be compared and merged with the other data set.

The first step in transforming the survey data was to establish a naming convention for each question that reflected both the specific questions and from which part of the survey the question originated. For each question name, the first two letters designate the survey group from which the question was taken and the second two numbers reflect the question number in the survey. In this case *qn* was used to designate the general portion of the survey and *sr* for the surface cruise part. Since the questions in the surveys from year to year were not the same, the question numbers had to be relabeled before the files could be merged. A *_r* suffix was appended to the names of these questions that were coded indicating the change. Table 2 summarizes these name changes for the variables of interest in the survey data set.

Table 2
Original question names and re-coded names

	Variable name in the survey taken in the summer of		
Variable Label	2001	2002	Final Coding
Ship Name	surf1	surf1	sr01
Desire to select Surface Warfare based on summer training experience	surf3	surf3	sr03_r
Number of days underway	surf5	surf7	sr07_r
Number of days in a port other than homeport	surf6	surf8	sr08_r
Running mate was knowledgeable and experienced	surf7	surf11	sr11_r
Ruining mate was warfare qualified	surf8	surf12	sr12_r
Morale of the ship	surf13	surf16	morale

Once the questions in each data set were renumbered and new names assigned, the two data sets were split based on the differences between the first- and second-class cruises. The resultant four files contained only first or second-class data for each summer. For example, the first file contained all summer of

2001 first-class responses, the second contained all summer of 2001 second-class responses, the third contained summer 2002 first-class responses, and the fourth contained summer 2002 second-class responses. This allowed the different files to be combined and analyzed by class.

The sample for the two survey data sets consisted of 1,609 midshipmen in 2001 and 2,001 midshipmen in the 2002 survey. This initial sample was filtered until only those midshipmen who answered all the questions of interest, listed in Table 3, remained in the data set. Midshipmen answers expressing doubt or ambiguity were coded as missing and rejected from the data set. For example, Question 3 of the 2002 survey asked: "I want to go SWO based on my experiences this summer" and gave the following options "Yes, No, or Don't know". "Don't know" responses were initially assigned a value of 3, but coded as a missing value and eliminated from the analysis. Table 3 contains the sample size after the different cases for each question were deleted. In all, there were 605 First-class observations and 615 Second-class observations available after the deletion of ambiguous responses.

Table 3
Sample observations after the deletion of ambiguous responses

	2001 Survey		2002 Survey	
Criteria	1/C	2/C	1/C	2/C
Initial Sample	684	924	999	1002
Desire to select Surface Warfare based on summer training experience	351	736	255	413
Number of days underway	351	733	255	412
Number of days out of homeport	351	650	255	412
Running mate was knowledgeable and experienced	351	650	255	410
Ruining mate was warfare qualified	351	631	255	410
Morale of the ship	351	205	254	410

The demographic data set obtained from IR was already in SPSS format and required relatively simple modification. Since the variables in this data set were unique there was no need to re-code the variable names. In preparation

for merging the data sets, the variable label for alpha number, defined in detail later in this chapter, was modified to correspond to the name used in all other data sets. Demographic data for all valid cases, as described in Table 3, was available.

There were two sources of summer cruise assignment data. The first was from the survey question (sr01), the second from the Summer Training Assignment Data. The summer training office Microsoft Excel data file was transformed into an SPSS file. In SPSS, the data was restructured so that the training assignments for each block appeared as a different variable. Each variable from the Summer Training Assignment Data Set was compared to the self-reported data obtained from the survey (sr01). In cases were no ship name was indicated in the survey, Summer Training Assignment Data was used to augment the information. In cases where the data conflicted, the survey data (sr01) was assumed correct. The Summer Training Assignment Data Set indicated that some midshipmen (3%) participated in multiple surface cruises. This was a problem because for each midshipmen, the survey contained data for only one surface cruise. In these cases, this study assumes the self-reported ship name (sr01) to be correct, and that the answers to the questions such as ship morale (morale) were applicable to the same ship indicated in the survey.

Once the various data sets had been prepared they were merged into the survey data set. Using the SPSS program, each data merge used a key variable to limit and sort the new data. This specialized merge procedure ensured that only information for each of the 605 First-class Midshipmen and the 615 Second-class Midshipmen in the survey data set were imported. All other midshipmen data was excluded from the data set.

The compiled data set was then split into separate first-class and second-class data sets. This was done because of the significant differences in the STP for first-class and second-class midshipmen as described in Chapter III and to ensure that no information was lost. Two data sets were required to keep the different variables separate. Theoretically each midshipman in the class of 2003 (see Table 1) could have participated in both a first-class and second-class Surface Cruise and completed a survey each year. Without the two data-sets each independent variable would need to be coded twice, once for the first-class cruise and a second time for the second-class cruise. Throughout the remainder of the study,

all analysis and tabulated results were conducted on both the first-class and second-class data sets in parallel.

Figure 7 illustrates the flow of information from the different data-sets into the First- and Second-class Data-sets. Table 4 shows the different independent and dependent variables contained in the First- and Second-class data-sets. Table 4 also contains the source of each variable used in the study.

Figure 7
Creation of the final data sets for the first and second part of the study

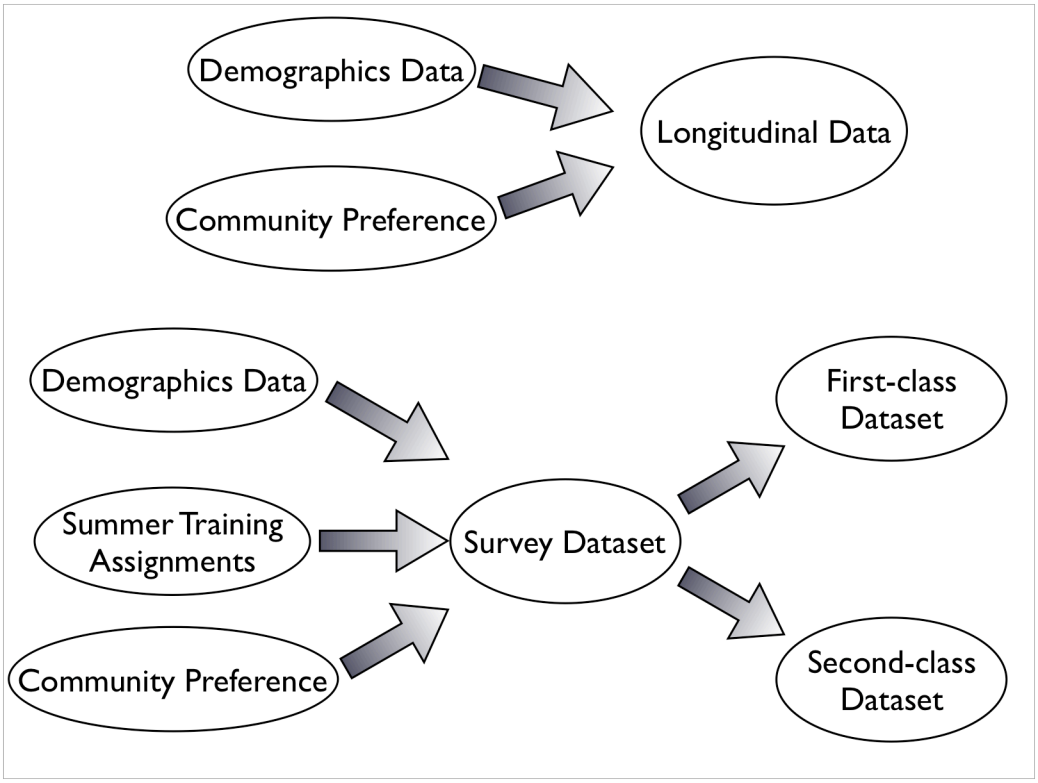

Table 4
Summary of original variables from combined data base

Resulting variables	Source	Variable Name	Possible Values
Alpha number	all	alpha_z	n/a
Desire to go SWO	Survey	sr03_r	1 - 2
Class graduation year	Dem.	gradyr	2000-2004
Academic Grade Point Average	Dem.	qpr	0 - 4
Academic Major	Dem.	major	n/a
Varsity Athletic Status	Dem.	var	0 - 1
Gender	Dem.	gender	n/a
Minority	Dem.	minority	n/a
Cruise Assignment	STA	actvy	n/a
Ship name	Survey	sr01_r	n/a
Days at sea	Survey	sr07_r	1 - 7
Days in port other than homeport	Survey	sr08_r	1 - 7
My running mate was knowledgeable and experienced	Survey	sr11_r	1 - 6
My running mate was warfare qualified	Survey	sr12_r	1 - 3
Ship morale	Survey	morale	1 - 6

Note: Survey is short for Survey data set, Dem. for Demographic data set, STA for Summer Training Assignments, and Pref. for Community preference data set.

C. VARIABLE DESCRIPTION

Once all the survey data had been consolidated, this study created the different variables needed to test the hypotheses. To express each occurrence of a warfare community preference, three dummy variables were created. Each dummy variable was assigned a value of zero and one depending on which community (surface, submarines, or aviation) it represented.

