

Diamonds or Dust:  
Personality and Social Predictors of Adaptation to the Military

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## ABSTRACT

Diamonds or Dust:  
Personality and Social Predictors of Adaptation to the Military

Amir Georges Sabongui, Ph.D  
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The present study sought to investigate the factors that facilitate or hinder adaptation during important life transitions. A sample of 611 older adolescents and young adults (mean age 21, sd 4) newly recruited into the Canadian military were followed longitudinally over the course of their 10-week basic training course. Ecological theory posits that adaptation during transitions across contexts can be facilitated by the availability of organismic resources internal to the individual consisting, among other factors, of personality traits (measured by the Big-five) and contextual resources external to the individual consisting of social relationships (measured by sociometric status and friendship qualities). The predictive validity of these resources was evaluated along three ecologically valid outcome dimensions: training completion, training performance, and psychosocial adjustment. Hierarchical linear modelling showed that personality traits accounted for only 2% of the variance whereas friendship qualities accounted for 22% suggesting that social factors far outweigh individual factors in predicting performance. Moreover, social status indicators such as popularity and perceived network embeddedness also emerged as important predictors of performance and adjustment. Finally, these resources are not static factors in predicting outcomes, as initial personality scores were less predictive of performance than were changes in personality over the course of training, suggesting the importance of intraindividual growth and adaptability. Results are

discussed in terms of modifying personnel selection strategies to include measures of social and emotional competence, especially in fields such as the military that require interdependence and teamwork for instrumental success.

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## INTRODUCTION

*The sergeant assembled his group of young trainees before their final training challenge: "This final challenge is going to test your limits over the next few days and put you under tremendous pressure: Many of you won't pass", he told them. "Remember though: Pressure makes diamonds...but it also makes dust".*

### General Introduction

Why some individuals successfully navigate through life challenges and adapt to new situations while others do not is an important question to organizational leaders and researchers in any field. In the real-life military vignette presented above, there is an implicit understanding (and an expectation) that when exposed to difficult situations, some individuals not only survive, but even flourish, fulfilling undiscovered potential; while others fall apart under the pressure, failing to adapt because they are unable to meet changing situational demands. Identifying which individuals will turn to 'diamonds' under the pressure and which will fall apart and turn to 'dust' is an important challenge. For obvious reasons, a high pressure crisis situation (especially within a military context) is not the ideal time to discover whether an individual will adapt and flourish or fall apart. It is important to be able to predict an individual's adaptability and performance potential beforehand as well as identify at risk individuals. Failure to do so puts people at risk for maladjustment and comes at a high cost to the individual and the organization. As Darwin (1859) himself suggested in On the Origin of Species, "It is not the strongest of the species that survives, nor the most intelligent that survives. It is the one that is the most adaptable".

In the present paper, Ecological Theory (Bronfenbrenner, 1979) will be used as an explanatory model to better understand the process of adaptation during important life

challenges and especially life transitions. Two types of resources available to the individual that facilitate adaptation during these transitions will also be explored, namely: organismic resources (internal resources consisting of personality and self-regulation) and contextual resources (external resources consisting of an individual's social relationships, especially dyadic relations and peer support). Within the context of Ecological theory, these resources will be explored at different levels of social complexity and social proximity. Finally, a model exploring the interactive influence of organismic and contextual resources on adaptation during a major life transition of entering into military service during late adolescence/ early adulthood is evaluated. There will be a particular focus on how personality shapes a social environment that can either facilitate or hinder this adaptation by assessing subjects' performance on ecologically valid outcomes of behavioural adaptation (such as passing training, overall performance) and emotional adaptation (psychosocial adjustment).

## Conceptual Overview

### *Adaptation in the Military*

Pulakos, Arad, Donovan, and Plamondon (2000) have suggested that adaptability is a multidimensional construct consisting of: solving problems creatively; dealing with uncertain and unpredictable environments; learning tasks, technologies, and procedures; interpersonal adaptability; cultural adaptability; and physically oriented adaptability. Moreover, these dimensions of adaptability vary across situations and challenges, with some challenges requiring more of some forms of adaptability and less of others.

Adaptation also requires the right resources, both internal to the individual (such as certain traits and characteristics), and external to the individual (such as adequate social support).

Adaptation to military life starts with the Basic Training course and occurs on many levels. Basic Training, after the recruitment process itself, is usually the first step in the formal integration of a new recruit into the military lifestyle and culture, and is their first experience at acquiring basic military skills. It consists of an 8-10 week indoctrination course that involves acquiring general or non trade-specific military skills such as dress, deportment, introduction to military culture, and basic soldiering skills such as drill, marksmanship and map reading. It usually involves being geographically and socially uprooted, relocated to a new milieu, isolated from friends and family, and challenged with intense physically and mentally demanding training. Adaptation thus encompasses physical, cultural, social, emotional, and intellectual adjustments in response to these challenges and occurs concomitantly with a cleaving off of past social support systems. Moreover, for most military trainees, the timing of their enrolment is concurrent to the developmentally salient transition from adolescence to adulthood. Brotz and Wilson (1946), writing about the induction of Basic Training for World War II recruits, aptly commented that, "Nothing in one's past seems relevant unless, possibly, a capacity for adaptation and the ability to assume a new role" (p. 374).

Failing to identify individuals at-risk of poor adaptation and thus with the potential to perform poorly and/or experience negative psychosocial outcomes in response to transitions or challenging and demanding situations comes at a very high organizational and human cost. In a study of United States Air Force Basic Training

programs, Talcott et al (Talcott, Haddock, Klesges, Lando, & Fiedler, 1999) estimated that US Air Force trainees who had failed their Basic Training had cost over USD\$7,000 per recruit for an average of only 10 days of training before failure. They further estimated that a single US Air Force Base could lose over USD\$14 million per year due to such Basic Training failures. With the number of U.S. Air Force personnel ranging approximately 500,000<sup>1</sup> and the number of Air Force bases and military training facilities world-wide numbering in the hundreds, the total cost of these training failures easily add up to billions of dollars per year for the US Air Force alone<sup>2</sup>.

Perhaps more importantly, however, are the human and social costs involved in such adaptation failures. Adaptation failures put individuals at risk for psychological and emotional maladjustment which can have long term deleterious effects and which can have society wide impact. Perhaps the most well known (and most highly publicized) human costs of adaptation failure are reports of the long term sequelae experienced by veterans of armed conflicts, some of whom will experience permanent psychological disability. Although not all adaptation failures are quite as compelling, two examples in recent Canadian military history have been quite dramatic and highlight the societal consequences of two kinds of adaptation failures: emotional and behavioural maladjustment.

The Canadian public has been witness to the very public mental health struggle of General Romeo Dallaire, one of Canada's most senior, highly decorated and respected military leaders. Dallaire had been deployed to Rwanda where he led an international

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<sup>1</sup> Including full time Service Personnel, Active Reserve, and Air National Guard.

<sup>2</sup> For strategic purposes, the exact number and location of US Air Force bases worldwide is undisclosed by the US military

contingent of UN peacekeepers during the Rwandan massacres in 1994. During these massacres over 800,000 people were murdered within 100 days. His public struggle with post-traumatic stress disorder, including depression, anxiety, substance abuse and multiple suicide attempts highlighted the mental health consequences of being exposed to overwhelming situational demands and challenges without the necessary resources. More compelling is the contrast of his pre- and post-morbid functioning: Here was an individual who had previously been extremely high functioning reduced to near total incapacity (Dallaire, 2003, personal communication).

Years previously, the Canadian military had another struggle with adaptation failures in Somalia. However, these had been marked by serious behavioural maladjustment rather than emotional difficulties. Canada's Airborne Division was a combat ready, highly select, extremely well trained group of commandos who had garnered international respect for their proficiency and skill. In 1992-93, they were deployed to Somalia in support of a UN sponsored peacekeeping mission. According to the Report of the Somalia Commission of Inquiry (1997), the events that transpired in Somalia "impugned the reputations of individuals, Canada's military and, indeed, the nation itself." Those events included the shooting of unarmed Somali civilians, the beating death of a teenager in the custody of Canadian soldiers, an apparent suicide attempt by one of these Canadian soldiers, and videotapes of repugnant hazing activities involving members of the Airborne Division. The adaptation failures were manifested in behaviour that violated accepted norms of conduct within that context, and thus, seriously maladapted to situational demands. This failure ultimately resulted in the disbanding of Canada's prestigious Commando Airborne Regiment.

These failures not only highlight the need for better training for modern military personnel, but also perhaps more importantly, the need for better selection and screening strategies to cull for individuals with the social and emotional aptitudes to adapt to the new military demands of diplomacy and ambassadorship placed on the modern soldier deployed abroad. Psychological testing for screening purposes in military personnel selection has historically focussed on identifying aptitudes for technical proficiency. However, it is clear that that soldiering proficiency and technical competence cannot predict adaptation failures. In the two examples cited above, the individuals involved had irreproachable technical and professional competence. However, they may not have had the internal or external resources necessary to adapt to new, changing and unfamiliar contextual and situational demands. In both of these examples, adaptation failures were marked by emotional distress, maladjustment, and/ or inappropriate behaviour in the face of challenges and demands that vastly outweighed their individual capacities and resources for adaptation.

### *Psychological Testing in the Military*

Psychological testing for screening purposes in personnel selection has been used in the military since at least the beginning of the 19<sup>th</sup> century (Schratz & Ree, 1989; Steege & Frischer, 1991). World War I and II were especially creative and constructive periods for research on personnel selection, as well as test and program validation (Handler, 2001; Martinussen, 1996). In fact, many developments and innovations from those periods have endured as part of the legacy of academic and research psychology. For example, the Minnesota Multiphasic Personality Inventory was created in order to

meet military needs during World War II and still endures today as the most widely used psychological test (Hathaway & McKinley, 1943).

In Canada, military psychology is much younger and saw its dawn at the outset of World War II when a group of Canadian psychologists stepped forward to form a working group in order to identify the best ways to marshal their resources in the looming war effort and demonstrate what psychologists could and should do (Anderson, 1991; Prociuk, 1988). They came to the conclusion that their skills could best be used in helping to select and classify new recruits for the Army in occupations that they were best able to fulfill. “From the beginning, their efforts were entirely dedicated to serving the central function of the personnel system (selection and classification) – providing commanders with men and women who were willing and more importantly, able to perform their assigned tasks” (Foster, 1991).

Today, in the best of cases, personnel selection and classification has focused on using aptitude tests and measures of general cognitive ability ( or “g”) to identify potentially successful military applicants and trainees, and assigning them to military trades that are most likely to be compatible with their natural abilities and aptitudes (Lamerson, 2002). However, this approach has met with varying degrees of success (Lamerson, 2002), partly because adaptation to the military is multi-dimensional and encompasses much more than learning a technical trade, calling upon an individual’s adaptability in many of the domains outlined above. Ecological theory offers a perspective for understanding such a process of multi-dimensional adaptation of the individual during the transition to a new milieu such as the military.

## *Ecological Theory*

### *History of Ecological Theory*

Ecological theory inherited its seminal influence from General Systems Theory which had been proposed in the 1940's by the biologist Ludwig von Bertalanffy (von Bertalanffy, 1968), and further developed by Ross Ashby's Cybernetics movement (Ashby, 1956). Von Bertalanffy was reacting against reductionism and attempting to revive the unity of science. He emphasized that real systems are open to and interact with their environments, and that they can acquire qualitatively new properties through emergence, resulting in continual evolution. Rather than reducing an entity (e.g. the human body) to the properties of its parts or elements (e.g. organs or cells), systems theory focuses on the arrangement of and relations between the parts which connect them into a whole. This particular organization determines a system, which is independent of the concrete substance of the elements (e.g. particles, cells, transistors, people, etc). Thus, the same concepts and principles of organization underlie the different disciplines (physics, biology, technology, sociology, etc.), providing a basis for their unification. Systems concepts include: system-environment boundary, input, output, process, state, hierarchy, goal-directedness, and information. In this way, Systems theory has influenced fields as diverse as: finance, physics, computer science, climatology, and clinical psychology, among countless other fields.

Ecological Theory (Bronfenbrenner, 1979, 1986) is the application of Systems concepts to developmental psychology. It was born out of a reaction to the strict behaviourism of the 1950s and 60s. Like most of psychology, developmental psychology had been swept in the wave of experimentation that accompanied behaviourism's



ascendancy. The dominant view of that era was that good science had to be done in a laboratory in order to control for as many extraneous variables as possible. However, most of the laboratory experiments were artificial in that they had little to do with the circumstances, challenges and behaviours that applied to real life, and therefore, had questionable generalizability and ecological validity.

In the mid 1970s, some scholars grew increasingly critical of these artificial laboratory experiments and dubbed them “Analog Studies” because the behaviour and settings were supposed to be analogous to real life. However, in most cases they were not, and fell short of replicating the real-life experiences of people. Experimental research in developmental psychology seemed to lack ecological validity. As a consequence, it was difficult to generalize from laboratory research to real individuals in the real world. The utility of years’ worth of experimental developmental research was questioned.

Among these scholars, Bronfenbrenner (1986) argued that to understand and predict development, you had to consider the individual within the actual settings in which they function and evolve. People cannot be separated from context for the two are entwined in real life. He thus argued for an emphasis on ecologically valid studies that were more correlational than experimental.

### *Ecological Subsystems*

Ecological Theory views the developing individual as being embedded at the centre of an interactive social nexus. Within this perspective, a person’s development cannot be understood separately from their social environment because the two are

intertwined in spheres of mutual influence. Thus, the developing individual is simultaneously influenced by and influences their social milieu in an interactive system which provides and calls upon different resources during the adaptive process (Bronfenbrenner, 1986).

The ecological model describes the environment as consisting of five levels of interactive social complexity at various levels of social proximity:

A *microsystem* is the immediate social environment or context surrounding the individual. This system has a direct impact on the development of, and is directly shaped by, the individual as an active participant in this system. Examples of a microsystem are the person's family, dyadic relationships, the peer group, or workplace.

A *mesosystem* is a system that connects two microsystems. Two of the individual's immediate environments can have mutual influence on each other, thus altering the influence each exerts over the developing individual. Examples of mesosystems are situations in which parents influence the child's choice of friends or of school by virtue of the neighbourhood they have chosen to establish their family in.

An *exosystem* is a system that the individual does not experience or participate in directly, but which indirectly impacts the individual through their effect on microsystems. Examples of exosystems could include a parent's workplace since stresses experienced in that setting can influence a parent's mood and availability, and thus, their relationship with their child.

A *macrosystem* refers to the cultural and subcultural context in which other settings are embedded. This system directly influences the individual through its effect on other systems.

A *chronosystem* refers to the pattern of environmental events and transitions over the life course and thus describes changes within the systems over time. Examples of chronosystems include the developmental effects of undergoing a role change during the transition from adolescence to adulthood.

What happens when the individual is confronted by a transition from one primary microsystem (such as their hometown friendships) to another (such as their military friendships)? Moreover, what happens when these transitions in microsystems are accompanied by macrosystem transitions such as when the individual leaves home and enters the military subculture? Myriad adaptational challenges emanate from this.

### *Adaptation*

Adaptation is the process of adjusting to changing demands and challenges. Many demands that are experienced by the individual emanate from environmental and individual changes during the regular course of personal development. Change is thus an impetus (and perhaps one of the biggest challenges) to adaptation. And since change is omnipresent, individuals are always engaged, more or less, in a process of adaptation. Selye called this process, the *General Adaptation Syndrome* in reference to the body's activation response to any demand placed on it that requires adaptation to re-establish a new dynamic equilibrium (Selye, 1936; 1974).

Ecological theory (Bronfenbrenner, 1986) views adaptation as the “progressive, mutual accommodation between an active growing human being and the changing properties of the immediate settings in which the developing person lives, as this process

is affected by relations between these settings, and by the larger contexts in which the settings are embedded” (p.21).

### *Transitions*

Because adaptation is the individual’s response to change, possibly the best time to study the process *in situ* is during periods of great personal change or transitions. In this way, researchers can quasi-experimentally study the process of adaptation while it is occurring and capitalize on natural “manipulations” of change variables (Little, 2002). Transitions are specific life events that are embedded within a trajectory and evolve over shorter time spans: they are “changes in state that are more or less abrupt” (Elder, 1985, p.32).

Military recruits undergoing basic training are engaged in transitions that occur on many levels. First, this transition is developmental. Recruits tend to be in the last years of adolescence or the period of early emerging adulthood, thereby navigating the developmentally salient transition of becoming adults with its concomitant physical, social, emotional and role changes. Second, this transition involves evolving identities and social roles. Military recruits are changing social roles from student to worker thereby experiencing both an identity and professional transition. For many, this will be their first full time job. Third, this transition is social. Military recruits are also physically removed from their home and social environments and are required to recreate new social bonds in a new physical and social milieu.