1. Warfare Preferences

In preparation for the cross-tab analysis the warfare community preferences for the class of 2000-2004 were coded into three warfare community variables: Surface (sr), Aviation (av), and Submarine (su). Each midshipman was given three different "choice points." To fully describe an individual midshipman's choice all three variables were required for each "choice point". The first set of variables: sr.1, av.1, and su.1, described the variables of the first

"choice point". The variables sr.2, av.2, and su.2 described the second "choice point" and sr.3, av.3 and su.3 for the third "choice point".

Each binary variable was assigned a value in accordance with the expressed warfare community preference of each midshipman. Both nuclear and conventional SWO's were assigned a value of 1" for sr and "0" for all other variables. Similarly, all aviators (both pilots and Naval Flight Officers) were coded "1" for the ar-variable and "0" for the sr-variable and su-variable. Submariners were assigned "1" for the su-variable and a "0" for all others. All options such as Marine Corps, Special Warfare, Medical, and Supply, were coded as missing variables and excluded from the analysis. For example, suppose a typical midshipman expressed an initial preference for aviation, a tentative preference for submarines and a final preference for surface warfare. These choices would be coded as: sr.1=0, av.1=1, su.1=0; sr.2=0, av.2=0, su.2=1; sr.3=1, av.3=0, sr.3=0.

To measure the stability of warfare preferences, this study compared the expressed preference for each Midshipman across two "choice points" over a specific period of time. Data limitations prevented using every class year in the cross-tabulations. For example, the class of 2000 only made one warfare community preference entry prior to graduation. Similarly, only the initial and tentative warfare preferences were available for the class of 2004 at the time of this study. Only the classes of 2001-2003 had data for the initial, tentative, and final "choice points".

Cross-tabulations, which showed the percentage of midshipmen who changed their warfare community preference, were calculated for the classes of 2001-2003. Since only partial data was available for the class of 2004, the change in warfare preference was only calculated between the initial and tentative preferences for the class of 2004. The class of 2000 was excluded from these calculations since there was only one warfare community preference for that class. Given the warfare preferences at three different "choice points" three combinations were possible. The first possibility was a comparison between the initial choice with the tentative choice; the second between the tentative and the final choice; the third between the initial choice and the final choice. The time between the initial choice and final choice (Δt_3) was about 18 months as described in Chapter III.

The coding by warfare specialty used above creates the ability to study the question of vocational stability along the lines of warfare community. Instead of asking the question "How many midshipmen change their warfare preferences?" this study can answer: "How many midshipmen changed their preferences to or from SWO or Aviation or Submarines?" Table 5 presents the percentage of midshipmen who changed their preferences by warfare community.

Table 5
Percentage of midshipmen selecting each warfare area by class year

Choice Points	USNA Class Year 2001	2002	2003	2004	Total Observations
A. Surface Warfare					
(sr.1) – (sr.2)	17.9%	13.1%	15.8%	15.5%	3,632
(sr.2) – (sr.3)	20.0%	17.7%	21.4%	N/A	2,905
(sr.1) – (sr.3)	23.1%	20.9%	24.3%	N/A	2,864
B. Aviation					
(av.1) – (av.2)	39.2%	43.8%	39.0%	33.4%	3,632
(av.2) – (av.3)	37.4%	38.2%	36.5%	N/A	2,905
(av.1) – (av.3)	34.3%	37.2%	35.6	N/A	2,864
C. Submarine Warfare					
(su.1) – (su.2)	13.7%	13.5%	11.9%	12.1%	3,632
(su.2) – (su.3)	16.6%	13.9%	13.8%	N/A	2,905
(su.1) – (su.3)	16.9%	12.5%	14.4%	N/A	2,864

NOTE: Class of 2004 Tentative and Final warfare choices were not available at the time of this study.

2. Dependent Survey Variables

The Summer Cruise Survey (sr03_r) reflected service assignment preferences at the conclusion of first and second class cruise. There was a subtle but significant difference between the nine variables that represent a midshipmen's warfare community choice and sr03-r. The survey question "Desire to go SWO" (sr03_r) asks midshipmen if they would want to select surface (yes or no); sr, av, and su were derived from the top warfare community choice from among all available options. The first method of obtaining warfare preference was obviously more leading and could influence the answers

provided to the questions. The answers to sr03_r, were coded Yes = 1 and No = 0. Table 6 shows the descriptive statistics for First and Second-class Midshipmen.

Table 6
Descriptive statistics of dependent variables for first-class midshipmen

Variable	Observations	Missing	Mean Value	Std. Deviation
sr03_r for First-Class	605	0	.30	.458
sr03_r for Second-Class	615	0	.16	.363

The data in Table 5 indicates that 30% of the midshipmen who participated in a first-class surface summer cruise expressed a desire to become a SWO. Only 16% of the midshipmen who participated in a second-class cruise would select surface warfare as their warfare community of choice. Previously the choice to split the data set by cruise experience was based on the nature and different objectives of each cruise. The data from Table 5 provides further empirical support for this choice and illustrates a measurable difference between the cruises.

3. Demographic Survey Variables

The demographic variables gender, minority status, varsity athletic status, academic major, and academic grade point average were coded as described below. Gender (male_r) represents a re-coding of the gender variable into a binary representation: Female = 0, Male = 1. Minority represents the official race/ethnicity status for each midshipmen in the data set. Non-caucasians of any race or ethnic group were coded as "1", while Caucasians were coded as "0." The resulting binary variable does not distinguish between the different minority groups in the sample. Varsity athletic status (varsity) represents midshipmen who have earned one or more varsity letters. Midshipmen with one or more varsity letters were coded "1" and those without a varsity letter were coded "0." The resulting binary variable does not distinguish between type of sport or number of varsity letters earned in a specific sport or the number of varsity letters earned in different sports.

The different academic majors at the academy were coded using the three variables: mjgp_1, mjgp_2, and mjgp_3. Each variable represents the different

classification of majors at the Academy. Engineering majors were classified into Group I, math and science majors were classified into Group II, and humanities/social science majors were classified into Group III. The specific majors and group classifications are listed in Table 7. The engineering majors were assigned a value of "1" in mjgp_1 and a "0" in both mjgp_2 and mjgp_3. Similarly the math and science majors listed in group two were assigned a value of "1" in mjgp_2 and a "0" otherwise. Finally, the humanities and social science majors were assigned "1" for mjgp_3 and a "0" otherwise. These three variables (mjgp_1, mjgp_2, and mjgp_3) did not distinguish between the different majors within each group.

Table 7
Academic majors listed by group at the Naval Academy

Group I (Engineering) Majors	Code		
Aeronautical Engineering	EAS	Astronautical Engineering	EASA
Electrical Engineering	EEE	General Engineering	EGE
Mechanical Engineering	EME	Naval Architecture	ENA
Ocean Engineering	EOE	Systems Engineering	ESE
Group II (Math/Science) Majors			
Chemistry	SCH	Computer Science	SCS
General Science	SGS	Mathematics	SMA
Oceanography	SOC	Physics	SPH
Quantitative Economics	SQE		
Group III (Humanities)			
Economics	FDC	English	HEG
History	HHS	Political Science	FPS

Cumulative Academic Quality Point Ratio (CAQPR) is a quantitative representation of a midshipman's cumulative academic grade point average. It is a continuous variable that ranges from 1.90 to 4.00. This variable includes only academic grades and does not account for military performance grades.

To facilitate some of the regression equations used later in this study, a second variable was created to represent the Cumulative Academic Quality Point Ratio for Midshipmen. Cumulative Academic Quality Point Ratio Re-coded (CAQPR_R) is also a continuous representation of a midshipmen's cumulative academic grade point average, but grouped in intervals of 0.25 CAQPR. Table 8 illustrates the ranges of CAQPR used and the associated CAQPR_R values.

Table 8
Cumulative Academic Quality Point Rating (CAQPR) and the coded values

CAQPR	CAQPR_R
4.00 – 3.75	10
3.74 – 3.50	9
3.45 – 3.25	8
3.24 – 3.00	7
2.99 – 2.75	6
2.74 – 2.50	5
2.45 – 2.25	4
2.24 – 2.00	3
1.99 – 1.75	2
1.74 – 1.50	1

Table 9 shows descriptive statistics for each of the demographic variables explored in this study. These statistics show that about 83% of the total population used in the study were male and 22% of the sample population were minority or non-Caucasian midshipmen. The percentage of varsity sports athletes in each sample was about 20%. The percentage of each midshipmen in the three types of academic majors was also calculated and listed. The engineering majors, Group III, were the largest group with 45% of the sample size and Group II majors were the smallest portion of the sample or about 25% of the sample. The demographics of all the different variables listed were similar from one class year to the next.

Table 9
Descriptive statistics of demographic variables

Variable	Observations	Mean Value	Std. Deviation
A. Statistics for First-Class Midshipmen			
male_z	605	.83	.499
minority	605	.22	.418
varsity	605	.20	.402
mjgp_1	605	.30	.458
mjgp_2	605	.25	.431
mjgp_3	605	.45	.498
aqpr	605	2.77	.438
CAQPR	605	5.62	1.76
B. Statistics for Second-Class Midshipmen			
male_z	615	.83	.347
minority	615	.19	.389
varsity	615	.17	.372
mjgp_1	615	.31	.464
mjgp_2	615	.24	.425
mjgp_3	615	.45	.498
aqpr	615	2.81	.503
CAQPR	615	5.74	2.033

4. Summer Training Program Variables

The Summer Training Program Experiences (represented by ship operational tempo, running mate, ship morale and ship type) were operationalized into seven variables based on the literature review and the questions from the survey data. Each variable was derived from survey questions and the information contained in the Summer Training Assignments database combined as already described.

Surface Operational Tempo (sr_ot) was a quantitative sum of two variables ("Number of days under way," sr07_r, and "Number of days in a port other than home port," sr08_r). In the survey, the answers to the questions asking for the "Number of days under way" and "Number of days in a port other than home port" were multiple choice. Each answer indicated a range of days that midshipmen were underway or out of homeport. These ranges were converted to actual days by using the scale listed in Table 10. Surface Operational

Tempo (sr_ot) was developed by summing the new values assigned to "Number of days under way" sr07_r, and "Number of days in a port other than home port" sr08_r. Surface Operational Tempo (sr_ot) represents the total number of days out of homeport or operational tempo of the ship during the midshipmen summer cruise it is a continuous variable that ranges from 0 to 54 days.

Table 10
Showing original and re-coded values for "Number of days under way" (sr07_r) and "Number of days in a port other than home port" (sr08_r)

Answer Values	Original values of sr07_r and sr08_r	coded values of sr07_r & sr08_r
> 25	1	27
20 - 24	2	22
15 - 19	3	17
10 - 14	4	12
5 - 9	5	7
1 - 5	6	3
0	7	0

Two survey questions addressed different aspects of the running mate assigned to each midshipmen. The first question (sr11_r) rated the perceived knowledge and experience of the running mate on a five-point scale ranging from "outstanding" to "terrible". The second question (sr12_r) asked midshipmen if their running mate was warfare qualified. For the first question, positive responses indicating a high level of satisfaction with the running mate's knowledge and experience were assigned a higher value than neutral or negative responses. In the second question regarding the running mate's warfare qualification, positive answers were coded as "1" and negative answers as "0". Any answers indicating "don't know" or "no opinion" were coded as missing for both questions and excluded from the analysis. The two variables were labeled as running mate Experience (srrun_ex) and running mate Qualification (srrun_qa).

The measure of ship morale was derived from a question on the surveys (morale) asking midshipmen to rate their ship's morale on a Likert scale.

Positive responses indicating a high level of ship moral were assigned a higher value than neutral or negative responses. For consistency, any answers indicating "don't know" or "no opinion" were coded as missing and excluded from the analysis. The resulting variable Ship Morale (morale) is a quantitative representation of a Midshipman's perception of the morale on their particular ship ranging from "1" to "5", with "1" representing ships with "terrible" morale and "5" ships with "outstanding" morale.

Ship name (sr01) was used to create four dichotomous variables representing four ship types. The different ship classes included in each of the four types are listed in Table 11. Amphibious ship type (gator), Cruiser or Destroyer ship type (crudes), Auxiliary ship type (aux), and Carrier (carrier) represent a re-coding of ship name (sr01_r). Ships in each class were assigned "1" for their corresponding type and a "0" for all other types. As in all other parts of the study, the ship type Carrier does not distinguish between nuclear and non-nuclear classes of aircraft carriers.

Table 11
Ship types and corresponding ship classes

Amphibious Ships Classes			
Wasp Class	LHD	Austin Class	LPD
Tarawa Class	LHA	San Antonio Class	LPD
Anchorage Class	LSD	Blue Ridge Class	LCC
Whidbey Island Class	LSD		
Cruiser, Destroyer, or Frigate Ship Classes			
Arleigh Burke Class	DDG	Ticonderoga Class	CG
Oliver Hazard Perry Class	FFG	Spruance Class	DD
Carriers			
Enterprise Class	CVN	Kitty Hawk Class	CV
John F. Kennedy Class	CV	Nimitz Class	CVN
Auxiliary Ship Classes			
Supply Class	AOE	Sacramento Class	AOE
Safeguard Class	ARS	Avenger Class	MCM

Descriptive statistics for the Summer Training Program Variables were: Surface Operational Tempo (sr_ot), Running Mate Experience (srrun_ex), Running Mate Qualification (srrun_qa), Ship Morale (morale), Amphibious ship type (gator), Cruiser or Destroyer ship type (crudes), Auxiliary ship type (aux), and Carrier (carrier). Their descriptive statistics are contained in Table 12. The mean values listed for each of the variables provide insight into the summer training program for each class. Surface Operational Tempo (sr_ot) Variable shows that First-class Midshipmen on Surface Cruise spend an average of about 17 days underway and Second-class Midshipmen spent about 16 days underway. The average time out of home port for Second-class Midshipmen on cruise was about 17 days. A mean value of 4.07 (based on a scale of 1 to 5) for Running Mate Experience (srrun_ex) indicates that the average midshipmen agreed that their running mate was knowledgeable and experienced. Similarly most midshipmen felt that their ship had "fair" morale based on the average value of Ship Morale (morale). Running Mate Qualification (srrun_qa) indicates that 57% of the First-class were paired with a warfare qualified officer and that 72% of the Second-class were paired with a warfare qualified enlisted Sailor. The large

difference in these values are that Second-class Midshipmen are paired with an enlisted running mate for cruise, while First-class are paired with junior officer running mates typically an Ensign or Lieutenant Junior Grade. The mean value listed for each ship type indicate the percentage of midshipmen that had a cruise on that type of ship; about 50% of the midshipmen on a surface cruise go to an Amphibious type of ship. Typically Amphibious transport ships have the larger berthing compartments that can accommodate several hundred midshipmen at one time. The next largest ship type is the cruiser destroyer type; this ship type accounts for about 40% of the midshipmen cruises. The remaining 10% of the midshipmen are split among auxiliary ships and carriers. The values shown in Table 12 are consistent with the expected values.

Table 12

Descriptive statistics of summer training program variables

Variable	Observations	Mean Value	Std. Deviation
A. Statistics for First-Class Midshipmen			
sr_ot	605	16.94	8.148
srrun_ex	605	4.07	1.045
srrun_qa	605	.57	.496
morale	605	3.01	1.147
gator	605	.50	.500
crudes	605	.41	.493
aux	605	.05	.217
carrier	605	.04	.191
B. Statistics for Second-Class Midshipmen			
sr_ot	615	15.66	8.661
srrun_ex	615	4.31	.908
srrun_qa	615	.72	.450
morale	615	3.01	1.147
gator	615	.55	.241
crudes	615	.37	.484
aux	615	.06	.241
carrier	615	.02	.144

These ten new variables created for this study could now be used to formulate the binary logistic regressions described above. Table 13 summarizes these new variables. By creating a dichotomous dependent variable (sr03_r) the binary logistic regression to help determine the effects of the various factors during the summer training. Using these variables the four model specifications can be discussed.

Table 13
Variables created for the study

New recoded variable labels	Variable Name	Variable Type	Possible Values
Desire to choose SWO	sr03_r	binary	0 or 1
First choice preference (taken during 2/C year)	srpref_2	binary	0 or 1
First choice preference (taken during 1/C year)	srpref_1	binary	0 or 1
First choice preference (final)	srpref_f	binary	0 or 1
Gender	male_z	binary	0 or 1
Minority	minority	binary	0 or 1
Academic Grade Point Average	qpr	scale	0 - 4.00
Academic Major	mj_gp	binary	0 or 1
Varsity Athletic Status	var	binary	0 or 1
Ship Morale	morale	scale	1 - 5
Ship Operational Tempo	sr_ot	scale	0 - 54
Running mate	sr_run	scale	0, 5, 10, 15, 20
Ship morale	morale	ordinal	1 - 5
Amphibious Transport Ship	gator	binary	0 or 1
Cruiser, Destroyer or Frigate	crudes	binary	0 or 1
Auxiliary Ship	aux	binary	0 or 1
Carrier	carrier	binary	0 or 1

D. RESEARCH METHODOLOGY

Using the variables listed in Table 13, this study creates several models used to explore the different hypotheses already postulated.

1. Community Preference

To test vocational interest stability of midshipmen (H_{0a} and H_{1a}) this study uses a series of cross-tab calculations and a LOGIT model. The cross-tab analysis

will showed the number of midshipmen that changed their declared first choice preference. The LOGIT model identifies the different demographic and academic factors that affects the choice of warfare community. Substituting the new variables into Equation 3.1 the following equation was obtained.

$$\ln\left(\frac{sr.1}{1-sr.1}\right) = \beta_1(male_z) + \beta_2(minority) + \beta_3(qpr) + \beta_4(mj_gp) + \beta_5(varsity) + e_i \quad . \tag{4.1}$$

In Equation 4.1 the dependent variable (sr.1) represents the first choice surface warfare community. The independent variables were derived from the data sets obtained from IR. The cross-tab and LOGIT analysis provided an indication of vocational stability and insight into the contributing factors of the final vocational choice.