Some studies have proposed that transitions into military settings and the new social roles offered by military service at an early age (before 21) can induce positive

change in life opportunities. For example, Elder (1986, 1987), reporting on a cohort of 83 World War II veterans that had been followed longitudinally into the 1980's, argued that specific features of military life could promote behavioural change and even 'turning points', redirecting individuals onto a different path that he argued was potentially a more positive life-course. The first feature is the "knifing off" of past experience in which the military separated recruits from their pasts and made their prior identities irrelevant in the new context. The transition meant separation from family influences and a measure of social independence coupled with the establishment of new social ties. Arguably then, these recruits could forge new identities which were more adapted (and perhaps better adjusted) to the new situational demands of military and even adult life. As one Marine recruit reported in this study, service provides almost "instant maturity" (Elder, 1987).

The second feature of military life is the "time-out" or "psychosocial moratorium" wherein the military gave youths a chance to take a break from their previous life path and to consider where they were going. Military service provided formative opportunities preceding definitive life-events such as marriage, parenthood, and completion of higher education (Hogan, 1981), thus allowing individuals to reintegrate these roles at a later time equipped with more maturity, resources and skills. For many, this transition gave them the sense of being on their own for the first time (Elder & Bailey, 1987).

The third feature of military life is the "broadened range of perspective, social knowledge, and basic skills" instilled by the military which offered youths a source of self-esteem (p.452). As one subject reported, "When I was in the service, I found myself living among fellows from all over the country...when you talk things over with them

and get their slant on things, it sort of opens up your horizons...you start thinking in broader terms than you did before”(p.452).

Sampson and Laub (1998) more recently extended these findings using archival data from Gluecks' (1950, 1968) longitudinal study of 500 delinquents and 500 nondelinquents initiated in the 1940s (see also Sampson & Laub 1993). They examined the relationship between adolescent competence and socioeconomic achievement in 1,000 disadvantaged men. Their subjects of particular interest were those men from impoverished backgrounds that had managed to attain successful adult outcomes. After controlling for intelligence, key family background and demographic variables, as well as antisocial behavior during childhood and adolescence, entering military service at an early age (before age 21) as well as overseas duty provided facilitative opportunities for men from disadvantaged backgrounds, even those that had been identified as juvenile delinquents, to redirect their life-course in adulthood onto a healthier pathway.

Transitions are multi-dimensional in that they can encompass many simultaneous changes: They can be developmental such as during a transition from one developmental period (such as adolescence), to another (such as adulthood); They can be social such as during a change in social milieus or peer groups; They can be geographic such as during a geographic move to a new neighbourhood or city; And they can reflect role transitions such as during a change from student to a member of the work force (Galambos and Leadbeater, 2002 in Hartup & Silbereisen, 2002). There are certainly other dimensions within which transitions can occur which would simply be too numerous to elaborate here, but in general, they fall into two broad categories: transitions experienced within the individual and transitions experienced within the environment.

Within the Ecological perspective, intra-individual transitions are the developmentally salient transitions an individual undergoes during their lifecourse, which in the case of military recruits undergoing Basic Training means transitioning from the world of adolescence to that of adulthood.

Environmental transitions are changes in micro, meso, exo, or macrosystems. According to ecological theory, an ecological transition (in any ecological system) is defined as “whenever a person’s position in the ecological environment is altered as a result of a change in role, setting, or both” (Bronfenbrenner, 1985, p.26). Development is defined as “the process through which the growing person acquires a more extended, differentiated, and valid conception of the ecological environment and becomes motivated and able to engage in activities that reveal the properties of, sustain, or restructure that environment at levels of similar or greater complexity in form and content”(Bronfenbrenner, 1985, p.27).

Thus, Ecological Theory views transitions as opportunities for growth and development. As well, transitions are opportunities for adaptation.

During a transition, an individual must select adaptive strategies and sometimes acquire new skills and resources that allow the individual to achieve certain goals. As such, transitions are problem-solving situations. Block and Block (1980) considered individuals as consummate problem solvers in the pursuit of cognitive, social, and personal goals. According to the Blocks, there are three dimensions of problem solving: goals, resources, and strategies. The following sections elaborate in much greater detail the goals of developmental and social transitions, the intra-individual and social resources available to assist in adaptation, and the strategies available within a coping framework.

For positive adaptation to occur, the individual must adapt along three dimensions: emotional, social, and instrumental. Emotional adaptation refers to the process of undergoing a transition in an emotionally balanced way and emerging with few or no negative emotional sequelae such as depression, anxiety or loneliness. Social adaptation refers to adjusting to new social roles and creating a new social network that is able to provide fulfilling interpersonal relationships that can provide emotional and instrumental support. Instrumental adaptation refers to adjusting to demands that require the acquisition of new skills and competencies, and is measured by professional performance or success at certain tasks.

A common view among personality theorists is that all human behaviour is organized around the pursuit of goals. Strategies and resources are available to assist the person in this pursuit (Austin & Vancouver, 1996; Bandura, 1999 (hndbk personality); Little, 1999 (hndbk personality). Goals energize and direct activities (Carver & Sheier, 1999) and are often multidimensional. Goals are not always static end-result entities. In fact, some goals are dynamic process oriented entities. For example, Carver proposes that “the goal of taking a vacation isn’t to be sitting in your driveway at the end of the two weeks, but to experience the events planned for in the vacation (p.554)”. In this way, the goal is to engage in the process in a meaningful and fulfilling way rather than to simply reach an end result.

Similarly, the goals of navigating a transition may be end-result goals and they may be more process-oriented goals during the positive adaptation to a new individual and environmental context. However, positive adaptation means many things: acquiring the skills necessary to rise to instrumental demands and challenges, meeting instrumental



goals, and experiencing the transition in an emotionally positive way (or at least in a way that is not too emotionally negative).

Following a discussion of adaptational resources, a model of the goals inherent in developmental transitions will be outlined with a focus on how each resource can contribute to and facilitate the transitional goal.

### *Adaptational Resources*

A person's ability to adapt positively to a transition will be dependent, to a large extent, on the resources they have available to them. These resources can be physical (ex, strength, health etc), psychological (ex, intelligence, personality, coping strategies), social (ex. a positive support network), or instrumental (ex. financial resources).

Resources are important inasmuch as they facilitate the person's movement toward desired goals (Carver & Sheier, 1999). In this context, two broad domains of resources are explored: intrapersonal organismic resources and interpersonal contextual resources. Because transitions are multi-dimensional, so too must the resources available to assist the individual in adaptation be. How those resources influence adaptation is further elaborated below.

Organismic level resources are constituted of intraindividual personal and psychological resources. Contextual level resources are constituted of extra-individual and social resources. Specifically, personality and self-regulatory resources are examined at the organismic level, and social and peer factors within the contextual level that contribute to positive adaptation during a transition. These factors are elaborated in more detail below.

### *Organismic/ Intrapersonal Resources*

At the core of adaptational resources are self-oriented resources. These resources are not present as distinct from the individual, but rather, are comprised of qualities, characteristics, and traits that the individual possesses internally that can assist in their goal directed quest. At the heart of the organismic perspective is the presumption that individuals are active agents and contributors to their own development. It puts the individual at the centre of the developmental process and views volitional behaviour as goal directed, where actions are both purposive and self-initiated (Randstakter, 1984; Chapman & Skinner, 1985). By extension, individuals are inherently active and self-regulating.

The centre of the self-regulation mechanism is the self, which is organized into personality traits. The following section explores the personality composition of the self and focuses on how personality traits can themselves be viewed as resources, each of which can contribute to facilitate adaptation to specific developmental challenges or problems. Following this elaboration of the role of personality traits, the role of these traits will be explored within a self-regulating context.

### *The Self & Personality*

The self is the nucleus of the social nexus (Bronfenbrenner, 1985). It is comprised of self- projections (how the individual behaves and is perceived by others) and self-perceptions (how the individual views themselves). One way to describe the content of the self is through inventory of the personality traits of which it is composed.

Personality traits represent a tendency to behave in consistent ways in certain kinds of situations (Caspi, 1997). They are individual differences in the tendency to behave, think, and feel in certain consistent ways. Thus, they constitute a process that leads to certain intentional states (Tellegen, 1991). “Therefore, personality is and does something...It is what lies behind specific acts and within the individual.” (Allport, 1937). Personality, thus, is a determining tendency, and when aroused by suitable situations, gives rise to behavioural responses to aid in adaptation to the situation. However, these traits are not static. Personality differences, in interaction with environmental circumstances, organize behaviour in dynamic ways during development over the life course and influence how individuals organize their behaviour to meet environmental demands and new developmental challenges (Caspi, 1997). Thus, personality traits ultimately derive their significance from the role they play in advancing adaptation within, and mastery of, the personal environment (Allport, 1937).

*The structure of personality: The emergence of the Five-Factor Model.* William McDougall (1932) writing in the first issue of *Character and Personality* (later to become the *Journal of Personality*) discussed at length the special meanings of the words “character” and “personality”. Toward the end of his essay, he offered an interesting conjecture: “Personality may to advantage be broadly analyzed into five distinguishable but separate factors, namely: intellect, character, temperament, disposition, and temper...” (p15, quoted in Digman, 1990). This suggestion was an uncanny anticipation of the results of the next half century of personality research would uncover: Namely, that an organizing taxonomy of personality would yield five broad factors.

Systematic efforts to organize the taxonomy and structure of personality began shortly thereafter, although, according to Digman (1990), it probably had less to do with McDougall's prophetic conjecture and more to do with the efforts of German psychologists Klages and Baumgarten's (1933) suggestion that a careful analysis of personality descriptors used in common language would elucidate its underlying facets. This undertaking influenced and inspired others such as Allport (1936), Cattell (1943-1948) and Eysenck (1970) in their own quests that followed in the systematic examination of language to uncover the structure of personality.

Cattell's work consisted of subjecting peer ratings of college students to factor analysis in order to uncover underlying personality facets. He distilled a relatively complex taxonomy of individual differences that consisted of 16 primary factors and 8 second-order factors (Cattell, 1965). Unfortunately, repeated attempts by researchers to replicate his work were largely unsuccessful (Digman, 1990). For example, when Tupes and Christal (1961) reanalyzed the correlations reported by Cattell during an initiative by the US Air Force to predict officer effectiveness, they found that a Five-Factor Model accounted for the data as well if not better than Cattell's proposed factors. The factors they uncovered in their Five Factor Model were: Surgency, Emotional Stability, Agreeableness, Dependability, and Culture (in Digman, 1990). In any event, even though Cattell's findings were not replicated, the factor analytic method that he used to arrive at underlying facets was productively applied in numerous other studies and to various other samples, and the empirically inspired theories of personality of Eysenck (1970) and Cattell dominated the literature on personality during much of the early years of personality research (Digman, 1990).

However, despite the ascendancy of Cattell and Eysenck in personality research, a parallel undercurrent to simplify personality structure to its simplest components was gaining momentum. As it would turn out later, the five factors identified by Tupes and Christal (1961), Norman (1963) and others (as well as those of McDougall 35 years before) were remarkably similar to those that would eventually become generally accepted by researchers today. However, as Digman (1990) points out, even though the work of Tupes and Christal should have had a seminal impact on personality research, it had only a minor impact because their study was published in an obscure Air Force technical report. Their Five-Factor Model was later corroborated in subsequent studies of the time (ex. Borgatta, 1964; Hakel, 1974; Norman, 1963; Smith, 1967). Borgatta's findings are noteworthy because he obtained five stable factors across five methods of data gathering (in Digman, 1990). Norman's work is also especially significant because his labels (Extroversion, Emotional Stability, Agreeableness, Conscientiousness, and Culture) are used commonly in the literature today and have been referred to ubiquitously as "The Big Five".

Subsequent research in the decades since has spawned a consistent body of literature providing compelling evidence for the robustness of the five-factor model: across different theoretical frameworks (Goldberg, 1981); using different instruments (such as adjective analysis, q-sort, peer ratings, and self ratings: eg. Conley, 1985; Costa & McCrae, 1988; McCrae, 1989; McCrae & Costa, 1985); in different cultures ranging from the occident to the orient (McCrae & Costa, 1997); using ratings obtained from different sources (such as teacher ratings of students, officer candidates rating one another, college students rating one another, or clinical staff members rating graduate

trainees (eg. Digman & Inouye, 1986; Digman & Takemoto-Chock, 1981; Watson, 1989); and a variety of samples ranging from young children to aging adults (McCrae & Costa, 1985).

Not only has it been definitively demonstrated that patterns of covariation among personality traits in English-speaking populations can be summarized by the five-factor model (FFM), but there is also mounting evidence that the FFM of personality trait structure may be a human universal. To assess the cross-cultural generalizability of the FFM, data from studies using 6 translations of the revised NEO Personality Inventory (Costa & McCrae, 1992) were compared with the American factor structure. Confirmatory factor analysis showed that German, Portuguese, Hebrew, Chinese, Korean, and Japanese samples (total N = 7,134) shared similar structures (McCrae & Costa, 1997).

*Personality traits: The Big Five.* Thus, personality traits are individual difference variables that are consistent patterns of thoughts, feelings, or actions that distinguish people from one another. Although traits are basic tendencies that remain stable across the life span (McCrae & Costa, 1988), characteristic behaviours can change considerably through adaptive processes and across contexts.

The Big Five represents a taxonomy of traits that personality psychologists suggest capture the essence of individual differences in personality. Although other taxonomic factors structures have been studied, the consensus among personality theorists today is that the Big Five are the only consistently reliable factors (Digman, 1990).

*Extroversion* describes the extent to which the person actively engages the world and seeks out or avoids social interactions and intense social experiences. Highly extroverted individuals are usually regarded as talkative, social and assertive, adventurous and energetic. It implies an energetic approach to the social and material world and includes sub-traits such as sociability, activity, assertiveness, and positive emotionality.

*Agreeableness* describes a person's interpersonal nature on a continuum from warmth and compassion to antagonism. Agreeable persons are perceived as being empathic, altruistic, helpful, trusting, good-natured, flexible, cooperative, caring and tolerant. In contrast, antagonistic persons are abrasive, ruthless, manipulative, and cynical. It contrasts a prosocial and communal orientation towards others with antagonism and includes sub-traits such as altruism, tender-mindedness, trust, and modesty.

*Conscientiousness* describes the extent and strength of impulse control, whether the person can delay gratification in the service of more distant goals or is unable to modulate impulsive expression. It describes socially prescribed impulse control that facilitates task and goal-directed behaviours, such as thinking before acting, delaying gratification, following norms and rules, and planning, organizing, and prioritizing tasks. It generally means that a person tends to be organized, planful, reliable, responsible, orderly and dependable. Other adjectives that are used are careful, persevering, and hardworking.

*Neuroticism* contrasts emotional stability and even-temperedness on one hand with negative emotionality, such as feeling anxious, nervous, sad, and tense. Neurotic

individuals are anxious, prone to depression, worrying, and are emotionally reactive or volatile. In contrast, someone who would display emotional stability would be characterized as secure, stable, relaxed, self-sufficient, not anxious, and tolerant of stress.

*Openness to experience* (versus closed-mindedness) describes the breadth, depth, originality, complexity and quality of an individual's mental and experiential life. Individuals who are high on this trait are imaginative, independent minded and have divergent thinking. They are intellectual, curious, imaginative, cultured, and broad-minded.

Behavioural genetics studies have also demonstrated the important genetic component of personality. In a landmark study that has stood the test of time involving nearly 800 pairs of twins and dozens of personality traits, Loehlin and Nickolls, (1976) reported that nearly all personality traits assessed by self-report questionnaire show moderate to high genetic influence: i.e. identical twins correlations are consistently greater than fraternal twins correlations. Extroversion and Neuroticism are by far the most widely studied traits. For five large twin studies in five different countries, with a total sample size of 24,000 pairs of twins, the average correlations for identical twins and for fraternal twins respectively was .51 and .18 for Extroversion, and .46 and .20 for Neuroticism (Loehlin, 1992).

Heritability is a statistic that describes the effect size of genetic influence and refers to the proportion of observed (phenotypic) variance that can be explained by genetic variance. Doubling the difference between identical and fraternal twin correlations estimates heritability of about 60% for Extroversion and 50% for Neuroticism (Plomin et al, 1997; Plomin & Caspi, 1999). Agreeableness,



Conscientiousness and Openness to Experience showed identical twin correlations of about .45 and fraternal twin correlations of about .20, suggesting heritability estimates of about 40% (Loehlin, 1992; Beer & Rose, 1995; Jang, Livesley, & Vernon, 1996).

Explaining 40-50% of the variance in personality research is an astonishing achievement considering that most research in this field has a glass ceiling of explaining 10% of the variance (as indexed by correlations in the .30 level; Caspi, 1998). However, this is an estimate of the net influence of genetic and environmental factors, regardless of how many individual factors are involved (Plomin & Caspi, 1999) and does not identify specific genes or specific genetic and environmental factors of variance.

#### *What do the Big Five predict?*

Most research looking at personality has focused on addressing the issues of whether personality exists as a valid and reliable construct and what the structure of personality is with much less research looking at what personality does: i.e., the impact of personality on outcomes such as overall adjustment or adaptation. The research that has focussed on outcomes has focused primarily on the downside of personality: that is, the extent to which particular personality traits undermine adjustment or predict negative outcomes. However, there is a growing body of literature from various fields of study that have shown that certain personality traits also act as facilitators to adjustment and predict positive outcomes.