The β coefficients were estimated by maximum likelihood techniques as previously described. The marginal effects for each variable was derived from the β coefficients associated with that variable as described in Chapter III. The marginal effects helped explain the effects of an incremental change in the independent variables (male_z, minority, qpr, mj_gp, and varsity) on the probability of choosing a given warfare community (sr.1).

2. Summer Cruise Factors

Another indication of midshipmen career preference can be obtained from the survey data administered to the classes of 2002-2004. Using the survey questions and the form of Equation 3.1, the following LOGIT specification can be expressed using the same independent variables as before:

$$\ln\left(\frac{sr03_r}{1-sr03_r}\right) = \beta_1(male_z) + \beta_2(minority) + \beta_3(qpr) + \beta_4(mj_gp) + \beta_5(varsity) + e_i \quad . \tag{4.2}$$

Equation 4.1 and 4.2 contain the same independent variables, but different dependent variables. In Equation 4.1 the dependent variable (sr.1) was taken from a list of warfare community preferences. In Equation 4.2 the dependent variable (sr03_r) was taken from a Yes-or-No survey question asking if a midshipman would choose to select surface warfare. A comparison of the β's

would indicate any differences in the way midshipmen respond to these questions.

The β coefficients in each of the above equations have a unique value. For example, the β_1 in both Equation 4.1 and Equation 4.2 is the Logit Coefficient for the variable male_z, but the value of β_1 in Equation 4.1 and Equation 4.2 would not be equal since the dependent variable is different. It is expected that the respective β coefficients to be similar in sign and significance in each equation.

Using the Survey information for first- and second-class, the following model isolated which characteristics of the summer cruise were meaningful in the development of career preferences:

$$\begin{aligned}\ln\left[\frac{sr03_r}{1-sr03_r}\right] = {} & \beta_1(male_z) + \beta_2(minority) + \\ & \beta_3(qpr) + \beta_4(mj_gp) + \beta_5(varsity) + \\ & \beta_6(sr_ot) + \beta_7(sr_run) + \\ & \beta_7(morale) + \beta_7(gator) + \\ & \beta_7(crudes) + \beta_7(carrier) + \beta_7(aux) + e_i\end{aligned} \quad . \qquad (4.3)$$

In Equation. 4.3 the different survey factors are added to those in Equation. 4.2 to determine their impact on the choice of selecting surface warfare.

Marginal effects calculations were needed in nonlinear models because of their complexity. In a linear model the "marginal effects" are constant but in the nonlinear specifications the marginal effects change when the value of other independent variables are allowed to vary. The marginal effects for both Equation. 4.2 and Equation. 4.3 are calculated using the β coefficients and the probability that a midshipman will select a particular warfare community. The nonlinear or logit models were calculated using the three step method (Bowman, 1998). The first step was to calculate the product of the logit coefficient, β, and the mean of each independent variable, $\overline{X}$ then summing this value over all independent variables. For n independent variables this can be written as:

$$Z = \sum_{k=1}^{n} (\overline{X}_k + \beta_k). \qquad (4.4)$$

In the second step we calculated the probability for the entire model using:

$$P_{(y=1)} = \frac{1}{1+e^{-Z}}. \tag{4.5}$$

Finally we calculated the marginal effects for each independent variable;

$$\text{marginal effects} = \beta_k P_{(y=1)}(1-P_{(y=1)}). \tag{4.6}$$

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V. PRELIMINARY DATA ANALYSIS

This chapter presents a preliminary statistical analysis on the career preferences and survey data using descriptive statistics and several univariate models. This section presents the results of several cross-tabulations on warfare community preferences and the Pearson Correlation (r) tests on the independent survey variables. These tests were designed to explore the initial questions regarding the timing and factors involved in the vocational development of midshipmen. Each statistical tool used a slightly different data set for its analysis. The cross-tabulations were based on all the warfare community selections for the classes of 2001-2003. In contrast, the Pearson Correlation (r) tests were based on the survey data for the classes of 2002-2004 and further limited to those midshipmen who answered all the questions of interest as described in Chapter III.

Cross-tabulations were used to determine the number of midshipmen who changed their first-choice warfare preferences during the last two years at the Academy. The three different choice points provided a reflection of interest stability over the last year in the Brigade. The first and second choice-points asked for community preference before and after the first-class summer training cruise, respectively. An examination of interest stability over this period would provide an indication of the impact of the First-class cruise and test the validity of the null hypothesis (H_{0a}).

The Pearson Correlation (r) tests determined the validity of the null hypothesis (H_{0b}) which claimed that there is no relationship between the warfare community preference and the chosen independent variables. Once the influence of the ten independent variables were examined with a univariate analysis, this study used the regression models previously described to understand the interrelationships among the variables and their impact on the dependent variable in combination with each other.

A. VOCATIONAL STABILITY OF FIRST-CLASS MIDSHIPMEN

Table 14 presents the percentage of midshipmen from the class of 2000-2003 who changed their first-choice warfare preference between the different choice points. The class of 2004 was excluded from this analysis because they

have not yet declared a tentative and final warfare preference. Any change in first-choice preference either *to* or *from* surface warfare, aviation, or submarine warfare was counted. For example, those midshipmen who initially indicated a desire to go SWO then changed to another community were added to those who indicated they did not want to go SWO then later listed SWO as their first choice. The resulting percentages do not indicate direction of the change in vocational interests but only the magnitude of the vocational stability. The higher the percentage the lower the vocational stability within the sample of 2,928 midshipmen.

Table 14
Interest stability between initial, tentative, and final choice points

Warfare Community	Change between Initial and Tentative	Change between Tentative and Final	Change between Initial and Final
Surface Warfare	11.7%	6.9%	14.7%
Aviation	16.1%	5.8%	18.1%
Submarine	8.2%	3.4%	8.9%

The results of the cross-tabulation shows only a 15% change between initial and final choice points for surface warfare. This means that for 85% of the midshipmen the first-class cruise experience had a relatively small impact on changing an individual's community choice. This high degree of interest stability supports the null hypothesis (H_{0a}).

Since only 11.7% of the midshipmen who considered surface warfare changed their warfare preference after the first class cruise, this study concludes that the first-class cruise experience had very little impact on warfare community choice. Further analysis of the first-class cruise would not yield any meaningful results because the data indicates that midshipmen formulate their opinions of warfare community some time before the first-class summer cruise experience. The small variance before and after the first-class cruise can not be explained by the events of the cruise itself and the significance of the variables associated with the cruise would not give any significant insight into the influence of the cruise on the warfare community selection process of each midshipman.

B. SECOND-CLASS CRUISE FACTORS

Focusing exclusively on the second-class cruise, this study examined the relationship between each independent variable and the dependent variable representing the desire to go SWO (sr03_r).

The Pearson's Correlation Coefficient (*r*) measured the strength or degree of linear relationship between two variables. The values for the Pearson Coefficient can range between -1.00 to +1.00. A correlation coefficient of 1.00 signified a perfect positive relationship, while -1.00 showed a perfect negative relationship. The smallest correlation between the variables is zero.

The validity of the null hypotheses (H_{0b}) is determined by the value of the correlation significance. A low significance level ($p < 0.05$) provided evidence of a statistically significant linear relationship between the two variables. A higher significance level ($p > 0.05$) would conclude that there is no indicated relationship between the variables and the null hypothesis (H_{0b}) is accepted for that value. The Pearson's (*r*) model tests each variable individually at different points during a midshipmen's time at the Academy. This test does not analyze the effect of each variable in combination with others. Despite the correlation significance for each variable, the Pearson Correlation Test results presented in this chapter will not change the linear and binary logistic models already derived. The linear and binary regression models presented later in this study will account for the interrelationships between the different variables.

1. Demographic Variables

The relationship between each demographic variable—male, minority status, varsity athletic status, academic major, and academic grade point average—and the different dependent variables for first- and second-class were tested. The results of these tests are listed in Table 15.

Table 15

Pearson Correlation (*r*) statistics for demographic variables of second-class midshipmen

Variable	r Value	SE	Significance
Female	-.155	.047	.000**
Minority Status	.480	.043	.230
Varsity Status	.001	.040	.981
Group 1 Major	-.087	.037	.032**
Group 2 Major	.046	.042	.254
Group 3 Major	.041	.041	.305
AQPR	.47	.043	.242

* Denotes statistical significance to the 0.1 level

** Denotes statistical significance to the 0.05 level

Based on the data in Table 15, this study rejects the null hypothesis (H_{0b}) for Male and Group 1 (engineering) Major when compared with the self-reported survey answers (sr03_r). The sign of the Pearson (r) value indicates that females and Group 3 (Humanities) majors were more likely to select SWO. Group 1 (Engineering) majors were less likely to express a desire to join the surface warfare community at the conclusion of the second-class Summer Training program.