*Personality and Outcomes.* In health psychology, research has shown that personality differences are related to risk and health-promoting behaviours. In an

archival prospective cohort study of bright children first studied by Terman in the 1920s, Friedman et al, (1995) examined longevity and cause of death data for N=1,215 subjects. They found that conscientiousness measured in childhood predicted longevity over the lifecourse beyond the possible mediating influences of avoiding accidents, alcohol, smoking, and overeating (Friedman, et al, 1995).

Personality can dictate ways in which a person will relate to their environment because individual differences in personality shape social experiences. Overall, traits are relatively poor predictors of single behavioural acts, but are better predictors of general trends of a person's behaviour. Looking at past behaviour of an individual may be the best predictor of future behaviour (Hogan, Johnson, and Briggs, 1997).

Buss (1991) posits that these five traits represent the most salient and important dimensions of an individual's social survival needs. These personality dimensions are relevant to adaptation to the social landscape (Caspi, 1997).

*Personality and Performance.* Organizational psychology has shown that personality differences are related to measures of job performance and offers incremental predictive validity over cognitive measures (Barrick, Mount, & Judge, 2001; Mount & Barrick, 1991; Tett et al, 1991).

Generally speaking, personality-performance research evolved in two distinct phases. The first phase spans a relatively long time period from the early 1900s through the mid 1980s. The general thrust of this research was to investigate the relationship between individual scales from existing personality inventories and various aspects of job performance. The overall conclusion from this era of research was that personality and

job performance were not meaningfully related across traits and across situations. In fact, many researchers at the time were arguing that personality as such did not exist and that all behaviour was situation or context specific (Barrick, Mount, & Judge, 2001). As Guion and Gottier (1965, p.159) noted in their influential review at the time, “There is no generalizable evidence that personality measures can be recommended as a good or practical tool for employee selection”. Until the 1980s, this philosophy went on unchallenged.

One reason for this pessimistic conclusion of the first era of personality-performance research was that there was no universally agreed upon classification system to reduce the literally thousands of personality traits into a smaller, more coherent, and manageable number. Consensus as to the use of the Big Five personality traits was still decades away. Second, there was a lack of clarity about the traits being measured: in some cases, similar traits appeared under different names; in other cases, the same names were being used to describe entirely different constructs (Barrick, Mount & Judge, 2001). To complicate matters, researchers did not distinguish between measurement of personality at the construct level, and measurement at the inventory or scale level. Researchers implicitly treated each individual personality scale as if it measured a distinct construct rather than recognizing, as today, that each scale from a personality inventory assessed only one aspect or facet of a larger construct within the FFM.

The second phase of personality-performance research which spans the mid 1980s to the present is characterized by two main characteristics: (1) more coherent organization of personality variables by a more consistent use of the FFM or ‘Big Five’ as an organizing model to measure personality; (2) The use of meta-analytic techniques

to resolve apparent discrepancies and flesh out moderator variables that can account for these discrepancies between studies. This led to more optimism about the usefulness of using personality traits as valid predictors and as Guion (1998) himself has recently noted in a retraction of his earlier condemnation of personality-performance research, "Meta-analyses have provided new grounds for optimism".

The essential conclusion of this second era of research is that personality-performance relations will vary to a large extent depending on what outcome you are studying (i.e. how you define job or training performance) and who you are studying (i.e. what occupational group and thus what skills are required within that group). Thus, it is important to consider not only the various dimensions of personality, but also understand the various dimensions of work performance, especially as each is linked to a different set of antecedent variables (see Borman, Penner, Allen, & Motowidlo, 2001).

*Personality-Performance in the Military.* One major initiative during the outset of the second era of personality-performance research started with a recognition of the limitations of traditional selection and classification methods based on cognitive and technical abilities used in the military. The US Army Research Institute for the Behavioral and Social Sciences sponsored a comprehensive research and development program named 'Project A' aimed at identifying performance predictors previously neglected. Beginning in the 1980s and continuing through the middle 1990s 'Project A' continued with its main objectives to explore predictor-performance relations beyond the predictive value of technical aptitudes and cognitive abilities or "g". Project A focused on predictor and criterion variables relevant to Army selection decisions and thus to

evaluate and enhance the Army's personnel selection and classification procedures. It started with a job analysis to identify salient aspects and skills requirements of different military occupations. The basic conclusions of this project were that: (1) Personality measures predicted non task-specific criterion variables such as motivation, effort and leadership better than did cognitive ability; (2) However, cognitive abilities were more predictive of task- or job-specific criterion variables comprising overall soldiering proficiency (tasks such as map reading, weapons handling, etc), (McHenry, Hough, Toqueam, Hanson, & Ashworth, 1990).

However, there were some important limitations to the generalizability of these results. Personality scales in Project A were clustered into personality composites which do not clearly load onto a FFM and thus it is not clear which specific personality traits predicted performance and adjustment. Also, job analyses which were published for US military occupations are not readily translatable to Canadian military occupations or non-military occupations.

*Personality-Performance Relationship.* Early in the identification of the FFM, the predictive usefulness of one of these traits was soon demonstrated by Smith (1967) and Wiggins et al (1969). Using characteristics denoting the construct of Conscientiousness (named Responsibility at the time) these investigators noted the “impressive” predictions that could be made in the area of educational achievement for undergraduate and graduate students. Today, Conscientiousness continues to be the most significant personality predictor of general performance.

In a series of determining meta-analyses, Mount and Barrick (1991) and Barrick, Mount, and Judge (2001) have elucidated the nature of the relationship between personality traits and performance. They recently conducted an exhaustive and comprehensive meta-analysis of all published meta-analyses on the subject of personality-performance relationships for the period from 1990 to the present, including their own previous meta-analysis which spanned the period prior to 1990, thus covering nearly a century of research. They included 11 meta-analyses and 4 conference presentations which overall account for a very large sample size: For Extroversion, their sample included 781 studies with a total of 121,464 subjects; For Emotional Stability, their meta-analysis included 677 studies for a total of 111,864 subjects; For Agreeableness, the total number of studies reviewed was 513 with a total of 88,843; For Conscientiousness, 681 studies were analyzed for a total of 127,628 subjects; For Openness to Experience, 171 studies were included for a total of 62,011 subjects. Results at the FFM level differed for each trait and showed that each personality trait predicts at least some criteria for some jobs. More specific and nuanced conclusions are presented below.

*Extroversion.* Extroversion did not predict general work performance but did predict certain aspects. Across  $K=48$  studies with a total sample population of  $N=3,719$  subjects, extroversion was demonstrated to predict teamwork with average partialled correlations of  $\omega=.16$ . As well, there was a consistent positive relationship between extroversion and training performance ( $\omega=.28$ ,  $K=21$ ,  $N=3,484$ ), managerial performance ( $\omega=.21$ ,  $K=67$ ,  $N=12,602$ ) and police officer performance ( $\omega=.12$ ,  $K=20$ ,  $N=2,074$ ). It would seem that these are all outcomes requiring both leadership and

interpersonal skills. Extroversion has also been demonstrated to be a particularly sensitive predictor of two specific criteria: higher training proficiency and teamwork. Thus, extroversion seems to predict successful work performance in occupations which seem to require good interpersonal relations and teamwork as well as applied leadership skills.

*Emotional stability.* Emotional stability was found to be a valid predictor of overall work performance across all occupational categories (independent samples  $\omega = .13$ ,  $K = 224$ ,  $N = 38,817$ ; non-independent analyses  $\omega = .15$ ,  $K = 453$ ,  $N = 73,047$ ). Emotional stability was also a valid predictor of the specific criterion for teamwork ( $r = .22$ ,  $K = 41$ ,  $N = 3,558$ ) but not other performance outcomes. Considering the specific occupational breakdowns, emotional stability was related to performance in some occupations (police, skilled or semi-skilled), but not others. Emotional stability was the only FFM trait other than Conscientiousness to show true score correlations that generalized to the overall work performance criterion.

These findings make intuitive sense, as it would be expected that individuals who are not temperamental, not stress-prone, not anxious and not worrisome (emotionally stable), and those who are hardworking, persistent, organized, efficient and achievement-oriented (conscientious), are most likely to perform well.

*Agreeableness.* Agreeableness displayed a weak relationship with the work performance criterion that was non-significant. While agreeableness was found to predict teamwork ( $\omega = .34$ ,  $K = 17$ ,  $N = 1,820$ ), the number of studies and total sample size of this analysis were not large. Furthermore, agreeableness was not strongly related to any other criterion or occupational group. More importantly, the magnitude of a potential

moderator variable rarely exceeded the mid .20's, based on an examination of the upper bounds of the 90% credibility values across criteria and occupational groups.

*Conscientiousness.* Conscientiousness generalizes across all criterion types and all occupations studied. Further, it had the highest overall predictive validity of the Big-Five personality traits. It is related to work performance across all jobs for both independent analyses ( $\omega = .27$ ,  $K = 239$ ,  $N = 48,100$ ) and non-independent analyses ( $\omega = .24$ ,  $K = 442$ ,  $N = 79,578$ ). In terms of specific criterion variables, it significantly predicted teamwork ( $\omega = .27$ ,  $K = 38$ ,  $N = 3,064$ ) and training performance ( $\omega = .27$ ,  $K = 20$ ,  $N = 3,909$ ). Furthermore, the magnitude of the true score correlations for this trait were consistently the highest among the Big Five, with the average true score correlation estimates ranging from the mid .20s to low .30s. Examination of the 90% credibility values demonstrated that the upper bound of these validity estimates generally was in the upper .30s. Thus, Conscientiousness appears to consistently predict success in virtually all jobs moderately well, and may predict success strongly when moderator effects are accounted for in certain situations. The results for Conscientiousness underscore its importance as a fundamental individual difference variable that has numerous implications for work outcomes. Conscientiousness appears to be the trait-oriented motivation variable that research psychologists have long searched for, and it should occupy a central role in theories seeking to explain performance.

*Openness to experience.* Openness to experience was not relevant to many work criteria. In fact, along with agreeableness, this dimension consistently reported the lowest average true score correlations across criteria and occupational groups. More importantly, the magnitude of the upper bound limit of the 90% credibility values suggests the search



for potential moderators would not be very useful, as the upper bound on true score correlations across criteria and occupational groups typically was in the low .20s. One exception to this finding, was reported for training proficiency, where the independent analyses suggest moderate effects ( $\omega = .33$ ,  $K = 18$ ,  $N = 3,177$ ).

### *Hierarchical Organization of Personality.*

Personality is organized hierarchically (Eysenck, 1947; Hson, John, & Goldberg, 1986; Norman, 1967). It is now widely accepted by most personality theorists (even the most ardent critics) that personality, however assessed, has its links to behaviour and its basic level reflects a specific response to a specific situation (Level 1). Responses, if typically made to prototypic situations, are seen as habits, act frequencies, behaviour aggregates, or specific items on inventories (Level 2). Next are the characteristics or facets represented by a person's response tendencies across different contexts and situations represented by scales on personality inventories (Level 3). At the fourth level are the five broad constructs – the Big Five – generated by systematic trait research of the past 40 years (Level 4). And at the highest level may be the personality types most recently reported in the personality literature (Level 5): the self-regulatory dimensions of Ego Resilience, Ego-Overcontrol and Ego-Undercontrol. At successively lower levels are more specific traits that in turn are composed of behavioural response tendencies (talkative, enthusiastic, energetic). In this hierarchical scheme, higher-order constructs can be shown to account for the observed covariation among lower order constructs (Caspi, 1999; Digman, 1990).

*Personality Traits as Resources in Developmental Goals.*

Van Lieshout and Heymans, (2000) proposed a taxonomy of developmental domains which represent a lifelong, thematically coherent sequence of developmental challenges and demands. There are challenges in each of four developmental domains that are faced by the person across the life course and Van Lieshout has proposed that specific personality traits can act as a resource and are ideally suited to assist in adaptation within this developmental challenge (Van Lieshout & Heymans, 2000).

The first is the interpersonal domain that concerns social competence in the formation and maintenance of various interpersonal relationships. The second is the performance domain, which concerns the acquisition and mastery of specific competencies required for achieving goals: whether pursuing academic goals, establishing a professional career, or educating children. Third is the development and acquisition of a coherent sense of self. Failure to develop a coherent sense of self results in emotional destabilization. Fourth, for many individuals, is the realization of intellectual, artistic or creative talents (Van Lieshout & Heymans, 2000). These domains are mutually interdependent and achievement or failure in one domain affects adjustment in the other domains. The problems, demands and opportunities that an individual faces during any developmental transition can be assigned globally to these four domains.

During a period of transition there are new demands and challenges in each of these four domains. The different personality traits afford opportunities for adaptation to these challenges and demands because they produce a tendency toward certain actions. Each personality trait may contribute to adaptation within a specific developmental domain through facilitating competencies and activating adaptive behaviours. Thus there

is a link between personality types and self-regulation, the Big-5 personality dimensions and the developmental domains elaborated above.

Agreeableness concerns the interrelatedness of one's own interests with those in one's social environment and thus refers to the interpersonal domain. Conscientiousness concerns the attainment of performance standards and thus refers to the performance domain. Emotional stability concerns the regulation of affect and is particularly at stake in the development and maintenance of a coherent self-concept and self-esteem. Openness to experience concerns the flexibility of information processing and particularly relates to the domain of intellectual, artistic, emotional and creative experiences. Although Van Lieshout provides the conceptual framework between personality traits and developmental domains, a conceptual elaboration is proposed here which elucidates a further link with specific developmental challenges and goals. This elaboration of Van Lieshout's model is presented in Table 1.

Table 1

*Personality Traits as Resources for Developmental Challenges*

Personality Dimensions	Developmental Domain	Challenges
Agreeableness, Extroversion	Interpersonal	<ul style="list-style-type: none"> <li>• Create positive social networks</li> <li>• Create strong and positive close interpersonal relations on dyadic level</li> <li>• Be able to use social relations for emotional and instrumental support</li> <li>• Learn code of social conduct and internalize or display social mores and values of new social environment</li> </ul>
Conscientiousness	Performance	<ul style="list-style-type: none"> <li>• Learn new skills specific to new environment</li> <li>• Adapt to new performance demands</li> <li>• Learn new metric of how instrumental performance is evaluated</li> </ul>
Emotional Stability	Self	<ul style="list-style-type: none"> <li>• Maintain emotional stability, balance, and health</li> <li>• Impulse control and modulation</li> <li>• Emotional self-regulation</li> <li>• Adaptable sense of self which is flexible enough to absorb new social and professional roles</li> </ul>
Openness to Experience	Intellectual, Creative	<ul style="list-style-type: none"> <li>• Finding creative problem solving strategies vs functional fixedness</li> <li>• Remain flexible and adaptable in the face of new experiences</li> </ul>

*Contextual, Social and Interpersonal Resources*

The next section looks at the interface between self and environment and explores the impact of social resources on adaptation. Understanding the developing individual also involves an explicit focus on the interface between the self and context within which the individual is embedded (Little, 2002). Investigations of social and emotional development are becoming more differentiated and sophisticated in their conceptions of the importance of the social context. This change in the field is based, in part, on Bronfenbrenner's (1979, 1986) efforts to increase awareness of the various levels of the individual's social ecology and the need to consider the interaction between the larger social world and the individual. Similarly, life span psychologists have heightened awareness of the interplay of historical, biological, and psychological influences on behaviour (Baltes, Lindenberger, & Caspi, 1999). From a transition perspective, changes in the individual's social context across the life span interacts with the individual's unique experiences, roles, and biology to produce an individualized developmental pathway. Further, individual differences in personality and social functioning also contribute to development.

Contexts reflect complex constellations of features, spanning from the micro to the molar levels, that both challenge and incite behaviour, thus having both a facilitative and hindering effect (Bronfenbrenner, 1995). Contexts provide both affordances and challenges on the range of individual actions and behaviours that can be expressed. Although some mechanisms of development are clearly universal, many mechanisms are context-specific or context-moderated mechanisms (i.e. mechanisms that function in interaction with contextual features; Little, 2002). Therefore, comparing individual

development across varying contexts can highlight which facets of the self-system are independent of the contextual variations, and which are not (Little, 1998). Similarly, comparing the same individual across numerous contexts would reveal which processes of the agentic self transcend context (Little, 2002). Studying individuals navigating transitions offers this advantage of observing the individual across contexts. Thus specific features of both contexts and individuals can be quasi-experimentally isolated in order to derive the nature their respective influences on developmental outcomes (Hawley & Little, 1999).

Perhaps the best model to study contextual influences is Bronfenbrenner's Ecological Theory of development. The individual is the center of a social nexus of concentric spheres of social proximity. The nucleus is the self consisting of personality. The second level of social proximity consists micro systems: dyadic relations, or one-on-one friendships with significant others. Also within the micro system at the next level of social proximity and complexity are peer relations and the peer social network.