2. Summer Training Variables

The summer training variables (running mate knowledge, running mate qualification, ship morale, ship type, and operational tempo) were each tested against the independent variable for both first- and second-class Cruise experiences. The results are listed in Table 16.

Table 16

Pearson Correlation (*r*) statistics for the summer training variables of second-class midshipmen

Variable	r Value	SE	Significance
Operational Tempo	.018	.036	.648
Running Mate Exp.	.117	.030	.004**
Running Mate Qual	.090	.036	.026**
Ship Morale	.210	.035	.000**
Amphibious Ship	-.073	.040	.070*
Cruiser/Destroyer	.066	.041	.130
Auxiliary Ship	.038	.045	.341
Carrier	-.032	.030	.427

* Denotes statistical significance to the 0.1 level

** Denotes statistical significance to the 0.05 level

Table 16 shows that Running Mate Experience, Running Mate Qualification and Ship Morale were significantly correlated with career choice. Midshipmen who reported observing positive ship morale on their ship were more likely to select SWO as their first choice warfare community after the summer training experience. Similarly, the positive Pearson (r) value for Running Mate Experience and Qualification indicate that these factors were positively correlated with the expressed decision to select surface warfare.

C. SUMMARY OF RESULTS

The most interesting results of the preliminary analysis was the finding that midshipmen career choices were relatively stable after the second semester of second-class year. For most midshipmen, their career choice is formed by experiences before the second half of the second-class year. Whatever factors impact the vocational development of midshipmen, this process remains relatively stagnant in the last year and a half of the Academy. This finding alone has a profound impact on the rest of the study. Specifically, the fact that first-class cruise has relatively little impact on a midshipmen's warfare community preference has significant impact on the model developed to help explain the influence of the summer training. Since the majority of midshipmen make their choice of warfare community independent of the first-class cruise experience,

any relationship between the summer cruise variables and the warfare community choice variables in the model are confounded by factors outside the training. There is little value in exploring these relationships, consequently the survey data from the first-class cruise experience is rejected from further analysis.

The conclusion of vocational stability after the middle of second-class year also highlights a significant gap in the data. The first two years at the Academy could be the most critical time for vocational development of midshipmen. These initial years at the academy could be the formative years during which midshipmen are making the career decisions of a life time. Unfortunately, no data is currently available to help identify exactly when midshipmen make their choice of warfare community. Some studies (Dinklage, 1968; Place, Payne, & Rinehart, 1996) suggest that gifted students make career decisions as early as during the high school years. Given the lack of data from which to help support or reject these findings for midshipmen, this study used the earlest data available and assumed that the second-class cruise had a significant impact on career interest and vocational development.

The second part of this chapter, the univariate analysis of the second-class survey data, indicated that gender, academic major, running-mate qualification/experience, and ship morale had an impact on the desire to select surface warfare at the conclusion of the summer training. Although these variables were considered independently in a univariate statistical analysis, all factors previously identified were examined in the final LOGIT model which considered the influence of all factors in combination with each other.

VI. RESULTS OF THE MULTIVARIATE MODELS

This chapter presents the results of the statistical analysis on several models of vocational choice and Summer Training for midshipmen. As previously explained, for most midshipmen the career choices made by the end of their second-class year were final. Midshipmen career choices were made based on factors or experiences before the end of second-class year. To help understand how this initial warfare choice was made this study used demographic and academic factors which characterized midshipmen prior to the first choice-point during the second semester of the second-class year. For example, the first part of this chapter identifies whether sex, minority status, varsity athletic status, academic major and academic grades impact the initial choice of warfare community. The second part of this chapter explores how midshipmen select one warfare community over another based on the experiences of the second-class cruise in addition to the demographic and academic factors examined in the first part of the study.

Several logit models were estimated to predict the probability of selecting a particular warfare community based on the factors discussed alone. This multivariate approach considered the effect of each factor, holding constant the effects of other factors. The models used in the first part include factors which are not unique to the second-class year such as demographics and academics. The second part includes the survey data for second-class midshipmen and determined which experiences on the second-class cruise influenced the choice of warfare community. It is important to note that the results derived from the survey data and included in the second part of this chapter were not based on a representative sample of the whole Brigade. A detailed statistical explanation of this limitation is presented as Appendix B.

A. COMMUNITY PREFERENCE FACTORS

The threshold of significance for the coefficients in the logit models are similar to that for the Pearson Correlation's (r) in Chapter V. A low significance level ($p < 0.05$) provides evidence of a statistically significant relationship between the variables. The statistics for these variables are shown in bold in the following tables. A higher significance level value ($p > 0.05$) means we cannot reject the

null hypothesis. In several cases, the relationship between the variables exhibit weak significance indicated by a significance level (p) value less than 0.01 but higher than 0.05. The marginal effects of each variable provides insight into the magnitude of the relationship between the independent and dependent variables as explained in Chapter IV.

1. Surface Warfare Community Preference Factors

In the first logit model, the dependent variable is "sr.1". As previously defined, this variable was coded as "1" for all midshipmen who selected surface warfare as their initial first choice warfare community, and a "0" for all other community choices. The independent variables for this model included demographic and academic factors of sex, minority status, varsity sports participation, graduation year, major and APR. These variables were defined in Chapter IV. Graduation year was included in this analysis to capture changes in preferences over time. Table 17 shows the regression results.

Table 17
Logit regression for initial surface warfare preference (sr.1)

Variable	LOGIT	Marginal effect	Significance
Male	**-1.061**	**-0.123**	**0.000****
Minority status	**0.305**	**0.035**	**0.009****
Varsity status	0.099	0.012	0.366
CAQPR	-0.031	-0.004	0.214
Group II major	**0.511**	**0.059**	**0.000****
Group III major	**0.619**	**0.072**	**0.000****
Grad. year	0.001	0.000	0.987
Constant	-2.559	-0.296	0.976

Note. Neglekerke R^2 = .07. Chi-square value = 148.91.
*p < .01. **p < .05.

Table 17 shows that sex, minority status and academic major were significant factors in predicting the choice of warfare community. The negative value of the logit coefficient for the variable male indicates that male midshipmen were less likely to express a preference for the surface warfare community. In other words female midshipmen were more likely to select surface warfare as a first choice preference. The value of the logit for minority status variable indicates that minority midshipmen were more likely to select

surface warfare as their first choice of warfare community. Similarly nontechnical (Group II and Group III) majors were also more likely to select surface warfare when compared to Engineers (Group I) majors.

2. Aviation Community Preference Factors

The second logit model uses the dependent variable "av.1". This variable was coded as "1" for all midshipmen who selected aviation as their initial first choice warfare community and a "0" for all other community options. This model used the same combination of independent variables as the first model. Table 18 shows the regression results.

Table 18
Logit regression for initial aviation warfare preference (av.1)

Variable	LOGIT	Marginal effect	Significance
Male	0.006	0.001	0.953
Minority status	**-0.355**	**-0.081**	**0.000****
Varsity status	**-0.274**	**-0.063**	**0.001****
CAQPR	0.008	0.002	0.675
Group II major	**-0.351**	**-0.080**	**0.000****
Group III major	**-0.306**	**-0.070**	**0.000****
Grad. year	-0.038	-0.009	0.206
Constant	76.602	17.512	0.208

Note. Neglekerke R^2 = .13. Chi-square value = 53.04.
*$p < .01$. **$p < .05$.

Table 18 shows that minority status, varsity status and major were significant factors in choosing the aviation community. Minority and varsity midshipmen were less likely to select aviation warfare than whites and varsity athletes. Group I engineering majors were more likely to select aviation when compared with the other majors.

3. Submarine Community Preference Factors

The third logit model used the dependent variable "su.1". This variable was coded as "1" for all midshipmen who selected the submarine community as their initial first choice warfare community and a "0" for all other community options. This model used the same combination of independent variables as the first and second model with one exception, the male variable. Since no females

are allowed to select submarine warfare as a warfare preference, the gender variable was excluded from this model. Table 19 shows the regression results.

Table 19
Logit regression for initial submarine warfare preference (su.1)

Variable	LOGIT	Marginal effect	Significance
Minority status	0.330	0.038	0.013
Varsity status	0.016	0.002	0.899
CAQPR	**0.157**	**0.018**	**0.000****
Group II major	**-0.451**	**-0.052**	**0.000****
Group III major	**-1.087**	**-0.126**	**0.000****
Grad. year	-0.010	-0.001	0.830
Constant	16.934	1.961	0.853

Note. Neglekerke R^2 = .07. Chi-square value = 2676.97.
*p < .01. **p < .05.

Table 19 shows that Academic QPR and academic major were significant factors in choosing the submarine community. Midshipmen with higher academic QPRs were more likely to select the submarine community as their first choice. The negative value of the coefficients indicated that nontechnical majors (Group II and Group III) were less likely to select the submarine warfare community. Similarly engineering majors (Group I) were more likely to select submarine warfare. Of the three logit models, these results were the most predictable and expected.

B. SECOND-CLASS CRUISE EXPERIENCE

The second part of this chapter examines the different aspects of the surface summer cruise experience. The data for this part comes from the second-class data set derived in Chapter IV. Only data from the classes of 2001-2002 second-class year were included in the analysis. Second-class year was chosen based on the result of the cross-tab analysis which showed that for 85% of the midshipmen warfare community choices remained the same following the first choice-point in the second semester of the second-class year. This study assumed that the second-class surface cruise was more influential in the vocational development of midshipmen than the first-class cruise. Unfortunately, this

relatively small number of observations produces a non-representative sample of the population. Despite this drawback the following analysis yields some interesting results.

The dependent variable used in this section was the expressed desire to go SWO (sr03_r) from the Survey. As defined in Chapter IV, this variable had a value of "1" for all cases of midshipmen who answered "yes" to Survey Question 3, "Do you wish to select Surface Warfare?" Answers of "no" or "not sure" were coded as "0." The independent variables included the academic and demographic variables used above in Tables 16-19 and several factors unique to the summer cruise experience identified in Chapter III and defined in Chapter IV. The unique factors are: operational tempo of the ship to which midshipmen were assigned; running mate experience and qualification; ship morale; and ship type. Table 20 shows the regression results.

Table 20
Logit regression using desire to go SWO from survey question (sr03_r)

Variable	LOGIT	Marginal Effects	Significance
Male	**-1.014**	**-0.111**	**0.000****
Minority Status	0.175	0.019	0.553
Varsity Status	-0.145	-0.016	0.651
Group II Major	0.483	0.053	0.147*
Group III Major	0.483	0.053	0.103*
CAQPR	0.064	0.007	0.272
Operational Tempo	-0.003	0.000	0.805
Running Mate Exp.	**0.288**	**0.032**	**0.091****
Running Mate Qual	0.481	0.053	0.106*
Ship Morale	**0.468**	**0.051**	**0.000****
Amphibious Ship	-0.147	-0.016	0.563
Auxiliary Ship	0.182	0.020	0.696
Carrier	-1.313	-0.144	0.244
Constant	-4.647	-0.510	0.000

Note. Neglekerke R^2 = .07. Chi-square value = 55.46.
*$p < .01$. **$p < .05$.

The significance levels of the variables confirm that sex, running mate experience, and ship morale were significant factors in the career decision. Male

midshipmen are 14.2% more likely to express a preference for surface warfare when compared to female midshipmen. The most striking statistic was that those midshipmen who claimed to have experienced positive morale aboard their ship were 22.3% more likely express a preference for surface warfare following the training than those who experienced poor morale during their training.

Surprisingly, several factors were not statistically significant in the analysis. Ship type was not a significant factor in the desire to go SWO. Despite a great emphasis on the more glamorous Cruiser, Destroyer, and Frigate platform options, ship type had very little impact on a midshipman's desire to select surface warfare. Since second-class cruise is the first "fleet experience" for most midshipmen there is little basis for cross-platform comparisons. The timing of the survey also prevents different midshipmen from discussing their cruise experiences and vicariously learning from each other and possibly altering their perspectives on their experiences. These explanations also lead to the conclusion that the influence of ship type would increase over time especially during the first-class cruise experience. Operational tempo of the ship also had little impact on the preference for SWO. Previously it was thought that the underway experience during a summer cruise would be most influential and positive but the model shows that this factor was not significant.

C. SUMMARY

A review of the different demographic and academic factors used in the first part of this chapter showed that the same factors – gender, minority status, varsity status, CAQPR, and academic major – had different influences on the career choices of midshipmen. For example, in the two models where gender was considered, it was a significant factor for surface warfare but not a significant factor for aviation. Gender was not considered for Submarine Warfare due to the ban on women in the submarine community. However, there is no policy that explains why surface warfare appeals more to females than males. One possibility is due to recruiting efforts or the appeal of a relatively short training track, which leads to a more flexible career and increased career options over other communities, such as aviation. This finding is also consistent with other

studies on gender and self-efficacy (Huang, 1999; Hackett, 1985) indicating a propensity of men towards more technical-scientific related fields. This explains, surface warfare's natural appeal to women who view this warfare community as the less-technical choice.

Minority midshipmen were also more likely to choose surface warfare when compared to whites. The reasons for this tendency are unclear from the research. Again, one possibility is that minority students often have a lower self-efficacy toward career aspirations and select the less-technical or less academically rigorous career choice. Another possibility for the appeal of surface warfare to minority midshipmen are the self-efficacy and outcome expectations in the community. Simply put, diversity attracts diversity. The success of minority officers in the surface warfare community helps attract and motivate other minorities to choose that same community. According to the theory (Lent, Brown, and Hackett, 2000) the success of junior officers in this community affect choice actions and performance domains more than the success of senior officers in the fleet. Although the reasons for this behavior are not entirely clear, the statistically significant relationship between the variables can not be ignored.

The second part of this chapter included several second-class cruise variables. Of all the second-class cruise factors considered, ship morale was the dominant variable. Based on the relative value of the coefficient in the final model, ship morale was almost twice as important than the next significant variable, running mate experience. Although it would seem obvious that midshipmen who observed good ship morale on cruise would want to join the surface warfare community, theoretical explanations were not clear-cut. Only Social-cognitive theory contains the framework for this type of relationship between the observed environment and future behavior.

Finding that some variables were not significant in the model was an interesting result. The study on the second-class cruise variables indicated that neither ship type nor underway time were significant on the choice of warfare community. This results were unexpected. Sending midshipmen to older and less glamorous amphibious ships has been seen as a logistical necessity rather than the optimal choice for recruiting midshipmen for surface warfare.

This study shows that where midshipmen go on cruise and what the ship does once they get there are less important than the morale of the crew and

wardroom on the ship. Again, Social-cognitivie theory is the only one of the three theories that appears to explain this finding. For most midshipmen, their summer cruise is their first experience with the Navy outside the Academy. Although most understand the technical differences among ship types, most do not have a reference point from which to compare the different lifestyles or missions associated with each ship type. Without an ability to make comparisons there is no real source of self-efficacy or outcome expectations, thus the impact on activity selection and subsequent choice actions is minimal. In effect, an amphibious transport ship for summer cruise is as good as a new destroyer.

VII. CONCLUSIONS

This chapter summarizes the main contributions of this study, discusses some of the open problems in the area and identifies opportunities for future work. This study has presented two approaches to understanding career development in midshipmen. At the individual level, this study offered three theoretical approaches to vocational development. Trait-Factor, Developmental, and Social-cognitive theories were chosen for this study based on their applicability to the vocational development of students between late adolescence and early adulthood and their possible application to the military in general and to midshipmen. At the group level, this study used survey data to verify the proposed relationships between different factors of the summer cruise experience and vocational choices.

A. SUMMARY OF FINDINGS

The focus of this study was an improved understanding of vocational development of midshipmen at the Naval Academy. To these ends, different theoretical models were used to help explain the observed behavior of midshipmen. Not surprisingly, the different models provided different degrees of usefulness. The Social-cognitive model was particularly useful in interpreting the quantitative results throughout this study. The experiences of the Summer Training Program and its influence on the individual midshipmen is best understood through the context of self-efficacy and the application of reciprocal determinism. These ideas above others help place these experiences in the larger context of career development at the Naval Academy.

From the empirical portion of this study, the most interesting conclusions are not *how* midshipmen make career choices but rather *when* they make these choices. This study showed that less than 25% of midshipmen change their first choice warfare community preference after second-class year. Unfortunately, no warfare community preference data was available for third- and fourth-class midshipmen. This made it difficult to determine exactly when midshipmen make their career choice or even if these choices were made before being admitted to the Academy.

Another interesting finding from the empirical data is the significance and relative importance of the different characteristics of the summer training program. Ship morale consistently emerged as the most meaningful variable in all models in which it was included. The logit coefficient for ship morale was almost twice as large as the next most significant variable. This finding along with the the other results of the multivariate models help establish and validate the utility of the social-cognitive theory and specifically the concept of self-efficacy. Equally interesting was the fact that ship type, operational tempo and running mate qualification were not found to be significant factors in the regression. Again these factors we

B. PROBLEMS AND RECOMMENDATIONS

A problem encountered during the research was a realization that the different theories selected were initially developed to help counselors identify the factors that might influence the process of vocational development in their clients. In this study, these theories were applied to help understand the relationship between summer cruise experiences and warfare community selection. A problem that arises with this approach is that the theories employed were never intended to predict group behaviors. The theories were derived from the literature and individual experiences of counselors in helping students and adults facing career decisions, and their application was not intended for the Brigade. Despite this liberal application, the theories provided direction and insight throughout this study.