Contextual influence also comes from the individual's embeddedness in macro and meso systems. Each sphere of the system contains resources available to assist the individual to adapt to changes. Presumably, the greater the differences between the old and new systems, [micro- (dyadic and peer relations) or macro- (larger social milieu)] the greater will be the adaptive challenge to be faced. Moderating variables such as personality, type of situation, and quality of these relationships that will affect the direction or strength of the relation between predictors and outcome must also be considered within this perspective.

*Peer relations and adaptation.*

There are two research paths that address the question of the impact of dyadic relations on adaptation during transitions. The first comes from transition research looking the impact of best friendships during transitions, and the second comes from the literature on resilience.

Friendships are dyadic relationships characterized by mutuality, reciprocity and trust (Hartup, 1996). Even casual observation of children and adolescents in natural settings reveals the ubiquity and power of friendships. To be friendless is to be without an important source of social support, without a mirror with which to see oneself, and without a companion with whom one can pursue pleasurable interests. However, being friended by no means guarantees that one's social development will be enhanced. As many of the researchers have argued persuasively, the having of friends is only part of the story. It is the characteristics and personal attributes of those friends, and the qualities that serve to define one's relationships with those friends, that determine whether the friendship will be salutary or damaging. Although there is a substantial literature on the normative developmental course friendships and the aspects of friendships at different ages that are most salient for individual adjustment, adolescent and adult friendships nonetheless are underrepresented in the literature which focuses predominantly on childhood friendships.

The study of peer relations has focused heavily on individual's dyadic experiences (Cairns, Xie, & Leung, 1998). However, friendships at the network level and peer social support have also been shown to improve psychosocial adjustment and adaptation during transitions and major life events. Peer relationships and social support

have been demonstrated to be directly related to social competence, self-esteem, and overall well-being (Barrera, 1981; Cauce, Feiner, & Primavera, 1982; Compas, Slavin, Wagner, & Wannatta, 1986) and as buffers against the effects of stress (Licitra-Keckler & Waas, 1993).

Social support refers to the presence and use of human relationships “to gain courage, confidence, or power of endurance ...[and /or] supply (one) with necessities” (Turner, Grindstaff, & Phillips, 1990; p. 46). One prevalent model of social support (Barrera, 1986) highlights the utility of three categories of social support: social embeddedness (the connections of individuals to significant others in their social environment), perceived social support (the extent to which one feels that one can rely on his/her peer network for different kinds of support during times of need), and enacted support (actions that others perform in providing support). Of the three, perceived social support has been the most studied and shown to attenuate distress and other adverse health outcomes more consistently than social embeddedness and enacted support (Turner et al, 1990), although all three have proven to be important predictors of outcome.

Having close friends and being embedded in a larger peer network inhibits victimization in children and adolescents (Boulton et al, 1999; Hodges & Perry, 1999; Pellegrini, Bartini, & Brooks, 1999). For example, in a study of early adolescents, Pellegrini and his colleagues (Pellegrini et al., 1999; Pellegrini & Bartini, 2000) has shown that children with close best friendships (measured by reciprocated best friend nominations) negatively and significantly predicted victimization ( $R^2 = .36, p < .01$ ). During early adolescence, affiliation with high quality peer networks can buffer the



psychosocial effects of bullying and victimization during the transition to middle school (Pellegrini, 2002), as well as inhibit the occurrence of bullying and victimization to begin with (Perry, Hodges, & Egan, 2001). Popularity and network embeddedness, (measured by number of “like most” nominations and reciprocated friendship nominations) also protected young adolescents from bullying (Pellegrini & Bartini, 1999) beyond the effects of dyadic best friendships. Young adolescents who were liked by few children and thus not tightly embedded in their peer network were more likely to be victimized ( $r=.48$ ,  $p<.01$ ). Thus, while being embedded in a peer network inhibits victimization and attenuates the psychological impact, not having friends and being rejected by peers contribute to victimization in the first place (Perry et al, 2001). In fact, some have argued that the social skills deficits that lead to adolescents not having a tight peer network is also antecedent to being victimized. As Boulton et al. (1999) have suggested, a hot temper and lack of social skills leads to rejection by peers and victimization. Interestingly then, there is at least some initial evidence that personality factors such as a lack of emotional stability (“hot temper”) can lead to negative adjustment because of their impact on relationships within the peer network.

In late adolescence, Gonzalez (2004) studied adaptation during the transition to College in a sample of 141 freshmen and found that positive peer attachments and support in new College friendships independently predicted adjustment during the first year.

Parenthood is also a major life transition and is a major marker of the transition between adolescence and adulthood. In a study of 268 pregnant adolescents (mean age 17.6 years), Turner, Grindstaff, and Phillips (1990) demonstrated that social support from

peers during the pregnancy independently contributed to increased psychological adaptation (measured by lower rates of depressive symptomology) in the mothers, and healthier babies (noted by higher birthweights), beyond the social support offered by parents and family.

During the transition to adulthood, Collins (2001) observed better adjustment for adolescents emerging from the child welfare system (foster and group care homes) when they had an identifiable peer social support group.

In health psychology, peer social support has been shown to improve psychosocial adjustment and quality of life for patients with: tuberculosis (Chang, Wu, Hansel, & Diette, 2004); breast cancer (Devine, Parker, Fouladi, & Cohen, 2003); and preventing depression and loneliness in gerontological subjects grieving the loss of a spouse (van Baarsen, 2003).

A review of 2,647 studies of PTSD showed that social support was a preventative factor that protected individuals from developing symptoms, and also facilitated recovery for those who did develop symptoms following traumatic life events (Ozer, Best, Lipsey, & Weiss, 2003).

Social support has been shown to attenuate the socio-emotional impact of: Parenting stress (Quittner, Glueckauf, & Jackson, 1990), Depression (Overholser, Norman, & Miller, 1987), Natural Disasters (Kaniasty & Norris, 1993) and Divorce (Burell, 2002).

Although, the very fact of having a peer group and peer group size serves as a protective factor in and of itself, it is also important to consider the qualities of an individual's relationships with their peers, since different qualities relate to different

outcomes. However, this is one aspect of the peer relationships of late adolescents and adults that has been little studied. Much of the literature on friendship quality and outcome comes from the child psychology literature and it is not clear if it is directly translatable to late adolescence and adulthood. In addition to determining whether a person is engaged in a friendship or embedded within a peer network, researchers have shown an increasing concern with the evaluation of the characteristics or qualities of those relationships. This is an important development given that an individual's understanding of friendship changes with age (Rubin, Bukowski, & Parker, 1998),

### The Study

In this study, the organismic and contextual factors that facilitate the favourable negotiation of life transitions are examined. It is a short-term longitudinal study of individuals navigating the developmentally salient transition from adolescence to emerging adulthood as they enter military service. Specifically, a subject pool of late adolescents and young adults were followed while they conducted their basic military training to assess the personality traits and friendship qualities that influence adaptation to life in the military with regard to social integration, instrumental success or failure, overall performance, as well as psychosocial adjustment.

The study is transitional in two ways. First, it follows individuals as they negotiate a significant developmental transition from late adolescence to early adulthood. This is the period during which individuals negotiate social role changes and the acquisition of new competencies. One of the markers of transitioning from adolescence to adulthood is the adoption of adult professional roles and establishing social

independence from family of origin. Second, it is transitional in that it follows these individuals as they negotiate a social transition into a novel environment and are required to recreate peer linkages, close interpersonal relationships, and a social support peer network able to provide the necessary instrumental and social support.

Developmental transition in this study has less to do with chronological age and more to do with a transitioning of social roles into the adult world. Without having to delineate a clear transitional age when individuals cross the threshold from adolescence to adulthood, for most subjects, the transition to adult roles lies somewhere between the time they enter training to the time they leave, especially that majority of subjects that are still in their teenage years and early 20s.

Organismic resources are embedded in the core of the social nucleus, the self. They consist of the qualities of the developing person are examined through a series of evaluations of personality which is measured by scores on the Big-five personality traits of Neuroticism, Extroversion, Openness to Experience, Conscientiousness, and Agreeableness. In addition to the important question of which personality traits predict which outcomes, there is the practical matter of how personality should be measured. In the person-perception literature, there is considerable research showing agreement between personality self-ratings and the ratings of others (Funder, 1987; John & Robins, 1993; McCrae & Costa, 1989); and some research that suggests that other's ratings of personality predict behavioural criteria better than self-reports (Mount, Barrick, & Strauss, 1994). In this study, a self-report questionnaire format was used.

During this developmental stage, many theories highlight the importance of self-identity formation as a major task of adolescence and early adulthood (eg. Erikson, 1950,

1959). Thus, the evolving self is evaluated over time in response to imperatives from the environment and a measure of personality change is incorporated into the study by its longitudinal design to assess whether personality *can* change in response to environmental pressures, and whether it *must* change in order for adaptation to occur.

Previous meta-analytic reviews have shown compelling evidence for the relationship between personality and performance (Barrick, Mount, & Judge, 2001). For example, Conscientiousness and Emotional Stability have emerged as stable predictors of performance. However, one weakness in the literature on personality and behavioural or performance criteria is the neglect of moderators of this relationship. Moreover, there are few, if any, studies that consider psychosocial adjustment measures as indicators of performance to assess subjective well-being as well as objective performance. When performance measures are used, there is little emphasis placed on the psychosocial adjustment which in and of itself may be considered part of successful performance and adaptation.

Previous research on Basic Military Training has indicated the importance of psycho-social well-being and mental health issues in predicting attrition. Talcott et al. (1999) found that psychiatric symptoms and psychological maladjustment were two of the four most common reasons for failure to graduate. Further, within psychological functioning, rebelliousness (Talcott et al, 1999), immaturity and social deviance (Holden & Scholtz, 2002); lack of motivation (Jensen, 1961); emotional instability and neuroticism (Hartmann, Sunde, Krestensen, & Martinussen, 2003); overdependence (Quick, Joplin, Nelson, Mangelsdorff, & Fiedler, 1999); depression (Carbone et al., 1999; Cigrang, Carbone, Todd, & Fiedler, 1998; Holden & Scholtz, 2002; Lubin, Fiedler, &

Whitlock, 1996, 1999) have all been related significantly to training failures. Thus, psychiatric and psychological symptomology to assess psychosocial functioning and maladjustment is used as both a predictor and an outcome measure of psychosocial maladjustment during training.

To the extent that the focus of effective performance in the military is the team rather than the individual, those personality traits that enhance or inhibit social relations will be closely examined. Thus, another key issue addressed in this study is the simultaneous evaluation of factors at different levels of influence. It is important to consider the moderating effects of social relationships between the personality-performance link. As discussed earlier, social relationships (dyadic friendships, peer social support, and network embeddedness) have been shown to independently predict *adjustment*, but it is not clear whether they can predict *performance* and how they interact with personality to perhaps moderate the personality-performance relationship. Personality traits that are relevant to social integration and functioning should take on importance in settings in which a functional interdependence and reliance on the team is promoted (Hackett, 2002).

These social factors at different levels of influence reflect the contextual resources of size and quality of an individual's friendships. Within a relatively short period of time, individuals undergo a major social transition, a re-creation and redefinition of their social network. Thus, it is important to measure change and development at the level of their close social relationships from which subjects will draw instrumental and emotional support.

By entering into a novel social environment, the individual is presented with the task of forging new relationships with peers in the social milieu while maintaining relationships to past figures. Insofar as their previous friendships exist in a developmental setting within which subjects no longer operate, friendships from the civilian setting will be less influential than the ability to create positive relations within the military setting. Few, if any, military candidates know their peers at the outset of their basic training and Bronfenbrenner (1985) has identified building social relationships as a developmental challenge. He argued that “the developmental potential of a setting is enhanced if the person’s initial transition into that setting is not made alone, that is, if he enters the new setting in the company of one or more persons with whom he has participated in prior settings” (p. 211). To the extent to which few if any trainees know each other upon entering the military, this constitutes a major break from their previous setting and thus a major developmental challenge. Immediately upon entry into Basic Training, they will be living and working with these peers, often for 24 hours a day, 7 days a week, relying very closely on them for instrumental and emotional support to negotiate difficult personal challenges. The process of forming reliable and close peer relationships while maintaining ties to previous friends and family constitute a major step in this process. This aspect of forging friendships and peer relationships is measured in this study as the quantity and quality of friendships at different times through the study, including an initial assessment of friendships from the civilian setting. In this way, individuals use the working models or schemas of their previous relationships which they have come to internalize and use these as blueprints in the creation of the new relations they create within their military peer network. The quality of these relationships is

studied by contrasting newly created friendship qualities with old ones, or, in other words, examining changes in friendship qualities over time and across settings. The importance of forming a close peer network emanates from research of the importance on social support networks for the successful negotiation of stressful life events. Subjects were evaluated on the extent to which they could derive social support from their peer network by assessing perceived social support along different dimensions of friendship and peer relationship quality such as instrumental support, emotional support and closeness, and conflict with peers.

Finally, adaptation is defined as subjects' abilities to successfully negotiate these challenges during the transition as assessed by ecologically valid outcomes: instrumental success or failure of the training course (labelled training completion), their overall performance on the course (labelled training performance), and their level of subjective psychosocial distress throughout (used as a measure of adjustment). Training completion is a dichotomous variable and is scored as pass or fail: Pass is defined as the successful completion and graduation from Basic Training whereas failure is a voluntary withdrawal from the course, or a request by the individual or staff that the person cease training for any reason, be it performance or health (injuries, etc) related. Psychosocial adjustment and distress was assessed by evaluating subjective reports of depression, anxiety, and psychopathology.

### *Overarching Theoretical Principles*

Ecological theory makes specific hypothetical and theoretical predictions about developmental transitions, especially when this involves a transition between



developmental contexts and settings. This short-term longitudinal study was designed to assess the differential and interactive influence of resources at two levels and thus to elucidate the personality and social factors that promote positive adaptation during developmental transitions. According to Bronfenbrenner (1985) developmental effects are not likely to be manifested until a person moves from their present primary setting into another, potential primary setting (i.e., from the home environment to the military environment), thus transitioning from a setting that has instigated and currently maintains the person's present level and direction of functioning to another setting requiring the person to take initiative to find new sources of stimulation and support. Such a transition between two primary settings is called a primary transition.

The development effect of a primary transition is a function of the match between the developmental trajectory generated in the old setting and the balance between challenge and support presented both by the new setting and its interconnection with the old. The nature of this balance is dependent on the person's stage of development, resources available, health, and degree of integration with as opposed to alienation from the existing social order in both the old and the new settings (Bronfenbrenner, 1985; p.288). The following overarching Ecological transition principles guide this study.

*Principle 1.* Different kinds of settings give rise to distinctive developmental patterns of role, activity, and relations for persons who become participants in those settings. Thus, transitioning from a civilian setting to a military setting involves a primary transition that requires adaptation to the different developmental patterns distinctive of the new military setting. Development will be enhanced by the ability to respond to these new distinctive patterns.

*Principle 2.* Human development is facilitated through interaction with persons who occupy a variety of roles and through participation in an ever-broadening role repertoire.

*Principle 3.* The developmental potential of settings in a mesosystem is enhanced if the role demands of the different settings are compatible and if the roles, activities and dyads in which the developing person engages encourage the development of mutual trust, a positive orientation, goal consensus between settings and an evolving balance of power in favour of the developing person.

*Principle 4.* Development is enhanced as a direct function of the number of structurally different settings in which the developing person participates in a variety of joint activities and primary dyads with others (p.212). Thus the quantity and quality of dyadic friendship relations constitute important contextual resource as the person transitions across settings.

### *Hypotheses*

Specific hypotheses were generated using these overarching Ecological principles regarding transitions. The hypotheses address the following questions: (1) How do pre-transition organismic (personality) and contextual (friendship qualities) resources facilitate adaptation to a developmental transition? (2) How does the accretion of resources from the new setting facilitate this transition? (3) What is the relative salience of organismic vs contextual resources in promoting adaptation, i.e. the differential and interactive influence of personality and social relationships?

*Hypothesis 1 – Organismic Resources.*

Given that different developmental trajectories and patterns are generated in the pre-training (civilian) setting and in the military setting (principle 1), basic training is expected to be a catalyst for development. Accordingly, the self evolves and adapts in response to this primary transition and individuals are expected to show both continuity (reflecting the ability to transpose organismic resources to new settings) and change (reflecting adaptation and accommodation) in response to imperatives of the military setting. Positive adaptation is defined as the process of positive integration to the military setting measured by training completion, training performance and positive psychosocial adjustment.

(A) Because personality is an enduring individual difference variable that is conceptualized to transcend context, it is expected that continuity will be reflected by stability of personality trait correlations across settings despite changes in mean scores.

(B) It is expected that accommodation to the military setting will be manifested by changes in personality trait scores across time even though successive personality measures are sampled over a relatively short 10 week period. These changes in score will be associated with better adjustment scores and course completion rates when they reflect acquisition of organismic resources that help the individual meet the situational demands of the military in keeping with Van Leishout's (1999) model of personality and developmental goals (as amplified in this study). Thus, increased Extroversion, Openness, Agreeableness, and Conscientiousness scores, and decreased Neuroticism scores will be associated to better adaptation because they represent increases in proximal resources that assist in meeting developmental challenges.