There are several issues this study was unable to analyze. The initial vision of incorporating the findings of previous studies predicting warfare community selection (Gille 2002, Bowers 2002) to form a model of midshipman career development did not come to fruition. Future research in this area is needed before a working theory can be formulated. Another question left unanswered is: When do midshipmen make their career choices? From the data available, this study only found a high stability of interest among first-class and second-class midshipmen. This study did not reveal at which point midshipmen made their career choices. There is no doubt that with time and continued study these research issues can be overcome and a full theory of midshipmen career development can be formulated and tested.

C. RECOMMENDATIONS FOR FUTURE RESEARCH

Throughout any study of this type there emerges the obvious need for continued research into this field. Based on the findings of this study, future research into vocational development at the Academy must consider the importance of self-efficacy and outcome expectations on career choice. Although programs and policies change from year to year at the Academy, continued research would provide a better understanding of the process of vocational development. The ultimate goal of future research would be to generate a new theory, or modifying existing theories, to explain vocational development in midshipmen at the Naval Academy.

One common problem that plagues all researchers is the availability of data. Before any future research can be done, there is a need for more data on midshipmen career preferences from admissions to commissioning. Surveys designed to assess the career preferences of midshipmen should include an "undecided" option. From a researcher's point of view, a midshipmen's indecision regarding career choices is as important as their final warfare community choice. Their indecision could be a function of midshipmen lacking sufficient information about the different warfare communities or a lack of self-efficacy regarding the different warfare communities.

Similarly, the summer cruise survey must be carefully revised. There is a strong temptation to make radical changes to the survey or to start anew, but this would be a mistake. The ability to use data from past classes is priceless when analyzing future changes in the training program. Specifically, questions about ship morale and running mate qualification should not be removed from the survey. Since self-efficacy and outcome expectations have an impact not only on career choice but also on future performance, future surveys must attempt to measure these mechanisms before and after the summer training experience.

The summer training program must have clearly stated objectives that include the vocational development of midshipmen. Because an individual's perception about their own capabilities impacts their ability to accomplish certain tasks, exposure to the fleet builds the required confidence. No matter what midshipmen choose to do in the fleet, their summer training experiences will help them form their opinions about themselves and their abilities. These opinions ultimately have an impact on career choice. The summer cruise

program should include providing these positive experiences as an objective of its training. At the same time, the program must not lose sight of its principle objective: to offer a leadership experience and stimulate a desire for serving in the fleet. Balance between these two often conflicting interests is important. Any policy changes to the summer training program must be made with an understanding of SCCT and the underlying factors that affect career choice.

APPENDIX A

FIRST CLASS SURVEY

Part I: The Influence of Summer Training on Service Assignment

1. Before your summer cruise, what were you most seriously considering for your service assignment?

_ Aviation

_ Special Operations

_ Special Warfare

_ Submarines

_ Surface

_ Marine Corps

_ Restricted line (CEC, medical, intelligence, crypto, etc.)

_ Other (please specify)

_ I had not decided

2. As a result of your summer cruise experience, what service assignment are you now most seriously considering?

_ Aviation

_ Special Operations

_ Special Warfare

_ Submarines

_ Surface

_ Marine Corps

_ Restricted line (CEC, medical, intelligence, crypto, etc.)

_ Other (please specify)

_ I had not decided

3. If your service assignment preferences changed as a result of the summer experience, was it due to a positive or negative experience?

_ It was a positive experience.

_ It was a negative experience.

_ I am not sure.

_ I did not change my preferences.

_ No opinion

4. If your service assignment preferences changed as a result of the summer experience, please choose the most prevailing reason.

_ Ship/unit morale

_ Overall cruise experience

_ Running mate

_ Operations

_ The community was different than I had envisioned

_ Other (please specify)

_ I have not changed my mind from before the cruise

Part II: Cruise Selection

5. The screening process for determining summer cruise assignments was fair.

_ Strongly agree

_ Agree

_ Neither agree nor disagree

_ Disagree

_ Strongly disagree

_ No opinion

6. Did you receive your primary summer training preferences?

_ I participated in one training block and I received my primary summer training preference.

_ I participated in two training blocks and I received one of my primary summer training preferences.

_ I participated in two training blocks and I received both of my primary summer training preferences.

_ I participated in three training blocks and received only one of my primary summer training preferences.

_ I participated in three training blocks and received two of my primary summer training preferences.

_ I participated in three training blocks and received all three of my primary summer training preferences.

_ I did not receive any of my primary summer training preferences.

_ No opinion

Part III: General Fleet Questions

7. My fleet cruise command's overall MIDSHIPMEN TRAINING PROGRAM was

_ Outstanding

_ Good

_ Fair

_ Poor

_ Terrible

_ No opinion

8. I look forward to entering the Fleet as a result of my summer cruise experiences.

_ Strongly agree

_ Agree

_ Neither agree nor disagree

_ Disagree

_ Strongly disagree

_ No opinion

Part IV: Effectiveness of the Midshipmen Liaison Officer (MLO)

9. My Midshipman Liaison Officer had a well-organized plan for my cruise.

_ Strongly agree

_ Agree

_ Neither agree nor disagree

_ Disagree

_ Strongly disagree

_ No opinion

10. When required, about how often did the MLO help you with travel arrangements?

_ Always assisted me

_ Frequently assisted me, but some things I needed to do on my own

_ Sometimes assisted me < tr>

_ Seldom assisted me; I had to do most of the arrangements on my own

_ I never received the help I needed

_ I did not require travel arrangements from the MLO

_ No opinion

11. When required, about how often did the MLO help you with ship/ squadron arrangements?

_ Always assisted me

_ Frequently assisted me, but some things I needed to do on my own

_ Sometimes assisted me

_ Seldom assisted me, I had to do most of the arrangements on my own

_ I never received the help I needed

_ I did not require travel arrangements from the MLO

_ No opinion

12. The MLO was accessible and easily contacted.

_ Strongly agree

_ Agree

_ Neither agree nor disagree

_ Disagree

_ Strongly disagree

_ No opinion

13. I was given the name and pager or phone number of my MLO.

_ Yes, I was given the information.

_ No, I was not given this information.

_ Don't remember

Part V: Classroom Instruction Compared to Fleet Experience

14. The navigation skills I learned in my Naval Science courses helped me with shipboard watchstanding (surface cruise, sub cruise, YP and CSNTS experiences).

_ Yes, most of the skills I learned in class were directly related to shipboard application.

_ Yes, many of the skills I learned in class generally helped with my understanding.

_ The skills I learned neither helped nor hindered my shipboard experience.

_ No, the skills taught in class had only minor relevance to shipboard application.

_ No, the skills taught were outdated and not in practice.

_ I did not participate in any navigation exercises.

_ No opinion.

15. Rate your observation of ethical practices in the Fleet.

_ Ethical practices were exceptional; I witnessed no instances of unethical behavior by officers or enlisted personnel.

_ Ethical practices were high; I witnessed only minor ethical infractions by officers or enlisted personnel (please explain in the comments section).

_ Ethical practices were acceptable; I witnessed a few isolated ethical infractions by officers or enlisted personnel (please explain in the comments section).

_ Ethical practices were unacceptable; I witnessed many ethical infractions by officers or enlisted personnel (please explain in the comments section).

_ Ethical practices were abysmal; I witnessed highly unethical behaviors in the daily routine (please explain in the comments section).

_ No opinion.

16. Rate the how the principles you learned in your Naval Leadership courses applied to the officer-enlisted relationships you witnessed in the Fleet.

_ The principles in the Naval leadership courses were directly related to the shipboard relationships.

_ The principles in the Naval leadership courses were generally associated with shipboard relationships.

_ The principles in the Naval leadership courses were somewhat aligned with shipboard relationships.

_ The principles in the Naval leadership courses were rarely associated with shipboard relationships

_ The principles in the Naval leadership courses are outdated and should be revised to reflect current practices.

_ No opinion.

17. Rate the extent to which you observed how much your running mate's daily routine included professional writing in carrying out his/her duties and admin responsibilities.

_ Most of the time

_ Often

_ Sometimes

_ Seldom

_ Never

_ No opinion

18. Based on your observations, how important do you think good writing skills are to a junior officer?

_ Critical

_ Important

_ Necessary

_ Not important

_ Insignificant

_ No opinion

19. My knowledge of all of the Naval communities and their relationship with one another allowed me to contribute to wardroom and crew conversations.

_ Strongly agree

_ Agree

_ Neither agree nor disagree

_ Disagree

_ Strongly disagree

_ No opinion

20. If you participated in (or observed) a fitness report review or a counselling session, rate how much it contributed to your professional development.

_ I witnessed one and I thought the experience was very beneficial to my professional development.

_ I witnessed one and I thought the experience was helpful to my professional development.

_ I witnessed one and I thought the experience was neither beneficial nor detrimental to my professional development.

_ I witnessed one and I thought the experience was not useful to my professional development.

_ I witnessed one and I thought the experience detrimental to my professional development.

_ A fitness review or counselling session was held, but I did not observe it.

_ No fitness reviews or counselling sessions were held while I was onboard.