*Hypothesis 2: Contextual Resources - Interpersonal Relationships.*

Previous literature has shown the positive effects of friendship and peer support on psychosocial adjustment during life challenges. As well, Bronfenbrenner (1985) has suggested the theoretical importance of interpersonal relationships insofar as they constitute a significant resource to assist the individual during transitions (principle 3 and 4). Because the nature of the military fosters interdependence, positive peer relations and social support will also translate into improved instrumental outcome. Thus, the acquisition of contextual resources during development and adaptation will be associated not only to psychosocial adjustment scores as previously shown in the literature, but will also translate into improved instrumental success.

(A) Given the ecological principle that the number of structurally different interactions is an important resource, being embedded within a peer network will enhance adaptation and development. Specifically, popularity (defined as the number of friendship nominations received) and network embeddedness (defined as the number of friendship nominations made) will both be associated with higher psychosocial adjustment, training completion and training performance.

(B) Adaptation will also be enhanced if these interpersonal relationships provide the individual with essential resources within the new context. Thus, positive friendship qualities will be associated to adaptation and friendships that are high in emotional and instrumental support and low in conflict will predict psychosocial adjustment and higher training completion and performance scores.

(C) Increased friendship qualities over time will also be associated to better outcomes because the resources available from a distal developmental setting (civilian friendships) become less influential over time for adaptation than resources available from the current setting within which the individual is currently embedded.

*Hypothesis 3. Interactive role of organismic and contextual resources.*

Given the previous literature that suggests that the relationship between personality and outcome is partially moderated by how personality shapes behaviour, experience, and social context, it is expected that the military social environment will vary as a function of personality traits. Consistent with Van Lieshout's (1999) model, as further amplified in this study, pro-social personality traits assist the creation of higher quality friendships and translate into higher rates of peer acceptance. Thus, individuals will not only have the advantage of these organismic personality resources, but will also be better equipped to create better quality supportive friendships, thus also enjoying more contextual resources. Specifically, it is expected that higher Extroversion, Agreeableness, and Openness scores will be associated to friendships with higher instrumental and emotional support and lower conflict.

## METHOD

### Subjects

The total subject pool for this study consisted of 800 officer and recruit candidates undergoing basic military training at the Canadian Forces Leadership and Recruit School in St. Jean sur Richelieu in the summer of 1999. From this pool, 76.4% agreed to participate in this study at Time 1, giving us a total sample size of  $n=611$  at T1. Over the course of the study, there were a total of 133 failures accounting for 22% of the sample, and another 150 subjects (or 25% of the sample) who dropped out of the study but completed their training. The final sample sizes were  $n=389$  at T2, and  $n=321$  at T3.

Demographic data for the sample is shown in Appendix 1. Demographic summaries show that the sample was predominantly male (78% male, 22% female). Ages of subjects ranged from 16 to 45, with a mean age of 21 years,  $sd=4.6$  years. Demographically, the sample cuts across a large array of SES and geographic boundaries with participants coming from all over Canada, although predominantly from Quebec (35%) and Ontario (25%). Participants came predominantly from small and large urban settings (60% combined from cities with at least 500 000 residents), although a significant proportion (about 20%) came from small towns with less than 100 000 residents, and 12% from rural settings. With regard to educational attainment, 95% had completed high school, with 25% of whom had gone further and completed CEGEP or trade school before enrolment and 3% having completed a University Bachelor's degree. In terms of language, 50% of subjects were Anglophone, 35% Francophone, and 4%

Allophone (first language other than French or English). Ten percent did not disclose their first official language.

### Procedures

Data was collected longitudinally three times over the course of 10 weeks during subjects' Basic Training course. Time 1 (T1) was on the first day of arrival to their Basic Training course, before commencement of their official training. Time 2 (T2) occurred 5 weeks later, around the mid point of their training. Time 3 (T3) was around 5 weeks after T2 and coincided with the last week of training. At each data collection period, subjects were met for a 2-3 hour session where they filled in the paper and pencil questionnaires to assess personality, peer relationships and adjustment. Performance outcomes were obtained from the training staff for participating subjects.

### Instruments

#### *Predictors*

#### *Personality Measure*

Participants were given a 150 item personality assessment questionnaire drawn from Goldberg's (1999) International Personality Item Pool (IPIP). The IPIP is a copyright free FFM instrument which measures the Big Five personality traits: Extroversion, Neuroticism, Conscientiousness, Openness, Agreeableness. Within each trait are 6 sub-domains or facets. Reliability coefficients are presented for each trait in Table 2.

Table 2

*Reliabilities (Cronbach Alpha) for Big-Five Personality Trait scores at T1 and T3*

IPIP			
Personality Trait	Facet	$\alpha$ T1	$\alpha$ T3
Neuroticism	Anxiety	.89	.92
	Anger		
	Depression		
	Self-consciousness		
	Impulsiveness		
	Vulnerability		
Extroversion	Friendliness	.89	.91
	Gregariousness		
	Assertiveness		
	Activity Level		
	Excitement-seeking		
	Cheerfulness		
Openness to Experience	Imagination	.78	.83
	Artistic Interests		
	Emotionality		
	Adventurousness		
	Intellect		
	Liberalism		
Agreeableness	Trust	.81	.85
	Morality		
	Altruism		
	Cooperation		
	Modesty		
	Sympathy		
Conscientiousness	Self-efficacy	.89	.94
	Orderliness		
	Dutifulness		
	Achievement-striving		
	Self-discipline		
	Cautiousness		



Table 3

*Big Five Personality Trait intercorrelations from T1 to T3*

	T3 neuro.	T3 extro.	T3 openness	T3 agreeable	T3 consc.
T1 neuroticism	.365	-.369	-.135	-.233	-.301
T1 extroversion	-.185	.471	.228	.096	.125
T1 openness	-.088	.171	.524	.142	.082
T1 agreeableness	-.086	.084	.139	.347	.062
T1 conscientiousness	-.173	.192	.123	.204	.278
<i>N</i> = 319					

### *Peer Relationships*

*Friendship Nominations Scale.* Participants were presented with a list of all personnel in their platoon and asked to write down the names of their 6 best friends in descending order of preference. Nominations were then used to compute sociometric variables. Popularity was computed as the total number of friendship nominations received. Friendship status was computed as the total number of reciprocated nominations received. Expansion was computed as the total number of nominations made, irrespective of whether or not these nominations were reciprocated.

*Friendship/Acquaintance Description Form (Wright, 1984, 1985).* The Friendship/Acquaintance Description form measures friendship quality and has been used for measuring adult friendships. The version of the ADF that was used was a 67 item self-report questionnaire which assesses, on a five-point Likert-type scale, the extent to which participants feel that their friends can fulfill various relationship functions. The version used was the Veroff (1996) adaptation which differs from the original in that it contains 22 extra items giving rise to 5 more subscales. The final scale is comprised of 13 subscales (the last five comprising Veroff's adaptation): (1) Voluntary Interdependence; (2) Person Qua Person; (3) Utility Value; (4) Ego Support; (5) Stimulation value; (6) Self-Affirmation value; (7) Security Value; (8) Maintenance Difficulty; (9) Emotional Support; (10) Confiding (Self-disclosure); (11) Advice (Information/ Appraisal Support); (12) Affective Bond; and (13) Relationship Satisfaction.

The ADF was filled out for best friends as well as for the social network as a whole. For the network appraisal, four subscales replace voluntary interdependence,

person qua person, and maintenance difficulty scales: network involvement (size and frequency of contacts), density, social integration, and network size.

Because of the high statistical overlap between measures, the friendship dimensions were aggregated by conceptual similarity to form broad friendship dimension. The dimensions of Voluntary Interdependence, Person Qua Person, Stimulation Value, and Reciprocity were used to compute a Companionship measure. Ego support, Self-affirmation, Security Value, Emotional Support, Confiding, and Affection were used to compute an Emotional Support measure. Utility and advice were used to compute an Instrumental support measure. Finally, because of the high intercorrelations between these dimensions (ranging from  $r=.79$  to  $.82$ ) the dimensions were further aggregated to form two broad friendship dimensions: Positive Friendship Qualities (comprised of Companionship, Emotional Support, and Instrumental Support) and Negative Friendship Qualities (comprised of items reflecting Conflict and Maintenance Difficulty). The final reliabilities for the Positive and Negative Friendship Qualities scales are shown in Table 4.

Table 4

*Reliabilities (Cronbach alphas) for Positive and Negative Qualities*

Friendship Quality	Cronbach Alpha		
	$\alpha$ T1	$\alpha$ T2	$\alpha$ T3
Positive Friendship Qualities	.95	.96	.97
Negative Friendship Qualities	.52	.59	.62

## *Outcomes*

### *Training completion*

Training completion was evaluated as a pass/fail by whether subjects passed or failed their training. Reasons for failures were not scored and thus failures could be due to subjects requesting to cease training, failing an essential training objective, or failing for medical reasons.

### *Training performance*

Training performance scores were obtained from the training staff only for those subjects who had completed their training and therefore had passed basic training. Training staff evaluated their trainees in a number of areas of soldiering proficiency and key training objectives ranging from drill, weapons handling, fitness, inspections etc. Training performance was thus the aggregate score subjects received across all training objectives. Scores were then standardized across all platoons and across officer and recruit trainees.

### *Psycho-Social Adjustment*

Psycho social adjustment was evaluated using the Symptom Check List (SCL-90; Derogatis et al). It assesses psychosocial maladjustment and susceptibility as well as change in the relative psychological health of subjects in nine areas of functioning: Somatization, Depression, Phobic, Obsessive-Compulsive, Anxiety, Paranoia, Interpersonal Sensitivity, Hostility, Psychoticism. Because of the high intercorrelations of the subscales, SCL-90 scores were aggregated to form a single psychosocial

maladjustment index. Reliabilities for the psychosocial adjustment measures are presented in Table 5.

Table 5

*Reliabilities (Cronbach Alpha) for Psychosocial Adjustment Subscales and Aggregated Score*

Adjustment measure	Cronbach Alphas		
	$\alpha$ T1	$\alpha$ T2	$\alpha$ T3
Somatization	.91	.93	.94
Depression	.93	.94	.95
Phobic	.90	.94	.95
Obsessive-Compulsive	.90	.92	.94
Anxiety	.90	.94	.94
Paranoia	.86	.90	.91
Interpersonal Sensitivity	.90	.93	.94
Hostility	.85	.88	.88
Psychoticism	.90	.94	.94
SCL Aggregated Total Score	.98	.99	.99

### *Controlling factors*

*Social Desirability: Marlowe-Crowne Social Desirability Scale* (Crowne & Marlowe, 1964). This measure is a 10 item scale which assesses the tendency for subjects to respond defensively thereby presenting themselves in an overly positive light.

### Plan of analysis

The data were analysed in three parts. Part one explores the influence of personality factors on performance and adjustment. Part two explores the unique influence of social factors on performance and adjustment, including sociometric measures and friendship qualities. Part three explores the links between personality factors and social relationships.

Multilevel modeling was used to determine the predictive value of personality and social relationships and whether changes in these factors across time could predict training performance. The term “multilevel” refers to hierarchical or nested data structure, usually within organizational groups, but the nesting may also consist of repeated measures within people, or respondents within clusters and in cluster sampling. Because of the focus on ecological theory and transitions, it is important to investigate the evolving relationship between individuals and their social context across time. The general concept is that individuals interact with the social context to which they belong, meaning that individual persons are influenced by the social groups to which they belong and that the properties of those groups are in turn influenced by the individuals who make up that group. Generally, the individual and the social groups are conceptualized as a hierarchical system with individuals and groups defined at separate levels. Such systems



can be observed at different hierarchical levels and as a result, may have variables defined at each level. This leads to investigations into the interaction between variables that describe the individuals and variables that describe the group.

To conduct these analyses, a Hierarchical Linear Modeling (HLM) program was used which involved computing a linear regression on regression equations (Arnold, 1992; Bryk & Raudenbush, 1992; Diez-Roux, 2000). There can be two or more levels of analysis depending on the complexity of the design and HLM can accommodate multiple levels simultaneously, thus eliminating the need for multiple analyses and protecting against type II error inflation. As well, it was important to include longitudinal contrasts to evaluate not only if personality traits were associated with outcomes, but also, if changes in personality could also predict outcomes. Thus, it was important to look at the association between different growth curves from T1 to T3 for each personality trait and evaluate if success could be predicted by the initial levels of these variables as well as by how much individuals change during training. Similar longitudinal contrasts were computed for the friendship qualities allowing evaluations of the impact of change over time on outcome. Thus, it is also possible to glean some information about the overall impact of a developmental event such as military service and basic training has on personality evolution.

#### *Part 1: Personality and outcome.*

For personality, two levels were of main interest. At level one in this analysis, a separate growth curve was computed on each of the Big-five personality traits for each individual subject. The growth curves thus indicated how much each subject changed

over the course of the study from T1 to T3. For each person, a slope and an intercept were computed on each of the five dimensions. The level 1 growth curves were next used as the predictor variables for the level 2 analysis where changes in each of the Big-five were used to predict performance at the end of training. Before examining the impact of predictors, an “unconditional model” (i.e. model without predictors (at both level 1 and 2) was run to determine the proportion of variance explained for by personality traits and these data were then used to determine how much variance each predictor explained in its respective equation. Overall, only 2% of the variance was accounted for by the between subjects effects.

The level 1 analysis yielded a coefficient indicating the intercept  $\beta_{0j}$  which was then entered as the predictor for the Level 2 analysis which yielded a coefficient reflecting the slope  $\beta_{1j}$ . Thus, there are two regression equations at the level 2 analysis: one equation to predict the intercept which evaluates the predictive value of initial levels of the personality trait, and one equation to predict the slope to evaluate the predictive value of changes in personality across time (before and after entering military service).

The final level 1 model for personality was:

$$Y = \beta_0 + \beta_1 (\text{time}) + \beta_2 (\text{openness}) + \beta_3 (\text{conscientiousness}) + \beta_4 (\text{extroversion}) + \beta_5 (\text{agreeableness}) + \beta_6 (\text{time} \times \text{conscientiousness}) + \beta_7 (\text{time} \times \text{extroversion}) + \beta_8 (\text{time} \times \text{agreeableness}) + \beta_9 (\text{time} \times \text{openness}) + r$$

The level 2 model:

$$\begin{aligned}\beta_0 &= \gamma_{00} + \gamma_{01} (\text{sex}) + \gamma_{02} (\text{training performance}) + u_0 \\ \beta_1 &= \gamma_{10} + \gamma_{11} (\text{sex}) + \gamma_{12} (\text{training performance}) + u_1 \\ \beta_2 &= \gamma_{20} + \gamma_{21} (\text{sex}) + \gamma_{22} (\text{training performance}) + u_2 \\ \beta_3 &= \gamma_{30} + \gamma_{31} (\text{sex}) + \gamma_{32} (\text{training performance}) + u_3 \\ \beta_4 &= \gamma_{40} + \gamma_{41} (\text{sex}) + \gamma_{42} (\text{training performance}) + u_4 \\ \beta_5 &= \gamma_{50} + \gamma_{51} (\text{sex}) + \gamma_{52} (\text{training performance}) + u_5 \\ \beta_6 &= \gamma_{60} + \gamma_{61} (\text{sex}) + \gamma_{62} (\text{training performance}) + u_6 \\ \beta_7 &= \gamma_{70} + \gamma_{71} (\text{sex}) + \gamma_{72} (\text{training performance}) + u_7 \\ \beta_8 &= \gamma_{80} + \gamma_{81} (\text{sex}) + \gamma_{82} (\text{training performance}) + u_8\end{aligned}$$

$$\beta_9 = \gamma_{90} + \gamma_{91} (\text{sex}) + \gamma_{92} (\text{training performance}) + u_9$$

Because Neuroticism emerged as the most stable predictor of performance, its regression equation was used as the baseline measure of predictive validity. All other personality traits were contrasted with the predictive value of Neuroticism in predicting performance to examine if they offered an increase in predictive validity.

### *Part 2. Peer relations and outcome.*

Next, the relationship between best friendship quality (both before and after joining the military) and outcomes were examined. Two indexes of friendship quality were used: Positive Qualities (companionship, emotional support, and instrumental support) and Negative Qualities (maintenance difficulties and conflict). Separate HLM models were used to assess the impact of friendship quality (both positive and negative qualities) on each of the three outcomes: training completion (pass/fail), training performance (final score), and psychosocial adjustment (aggregated SCL-90 scores).

#### *Friendship quality and Training completion.*

For the analysis examining the association between friendship quality and training completion, time did not emerge as a significant predictor during initial analyses examining either positive or negative friendship quality and was removed from further analyses on training completion. The Level 1 model for pass/fail by maintenance difficulty was the following:

$$Y = \beta_0 + \beta_1 (\text{time}) + \beta_2 (\text{best friend maintenance difficulty}) + \beta_3 (\text{time} \times \text{best friend maintenance difficulty}) + r$$

The level 2 model :

$$\begin{aligned}\beta_0 &= \gamma_{00} + \gamma_{01} (\text{age}) + \gamma_{02} (\text{sex}) + u_0 \\ \beta_1 &= \gamma_{10} + \gamma_{11} (\text{pass/fail}) + \gamma_{12} (\text{age}) + \gamma_{13} (\text{sex}) + u_1 \\ \beta_2 &= \gamma_{20} + \gamma_{21} (\text{pass/fail}) + \gamma_{22} (\text{age}) + \gamma_{23} (\text{sex}) + u_2 \\ \beta_3 &= \gamma_{30} + \gamma_{31} (\text{pass/fail}) + \gamma_{32} (\text{age}) + \gamma_{33} (\text{sex}) + u_3\end{aligned}$$

A separate model was used for positive friendship quality with time effects removed from the model and maintenance difficulty coded as 0, thus removing the friendship quality factor from the model. The final models for positive friendship quality were:

Level 1 model:

$$Y = \beta_0 + r$$

Level 2 model:

$$\beta_0 = \gamma_{00} + \gamma_{01} (\text{pass/fail}) + \gamma_{02} (\text{age}) + \gamma_{03} (\text{sex}) + u$$

### *Part 3: Interactive effects of Personality and Peer Relations*

To test the interactive influence of personality and peer relations and evaluate the unique variance accounted for by personality traits in predicting friendship qualities, step-wise multiple regressions were computed by entering T1 friendship qualities on the first step and the Big-Five personality traits on the second step. Separate regression models were used for positive and negative friendship qualities.

## RESULTS

### Personality and Outcome

Hypothesis 1 had predicted that adaptation during a primary transition would be reflected by continuity and change in personality scores as subjects adapt to the situational demands of the military setting during Basic Training. Specifically, accommodation to situational demands of the new military setting was measured by changes in personality scores across time and these changes were then used to predict performance. In order to evaluate these predictions, first, stability analyses were conducted to test the continuity and change in personality. Second, HLM analyses were used to assess the association between changes in personality and performance.

#### *Stability of Personality*

To test the stability of individual differences and elucidate the least reordering during group-wide changes, stability analyses were conducted using the method proposed by Meng, Rosenthal, and Rubin (1992). This analysis consisted of comparing the correlation coefficients from T1 to T3 for each of the Big-Five personality traits and contrasting them with each other which allows a comparison of different levels of change across time and for each personality trait. Correlation contrasts from T1 to T3 are then standardized within the whole group and tested for significance using standard z-scores.

For the personality traits, Openness emerged the most stable personality trait from T1 to T3 with a correlation coefficient of  $r_{t1t3}=.52$ , being significantly more stable than Conscientiousness ( $r_{t1t3}=.28$ ,  $z=3.93$ ,  $p<.05$ ), Agreeableness ( $r_{t1t3}=.35$ ,  $z=2.88$ ,  $p<.05$ ) and Neuroticism ( $r_{t1t3}=.36$ ,  $z=2.47$ ,  $p<.05$ ), but not significantly more than Extroversion

( $r_{t1t3}=.47$ ,  $z=.94$ , ns). Conscientiousness emerged as the least stable personality trait with a T1 to T3 correlation of  $r_{t1t3}=.28$  and tended to show a group mean decrease over time, being significantly less stable than Openness ( $z=3.93$ ,  $p<.05$ ) and Extroversion ( $z=-3.26$ ,  $p<.05$ ), but not significantly different from Agreeableness ( $z=-1.12$ , ns) or Neuroticism ( $z=-1.46$ , ns). Figure 1 shows the differential coefficients of stability for the Big Five personality traits from T1 to T3.

Thus Hypothesis 1(A) was partially supported with Openness to Experience emerging as the most stable trait, followed by Extroversion, Neuroticism, Agreeableness and finally Conscientiousness. Conscientiousness emerged as both the least stable trait and the only trait that showed a significant mean change across settings with a tendency to decrease from T1 to T3.

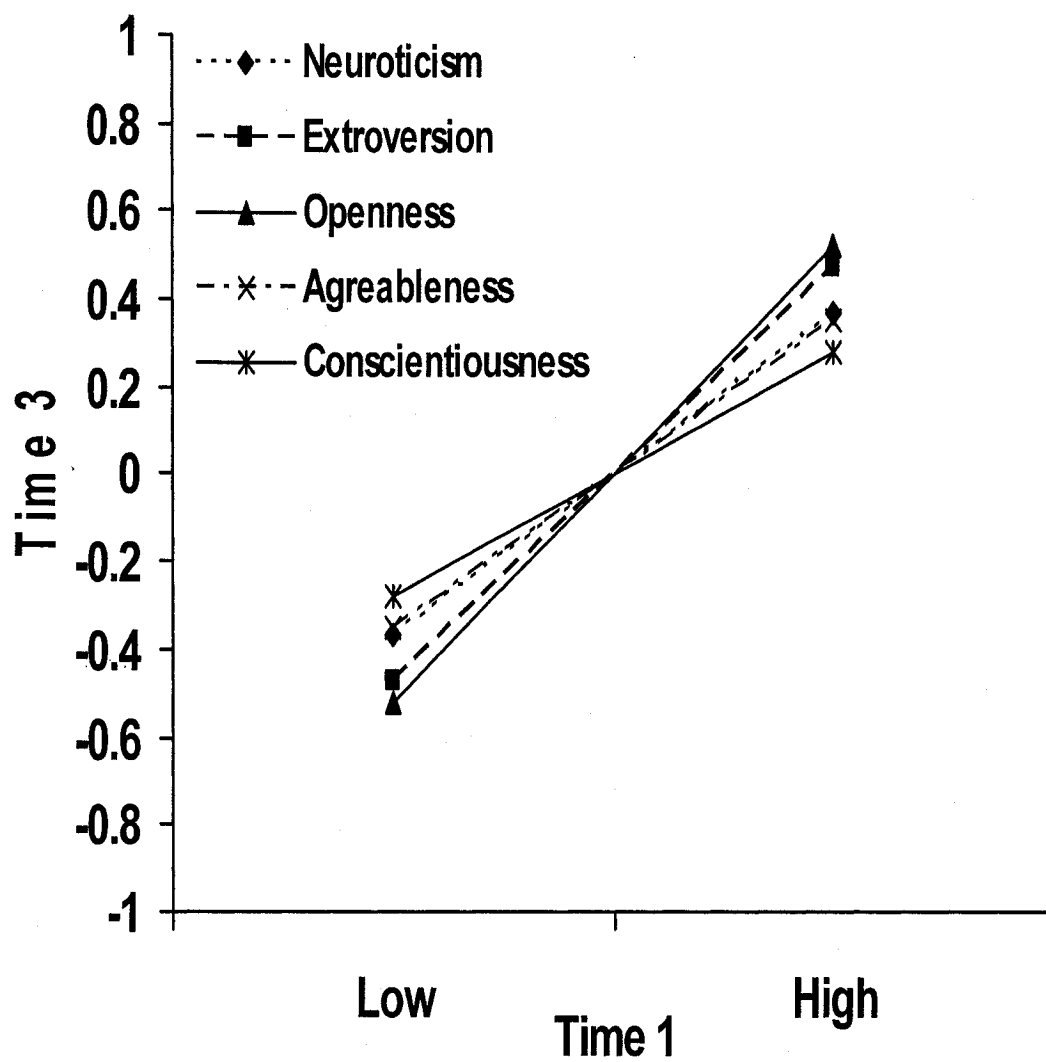


Figure 1. Stability coefficients for Big-Five Personality Traits.

*Personality Traits and Performance*

Next HLM analyses were conducted to elucidate the influence of changes in personality on adaptation. Initially, HLM analyses were conducted to assess the influence of personality traits on training completion. However, analyses showed that neither initial personality scores nor changes in personality affected whether subjects passed or failed training.

Next, HLM analyses examining the links between both initial and changes in personality traits and training performance were conducted. The results of this analysis are presented below for each personality trait and are found in Table 6.

*Neuroticism.* As expected, there was a significant intercept for Neuroticism (coeff=-.09,  $p<.01$ ), but there was no significant effect for the slope (coeff=-.03,  $p$  ns). This suggests that training completion was associated to lower initial rates of Neuroticism at T1, but not to changes in neuroticism from T1 to T3. Thus, subjects with higher Neuroticism scores at T1 were more likely to have low performance scores during training. The results for Neuroticism are further illustrated in Figure 2.

*Extroversion.* There was a significant effect for change in Extroversion on performance (coeff=.19,  $p<.01$ ), but not for the initial level of Extroversion (coeff = .08,  $p$  ns). This suggests that it is not Extroversion in general that is linked to performance, but rather changes in extroversion. Specifically, those who passed remained stable in extroversion while those who failed decreased in Extroversion (see Figure 5). There was a significant sex effect for the Extroversion intercept (coeff=.29,  $p <.05$ ) with women tending to be more extroverted than men in general. The results for Extroversion are further illustrated in Figure 5.



*Openness:* The slope (coeff=.07,  $p$  ns.) and the intercept (coeff=.07, ns.) for Openness were not associated with performance suggesting that Openness to experience is not a factor that is associated with training performance. However, there was a significant sex difference with women having higher Openness scores than men in general (coeff=.32,  $p<.01$ ). The results for Openness are presented in Figure 3.

*Agreeableness:* The intercept for Agreeableness was linked to performance (coeff=.11,  $p<.05$ ), but the slope was not (coeff=.10,  $p$  ns). This suggests that higher initial rates of Agreeableness were linked to passing training. Thus, this means that higher Agreeableness scores at T1 were associated to higher training performance scores. There was also a marginal trend for gender on initial rates of Agreeableness (coeff=.23,  $p=.06$ ) with women having higher levels of Agreeableness than men (see Figure 6).

*Conscientiousness:* There was a significant slope for Conscientiousness on performance (coeff=.21,  $p=.01$ ), but not for the initial level of Conscientiousness (coeff=.08,  $p$  ns). This suggests that it is not Conscientiousness in general that is linked to performance, but rather changes in Conscientiousness. Specifically, subjects who performed well in their training showed no decrease in conscientiousness over time whereas low performers tended to decrease in conscientiousness from T1 to T3 (refer to Figure 4).

Hypothesis 1(B) predicted that the salience of the primary transition could change personality in order for the individual to accommodate to the new setting even though personality scores were sampled within a relatively short 10-week period. This prediction was not broadly supported with results showing that only Conscientiousness tended to change over time with a significant group-wide decrease, showing significant stress

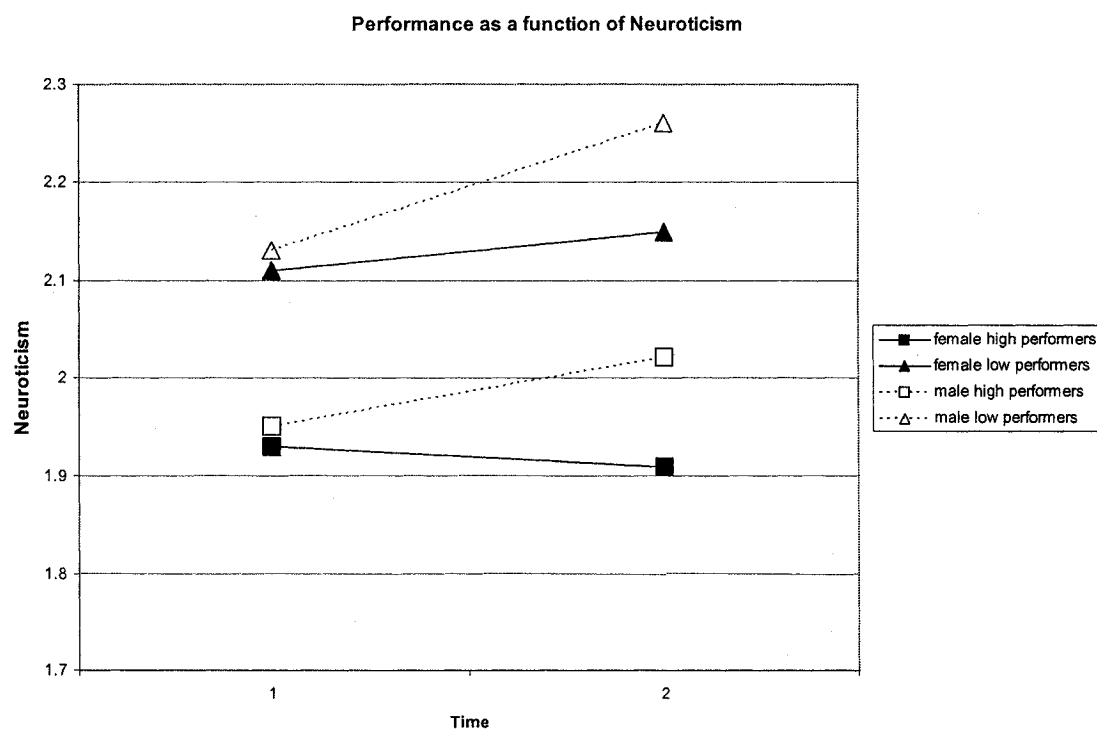
rather than accommodation to situational demands. However, Hypothesis 1(B) had also predicted that changes in personality would be associated to improved performance when this resulted in an increase in resources. Thus, this decrease in Conscientiousness did not improve adaptation, but rather was associated to poorer outcomes because it results in a net decrease in resources. Thus Hypothesis 1(B) is partially supported.

Table 6

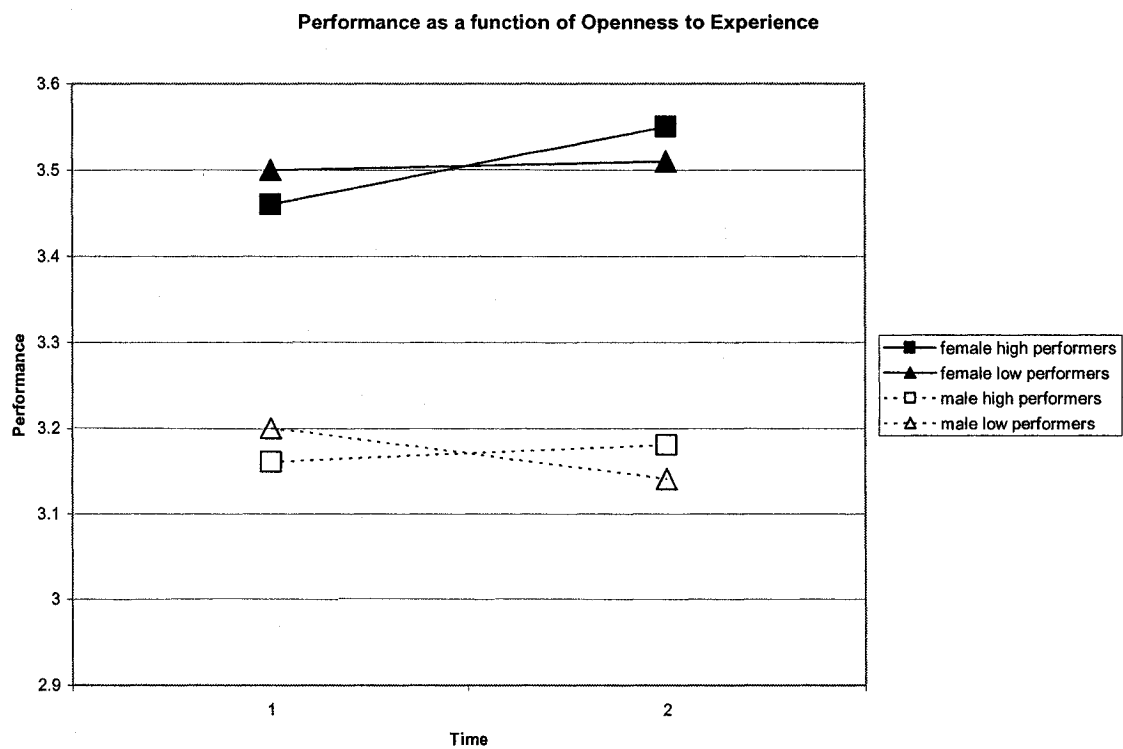
*HLM results for Big-Five personality traits and training performance*

Fixed Effect		Coeff.	SE	T-ratio	Df	p-value
Neuroticism	Intercept 1 $\beta_0$					
	Intercept 2 $\gamma_{00}$	2.06	.10	20.44	191	<.001**
	Sex $\gamma_{01}$	-.02	.08	-.298	191	.766 ns
	Performance $\gamma_{02}$	-.09	.03	-2.99	191	.003 **
Openness	Slope $\beta_2$					
	Intercept 2 $\gamma_{20}$	.82	.14	5.87	191	.00**
	Sex $\gamma_{21}$	.32	.11	3.05	191	.00**
	Performance $\gamma_{22}$	.07	.05	1.44	191	.15ns
Conscientiousness	Slope $\beta_3$					
	Intercept 2 $\gamma_{30}$	1.77	.18	9.97	191	.00**
	Sex $\gamma_{31}$	.14	.14	.99	191	.32ns
	Performance $\gamma_{32}$	.08	.06	1.29	191	.20ns
Extroversion	Slope $\beta_4$					
	Intercept2 $\gamma_{40}$	1.39	.17	8.12	191	.00**
	Sex $\gamma_{41}$	.29	.13	2.29	191	.02*
	Performance $\gamma_{42}$	.08	.06	1.21	191	.27ns
Agreeableness	Slope $\beta_5$					
	Intercept2 $\gamma_{50}$	1.28	.16	8.20	191	.00**