_ No opinion.

21. If you participated in (or observed) a Captain's Mast, rate how much it contributed to your professional development.

_ I witnessed one and I thought the experience was very beneficial to my professional development.

_ I witnessed one and I thought the experience was helpful to my professional development.

_ I witnessed one and I thought the experience was neither beneficial nor detrimental to my professional development.

_ I witnessed one and I thought the experience was not useful to my professional development.

_ I witnessed one and I thought the experience detrimental to my professional development.

_ A Captain's Mast was held, but I did not observe it.

_ No Captain's Masts were held while I was onboard.

_ No opinion.

22. Rate your impression of an awards ceremony or a qualifications pinning ceremony that you witnessed.

_ The ceremony made me appreciate the importance of these events.

_ The ceremony improved my understanding of these events.

_ The ceremony had no effect on my perception of these events.

_ The ceremony did not seem important to the ship.

_ The ceremony had no significance.

_ A ceremony was held, but I was not in attendance.

_ No ceremony was held.

_ No opinion.

Part VI: Summer Training Web Site

23. The summer training web site was an effective tool in passing cruise and training embark/report information.

_ Strongly agree

_ Agree

_ Neither agree nor disagree

_ Disagree

_ Strongly disagree

_ No opinion

24. The summer training web site was easily accessed off the yard.

_ Strongly agree

_ Agree

_ Neither agree nor disagree

_ Disagree

_ Strongly disagree

_ No opinion

25. The information was kept current.

_ Strongly agree

_ Agree

_ Neither agree nor disagree

_ Disagree

_ Strongly disagree

_ No opinion

26. How often did you check the web page?

_ At least every week

_ Once every two weeks

_ Once a month

_ Just before a cruise

_ Once the entire summer

_ I did not access the web page at all.

_ I was not aware there was a web page.

_ Don't recall.

27. The information I needed from the web site was easy to find.

_ Strongly agree

_ Agree

_ Neither agree nor disagree

_ Disagree

_ Strongly disagree

_ No opinion

28. The Summer Training Office should use the web site next year.

_ Strongly agree

_ Agree

_ Neither agree nor disagree

_ Disagree

_ Strongly disagree

_ No opinion

Part VII: Communication and Organization of the Summer Training Office

29. Rate the effectiveness of the January intersessional summer cruise brief.

_ Outstanding

_ Good

_ Fair

_ Poor

_ Terrible

_ No opinion

30. Rate the effectiveness of the May intersessional summer cruise brief.

_ Outstanding

_ Good

_ Fair

_ Poor

_ Terrible

_ No opinion

31. Rate the overall effectiveness of the summer cruise assignment process, including entering your cruise preferences in MIDS and the allocation of cruise assignments.

_ Outstanding

_ Good

_ Fair

_ Poor

_ Terrible

_ No opinion

32. Were you issued a Summer Training Handbook?

_ Yes

_ No

_ Don't recall

33. Rate the usefulness of the cruise guidelines objectives contained in your Summer Training Handbook.

_ Outstanding

_ Good

_ Fair

_ Poor

_ Terrible

_ I was not issed a Summer Training Handbook

_ No opinion

34. Rate the usefulness of the Midshipman Summer Training Handbook in preparing you for your cruise.

_ Outstanding

_ Good

_ Fair

_ Poor

_ Terrible

_ I was not issued a Summer Training Handbook

_ No opinion

35. Rate the usefulness of the Midshipman Summer Training Handbook in addressing administrative matters.

_ Outstanding

_ Good

_ Fair

_ Poor

_ Terrible

_ I was not issued a Summer Training Handbook

_ No opinion

36. How often did you keep the summer cruise phone numbers on your person?

_ Always

_ Frequently

_ Sometimes

_ Seldom

_ Never

_ I did not have the summer cruise phone numbers.

_ No opinion

37. When you called the summer cruise phone numbers, how often did you reach someone?

_ Every time

_ Most of the time

_ Sometimes

_ Seldom

_ Never

_ I did not call the summer cruise phone numbers

_ No opinion

38. Did you have a personal cell phone with you throughout the summer?

_ Yes, and I could receive or make calls everywhere I was stationed.

_ Yes, but I could not receive or make calls everywhere I was stationed.

_ I have a personal cell phone, but I did not take it with me or use it while on cruise.

_ I do not have a personal cell phone.

_ Do not recall.

39. My summer cruise changed _____ times.

_ It did not change at all from the original arrangements.

_ 1 time

_ 2 times

_ 3 times

_ 4 times

_ 5 times

_ >5 times

_ Do not recall.

40. If your cruise assignment changed, how promptly were you notified of the changes?

_ Immediately

_ As soon as possible

_ Not very promptly

_ I was not notified in a timely manner

_ I did not have any cruise assignment changes

_ No opinion

APPENDIX B

This appendix describes the analysis used in determining whether the 615 survey responses used in this study were a representative sample of the entire population of midshipmen surveyed or not. There is no doubt that the number of survey responses considered were sufficient for the analysis conducted in the survey but this appendix demonstrates that the 615 responses considered were not a representative sample of the total population.

To determine the validity of the sample population, this study created a new variable called survey. This variable was assigned a value of "1" for all midshipmen whose survey responses were considered in the study and "0" for all midshipmen who did not complete the survey or whose responses were not considered in the analysis. If the sample survey responses used in this study were a representative sample, then there would be no significance in any of the random independent variables selected in this study.

Two surveys (see Table 1) were administered to the midshipmen in the classes of 2002-2004. Approximately 1,000 midshipmen from each class were surveyed at the end of their summer cruise experience. The class of 2003 was surveyed twice, once after their first-class cruise and again after their second-class cruise. A total of 3,931 surveys were administered; of these surveys administered, 615 responses were considered in this study.

Demographic and academic information was obtained for each midshipman. This information was merged into the data set. Gender, minority status, varsity status, CAQPR, and academic major information were combined with the survey value to create the final data set. The specific values for the above variables have been defined in Chapter IV. Table B1 lists the descriptive statistics for these variables.

Table B1 shows that 54 observations were missing minority status, CAQPR, and academic major information. Academic information for midshipmen who did not graduate from the Academy was not available in the data set and listed as missing values. All missing values were excluded from the analysis. The descriptive statistics also indicated that only 15% of the administered surveys were used in this study. This was due to the data cleaning or from midshipmen who simply did not participate in the survey. The total

number of male midshipmen made up about 85% of the population. Similarly, 18% were minority midshipmen, 21% were varsity athletes and 24% and 41% were Group II and Group III majors respectively. These average values for gender, minority, varsity status, and academic major, were consistent with those obtained from the descriptive statistics of the same variables used in the study and listed in Table 9.

Table B1
Descriptive statistics of survey responses

Variable	Observations	Missing	Mean Value	Std. Deviation
Survey	3931	0	0.15	0.360
Male	3931	0	0.85	0.359
Minority status	3877	54	0.18	0.382
Varsity status	3931	0	0.21	0.409
CAQPR	3877	54	6.41	1.936
Group II major	3877	54	0.24	0.429
Group III major	3877	54	0.41	0.493

A comparison of the statistics listed in Table B1 and the statisics listed in Table 9 of the study provide some interesting conclusions about the general population of midshipmen and the responces used in the study. The statistics in Table B1 was calculated using 3877 survey responses; the value shown in Table 9 was calculated on 605 first-class responses and the 615 second-class responses. The difference in the the mean value of CAQPR in Table B1 and Table 9 indicate that the survey responces used in the study were not representative of the entire population of the Brigade.

The variables described above were used in a logit regression to model the relationship between the responses used in the analysis and the responses rejected. Equation A.1 shows the logit model investigated.

$$\ln\left(\frac{survey}{1-survey}\right) = \beta_1(male_z) + \beta_2(minority) + \beta_3(varsity) + \beta_4(CAQPR) + \beta_5(mj_gp2) + \beta_6(mj_gp3) + e_i \qquad \text{(B.1)}$$

In Equation A.1, the dependent variable "survey" is shown as a function of the six independent variables: gender, minority status, varsity athletics status, CAQPR, Group II major, and Group III major. The values of the β coefficients were determined from the regression as described in Chapter III.

Table B2
Logit regression for "survey" variable

Variable	LOGIT	Marginal effect	Significance
Male	-0.168	-0.016	0.166
Minority status	-0.075	-0.009	0.526
Varsity status	-0.160	-0.019	0.155
CAQPR	**-0.119**	**-0.014**	**0.000****
Group II major	0.034	0.004	0.782
Group III major	0.169	0.020	0.108
Constant	**-0.849**	**-0.098**	**0.000****

Note. Neglekerke R^2 = .014. Chi-square value = 32.118.
*p < .01. **p < .05.

Table B2 shows the result of the logit analysis. As expected, the data from the regression output shows that CAQPR is a significant factor in the regression. The sign of the logit coefficient is consistent with the lower average of the sample as compared to the general population of midshipmen. This indicates that the sample used in the study is not a representative sample.

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