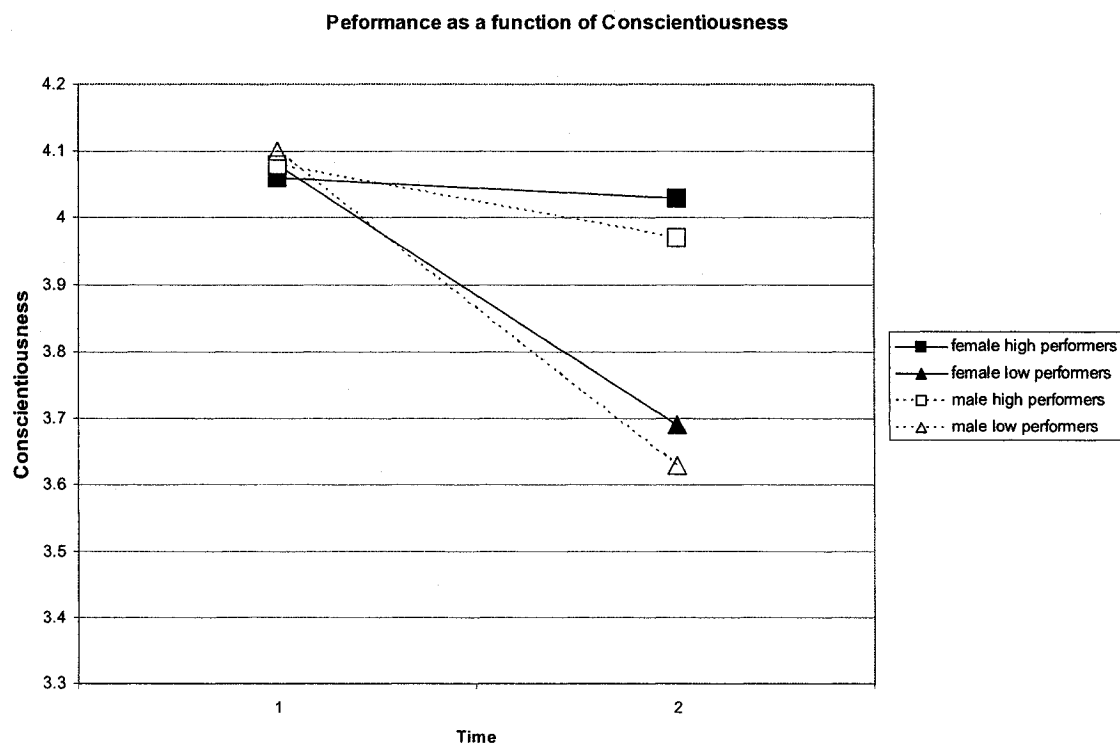
	Sex $\gamma_{51}$	.23	.12	1.85	191	.06ns
	Performance $\gamma_{52}$	.11	.05	1.97	191	.05*
Time x	Slope $\beta_1$					
Neuroticism	Intercept 2 $\gamma_{10}$	.19	.15	1.29	191	.20 ns
	Sex $\gamma_{11}$	-.09	.12	-.78	191	.43ns
	Performance $\gamma_{12}$	-.03	.04	-.65	191	.51ns
Time x	Slope $\beta_6$					
Conscientious.	Intercept2 $\gamma_{60}$	-.56	.24	-2.34	191	.02*
	Sex $\gamma_{61}$	.17	.19	.90	191	.37ns
	Performance $\gamma_{62}$	.21	.08	2.60	191	.01**
Time x	Slope $\beta_7$					
Extroversion	Intercept 2 $\gamma_{70}$	-.38	.25	-1.51	191	.13ns
	Sex $\gamma_{71}$	.10	.21	.46	191	.64ns
	Performance $\gamma_{72}$	.19	.07	2.63	191	.01**
Time x	Slope $\beta_8$					
Agreeableness	Intercept 2 $\gamma_{80}$	-.42	.23	-1.84	191	.07ns
	Sex $\gamma_{81}$	.15	.19	.80	191	.42ns
	Performance $\gamma_{82}$	.10	.07	1.51	191	.13ns
Time x	Slope $\beta_9$					
Openness	Intercept2 $\gamma_{90}$	-.28	.21	-1.35	191	.18ns
	Sex $\gamma_{91}$	.17	.17	.97	191	.33ns
	Performance $\gamma_{92}$	.07	.07	1.08	191	.28ns



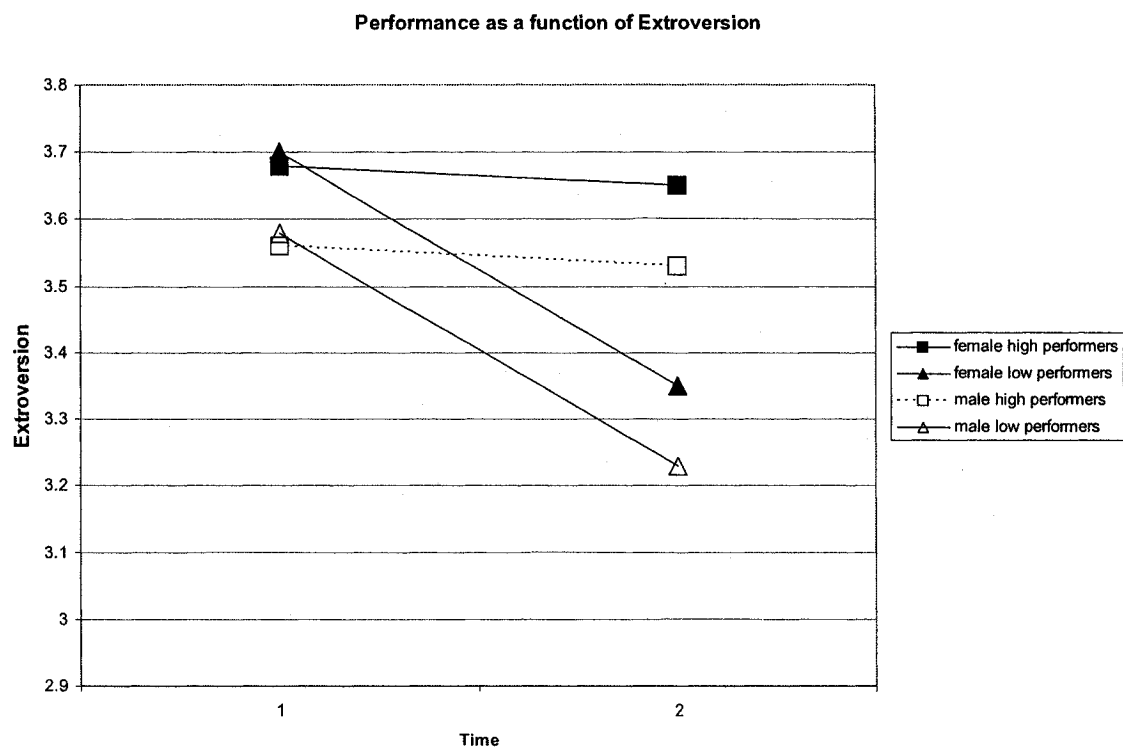
*Figure 2.* Stability of Neuroticism and performance.



*Figure 3. Stability of Openness and performance.*

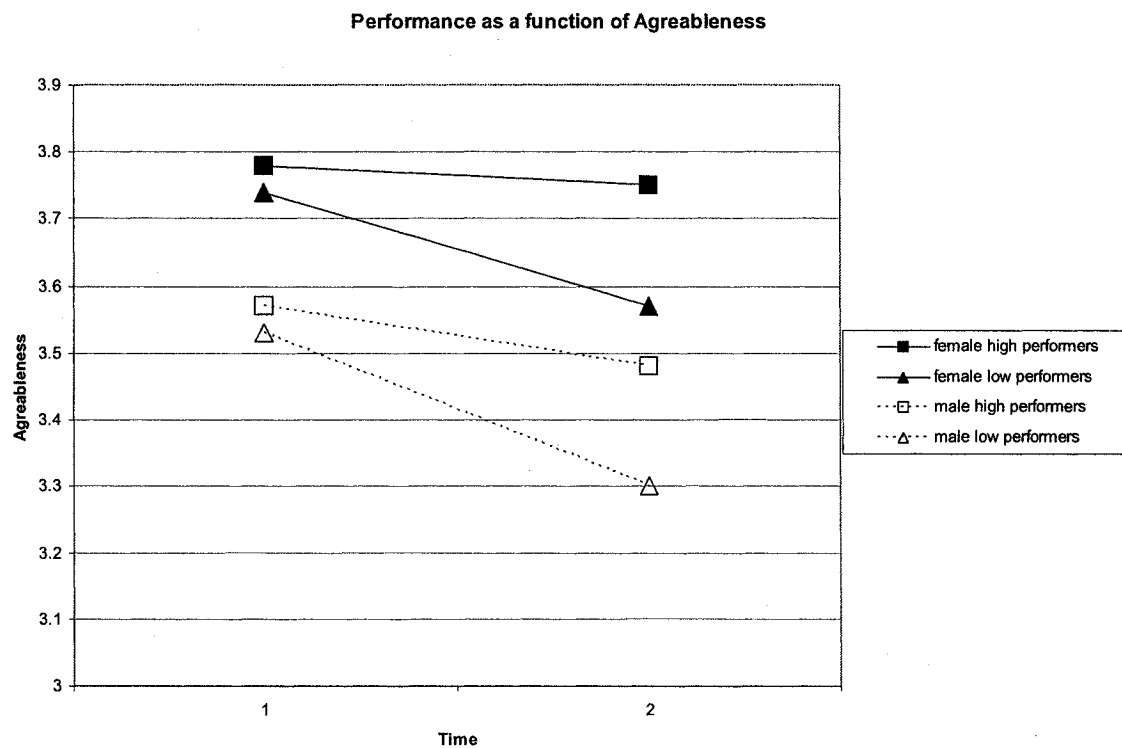


*Figure 4.* Stability of Conscientiousness and performance.



*Figure 5.* Stability of Extroversion and performance.





*Figure 6.* Stability of Agreeableness and Performance.

In this next section, the hypotheses concerning social and contextual factors are examined. Hypothesis 2 predicted that positive peer relations and social support would predict better psychosocial adjustment. Moreover, as stress increases during training, and individuals are increasingly isolated from social support from their home settings, the salience of the supportive effects of new friendships within the military should increase. In addition to better psychosocial adjustment, it was also expected that because the nature of the military context focuses on fostering instrumental interdependence, positive peer relations would translate into improved instrumental outcomes such as training completion and training performance.

Two indexes of friendship quality: positive and negative qualities, were assessed. Separate HLM analyses were used to assess the impact of friendship qualities on each of the three outcomes: training completion (pass/fail), training performance (final score), and psychosocial adjustment (aggregated SCL-90 scores).

#### *Sociometrics and outcome*

Hypothesis 2(A) had predicted that the number of friendship dyads within which the individual is embedded would be associated to improved adaptation. Because friendship nominations were assessed only within the military setting, no changes in sociometric variables could be assessed. Therefore, multiple regression analyses were used to assess the association between sociometric status and outcome. Four sociometric measures were included in this analysis: (1) Popularity (defined as the number of friendship nominations

received), (2) Expansiveness (defined as the number of friendship nominations made – regardless of whether or not these nominations were reciprocated), (3) Friendship (defined as the number of reciprocated friend nominations), and (4) Best Friendships (defined as a reciprocated best friend nomination). All four sociometric variables were entered as predictors in a single step in the regression. Sociometric status was not widely associated with either training performance or psychosocial adjustment. However, there were stronger associations between sociometric status and training completion. Specifically, popularity was associated to both training completion ( $\beta=.23$ ,  $p<.001$ ) and less strongly to training performance ( $\beta=.15$ ,  $p=.02$ ). Expansiveness also emerged as a predictor of training completion ( $\beta=.20$ ,  $p<.001$ ), whereas friendship and best friendship did not. Thus hypothesis 2(A) is supported suggesting that success in basic training is at least partly associated to network embeddedness and the number of different interpersonal relationships a person can create within a novel setting following a primary transition, whether or not those relationships are necessarily reciprocated.



*The effects of friendship quality on outcome*

Hypothesis 2(B&C) had predicted that adaptation would also be enhanced if the qualities of these peer interactions provided the individual with essential resources such as instrumental and emotional support. Thus, it was predicted that friendship qualities would be associated to adjustment and instrumental success. This hypothesis was evaluated using two separate HLM models examining the differential effects of positive and negative friendship quality on adjustment and training completion. The results for psychosocial adjustment are presented in Table 7, and illustrated in Figure 7 (Negative Qualities) and Figure 8 (Positive Qualities).

For the association between friendship quality and adjustment, growth curves were computed for friendship qualities and maladjustment at T1, T2 and T3 while controlling for initial maladjustment. Results showed that there was a significant association between negative friendship quality, time and psychosocial adjustment. Specifically, subjects who had low initial maladjustment scores at T1 and remained low on maladjustment through to T3 had negative friendship quality scores that remained low across time and thus did not show any increases in relationship conflicts during training. Conversely, these subjects did show increases in positive friendship qualities from T1 to T3.

For subjects who had high initial maladjustment scores but who improved at T3, their friendship qualities tended to improve over time with decreasing rates of conflict and increasing rates of instrumental and emotional support over time.

Those subjects who started low on maladjustment but ended high on maladjustment showing poor adaptation also showed increases in their level of negative

friendship qualities. Thus, regardless of initial maladjustment scores, individuals who experienced the highest levels of psychosocial maladjustment over the course of training and thus the poorest adaptation to the military setting tended to increase their level of interpersonal conflict with their friends over time and decrease the amount of emotional and instrumental support.

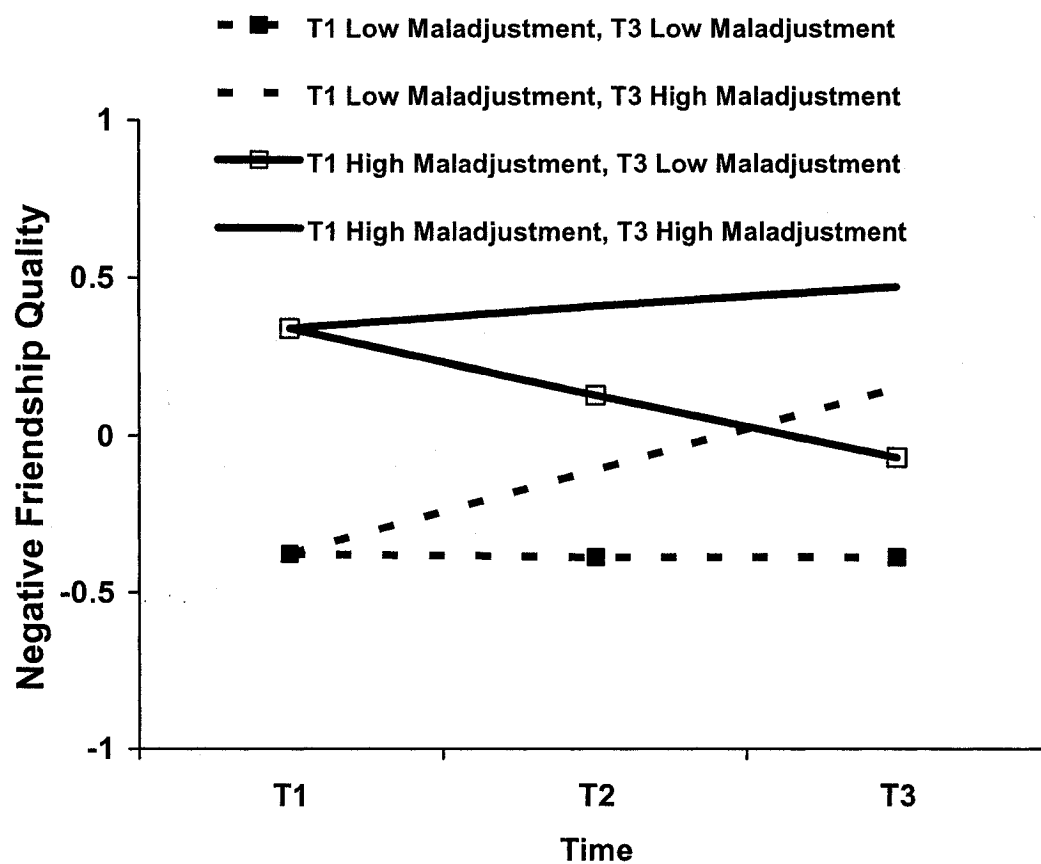


Figure 7. Growth Curves for Negative Friendship Quality and Adjustment Over Time.

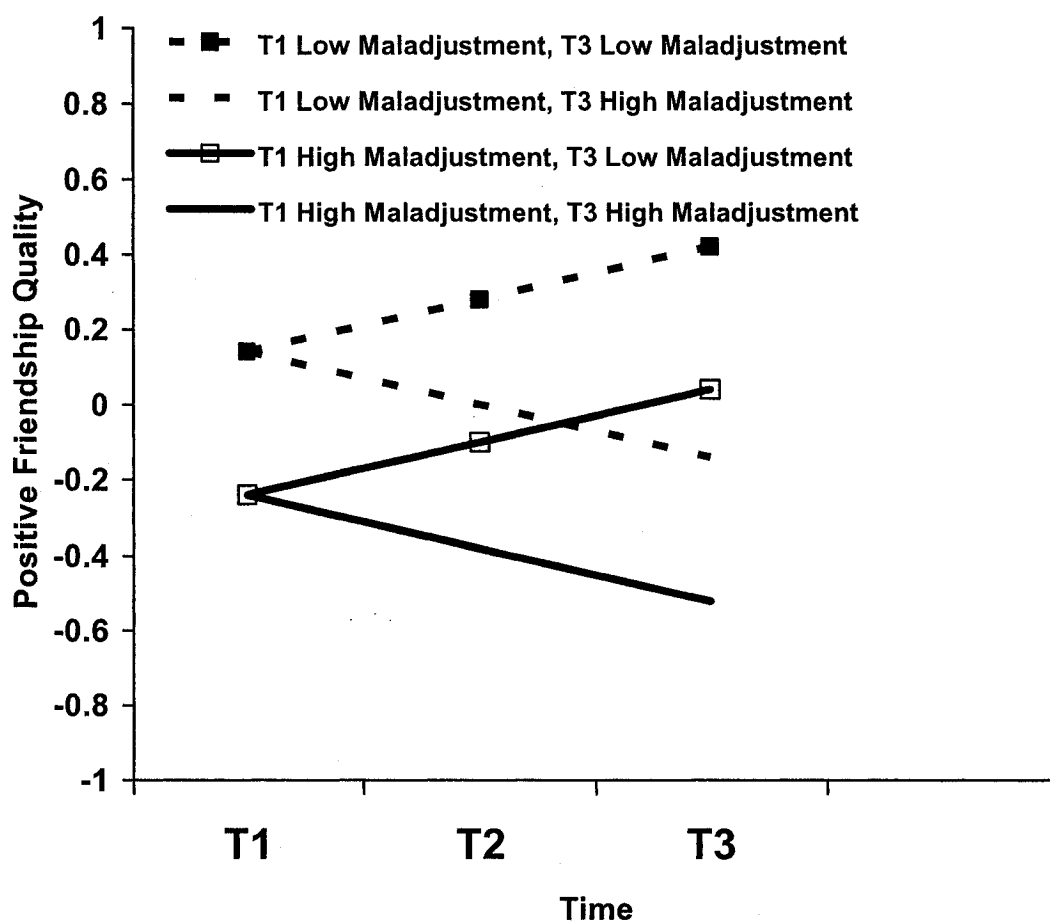


Figure 8. Growth Curves for Positive Friendship Quality and Adjustment Over Time.



Table 8

*Fixed Effects for HLM Best Friend Quality and Adjustment*

	Fixed Effect	Coeff.	SE	T-ratio	Df	p-value
Maladjustment Score	Intercept 1 $\beta_0$					
	Intercept 2 $\gamma_{00}$	-.05	.06	-.92	241	.36ns
	T1 maladjustment $\gamma_{01}$	-.19	.04	-4.13	241	.00**
Time	Slope $\beta_1$					
	Intercept 2 $\gamma_{10}$	.00	.01	-.12	241	.91ns
	T3 $\gamma_{11}$	-.03	.01	-5.32	241	.00**
Friendship Quality	Slope $\beta_2$					
	Intercept 2 $\gamma_{20}$	.03	.08	.41	241	.68ns
	T1 $\gamma_{21}$	.55	.07	7.93	241	.00**
Time X Friendship Quality	Slope $\beta_3$					
	Intercept 2 $\gamma_{30}$	.01	.01	.67	240	.51ns
	Maladjustment T1 $\gamma_{31}$	-.03	.01	-3.08	240	.00**
	Maladjustment T3 $\gamma_{32}$	.06	.01	6.65	240	.00**

*Best friendship qualities and training completion.*

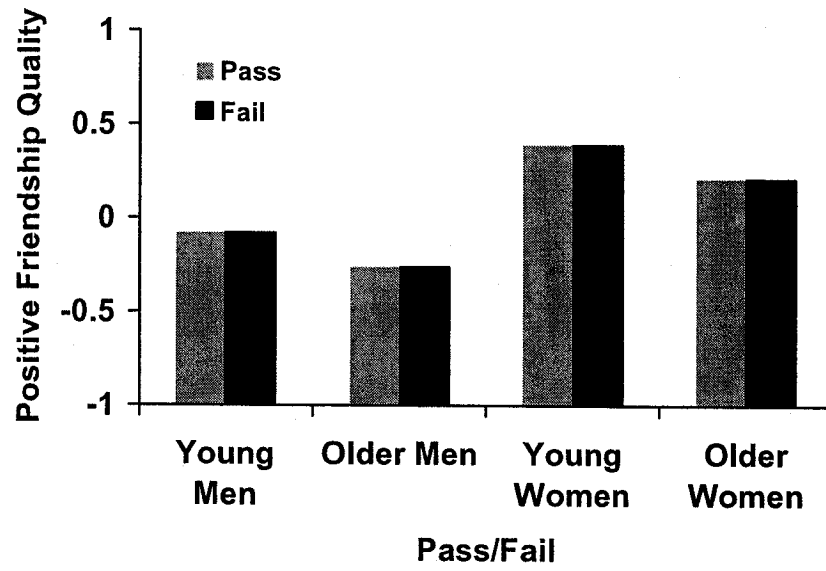
In this set of analyses, the association between friendship qualities and training completion were examined. At level 1, an unconditional model of the effects of friendship quality on training completion showed that total between subjects variance accounted for by this model was 22% leaving 78% accounted for by within subjects variance. An additional 2% of the between subjects variance was accounted for by age and sex. Time did not emerge as a significant predictor during initial analyses examining either negative or positive friendship quality and was removed from further analyses on training completion. This suggests that changes in friendship quality over time were not significantly associated to training completion.

These results are presented in Table 8 and more closely illustrated in Figures 9 and 10 which display the interactive effects of sex and age on training completion separately for positive friendship quality (Figure 9) and negative friendship quality (Figure 10).

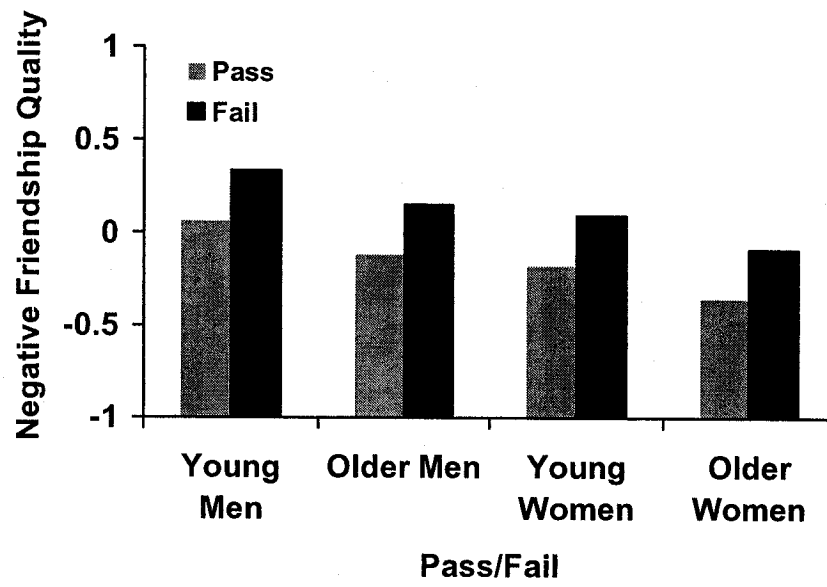
Figure 9 shows that positive friendship quality was related to sex (coeff=.27,  $p < .001$ ), and a moderate age effect (coeff=-.02,  $p < .001$ ), with women showing higher quality friendships than men and younger subjects showing higher quality friendships than older subject. However, no association was found with positive qualities and training completion.

For negative friendship qualities, Figure 10 shows that initial levels were linked to training completion (coeff=-.27,  $p < .01$ ), but changes were not (coeff= .02,  $p$  ns). Specifically, higher initial levels of negativity with friends before subjects entered the military were associated to higher levels of training failure. In addition, sex was linked

to negative friendship qualities (coeff=-.71,  $p < .001$ ) with males reporting more conflict and maintenance difficulties than females.



*Figure 9.* Positive Friendship Quality and Training completion.



*Figure 10.* Interactive effects of Age, Sex, Negative Friendship Quality and Training Completion.

Table 9

*Effects for Friendship Quality and Training Completion*

	Fixed Effect	Coeff.	SE	T-ratio	Df	p-value
Intercept 1	$B_0$					
	Intercept 2 $\gamma_{00}$	-.21	.21	-1.00	514	.32ns
	T1 Age $\gamma_{01}$	-.02	.09	-1.95	514	.05*
	T1 Sex $\gamma_{02}$	.47	.09	5.48	514	.00**
Time	Slope $\beta_1$					
	Intercept 2 $\gamma_{10}$	-.02	.04	-.65	513	.72ns
	Pass/Fail $\gamma_{11}$	.03	.02	1.25	513	.21ns
	T1 Age $\gamma_{12}$	.00	.00	-.41	513	.68ns
	T1 Sex $\gamma_{13}$	.00	.02	.07	513	.94ns
Negative	Slope $\beta_2$					
Friendship Quality	Intercept 2 $\gamma_{20}$	1.12	.34	3.28	513	.00**
	Pass/Fail $\gamma_{21}$	-.27	.01	-2.79	513	.01**
	T1 Age $\gamma_{22}$	.00	.01	-.11	513	.91ns
	T1 Sex $\gamma_{23}$	-.71	.14	-5.11	513	.00**
Time X	Slope $\beta_3$					
Friendship Quality	Intercept 2 $\gamma_{30}$	.05	.06	.82	513	.41ns
	Pass/Fail $\gamma_{31}$	-.02	.03	-.82	513	.41ns
	T1 Age $\gamma_{32}$	.00	.00	-.29	513	.77ns
	T1 Sex $\gamma_{33}$	-.01	.02	-.27	513	.79ns

Table 10

*Effects of Best Friendship Quality and Training Performance*

	Fixed Effect	Coeff.	SE	T-ratio	Df	p-value
Intercept 1	$B_0$					
	Intercept 2 $\gamma_{00}$	-.48	.16	-2.96	299	.00**
	Performance $\gamma_{01}$	-.02	.05	-.39	299	.70ns
	T1 Sex $\gamma_{02}$	.42	.13	3.27	299	.00**
Time	Slope $\beta_1$					
	Intercept 2 $\gamma_{10}$	-.02	.03	-.78	299	.44ns
	Performance $\gamma_{11}$	.02	.01	2.92	299	.00**
	T1 Sex $\gamma_{12}$	.01	.02	.62	299	.54ns
Negative	Slope $\beta_2$					
Friendship Quality	Intercept 2 $\gamma_{20}$	.86	.25	3.49	299	.00**
	Performance $\gamma_{21}$	-.16	.08	-2.09	299	.04*
	T1 Sex $\gamma_{22}$	-.66	.19	-3.41	299	.00**
Time X	Slope $\beta_3$					
Negative Friendship	Intercept 2 $\gamma_{30}$	.01	.04	.40	299	.69ns
Quality	Performance $\gamma_{31}$	-.01	.01	-1.18	299	.24ns
	T1 Sex $\gamma_{32}$	-.01	.03	-.28	299	.78ns

*The interactive effects of personality and friendship quality*

To test the interactive influence of personality and peer relations and evaluate the unique variance accounted for by personality traits in predicting friendship qualities, step-wise multiple regressions were computed by entering T1 friendship qualities on the first step as a control and the Big-Five personality traits on the second step. Separate regression models were used for positive (Table 11) and negative (Table 12) friendship qualities.

Hypothesis 3 had predicted that pro-social personality traits would facilitate the creation of social relationships within the military and result in higher levels of peer acceptance and better quality friendships, thus shaping a social environment that would facilitate adaptation because of the availability of contextual resources. Results showed that Neuroticism ( $\beta = -.156$ ,  $p = .007$ ) predicted subsequent Negative friendship qualities at T2 suggesting that individuals with high rates of emotional instability were more likely to create conflictual relationships within the military. Surprisingly, Openness also emerged as a predictor of negative friendship qualities, contrary to what was hypothesized and although Openness is generally considered to be a prosocial personality trait. Extroversion ( $\beta = .15$ ,  $p = .007$ ) and Conscientiousness ( $\beta = .15$ ,  $p = .005$ ) emerged as predictors of Positive Friendship Qualities at T2.

In terms of sociometrics, Neuroticism was negatively related to all sociometric variables and was generally related to lower popularity ( $r = -.14^{**}$ ), lower expansiveness ( $r = -.17^{**}$ ), lower number of friendships ( $r = -.11^{*}$ ) and fewer best friend nominations ( $r =$



12\*). Thus, Neuroticism was related to lower overall rates of peer acceptance and poorer embeddedness in the peer network.

In general though, personality traits were not strongly related to sociometric status. The one exception was Expansiveness, which showed significant correlations with Extroversion ( $r=.14^{**}$ ), Conscientiousness ( $r=.14^{**}$ ), and Agreeableness ( $r=.09^{*}$ ). Extroversion showed a significant relationship with reciprocated friendships ( $r=.10^{*}$ ). However, conclusions about Hypothesis 3 and sociometric status are somewhat mitigated because of the surprisingly low correlations ranging from .01 to a high of only -.17. The intercorrelations between personality traits and sociometric status are presented in Table 13.

Hypothesis 3 was only partially supported suggesting that certain prosocial personality traits can shape a positive peer environment whereas anti-social traits like Neuroticism tend to create smaller , more negative and less supportive peer support networks.

Table 11.

*T1 Big-five Personality Traits predicting T2 Positive Friendship Qualities*

N=421

Step	$\beta$	Std. Error	Stand. $\beta$	t	Sig.
1(Constant)	.0005	.042		.013	.990
T1 Positive BF Qual	.286	.049	.272	5.790	.000 ***
2(Constant)	-.01	.041		-.240	.811 Ns
T1 Positive BF Qual	.195	.054	.185	3.619	.000 ***
Neuroticism	.05	.049	.057	1.088	.277 Ns
Extroversion	.137	.050	.150	2.720	.007 **
Openness	.04	.047	.046	.875	.382 Ns
Agreeableness	-.01	.046	-.011	-.221	.825 Ns
Conscientiousness	.141	.050	.154	2.832	.005 ***

## Model Summary

	R	R <sup>2</sup>	Adjusted R <sup>2</sup>	Std. Error of Estimate	R <sup>2</sup> Change	F Change	df1	df2	Sig. F Change
Step 1	.27	.07	.07	.87	.07	33.521	1	419	<.001
Step 2	.36	.13	.12	.85	.05	5.147	5	414	<.001

Table 12.

*T1 Big-five Personality Traits predicting T2 Negative Friendship Qualities*

N= 308

Step	$\beta$	Std. Error	Stand. $\beta$	t	Sig.
1(Constant)	-.081	.046		-.189	.850
T1 Negative BF Qual	.335	.046	.339	7.321	.000 ***
2(Constant)	-.014	.046		-.304	.762 Ns
T1 Negative BF Qual	.319	.048	.322	6.632	.000 ***
Neuroticism	.129	.057	.124	2.281	.023 **
Extroversion	.104	.055	.103	1.894	.059 Ns
Openness	-.002	.050	-.002	-.034	.973 Ns
Agreeableness	.114	.050	.115	2.305	.022 *
Conscientiousness	.020	.055	.018	.338	.736 Ns

## Model Summary

	R	R <sup>2</sup>	Adjusted R <sup>2</sup>	Std. Error of Estimate	R <sup>2</sup> Change	F Change	df1	df2	Sig. F Change
Step 1	.339	.115	.112	.9421	.115	53.599	1	414	.000
Step 2	.382	.146	.133	.9311	.031	2.968	5	409	.012

Table 13.

*Intercorrelations between T1 Big-Five personality Traits and T3 Sociometrics*

N= 308

Personality Trait	Popularity	Expansiveness	Reciprocated Friendships	Best Friendships
Neuroticism	-.14 **	-.17 **	-.11 *	-.12 **
Extroversion	.11	.14 **	.10 *	.02
Openness	-.08	.06	-.05	-.05
Agreeableness	.01	.09 *	.02	-.01
Conscientiousness	.01	.14 **	.01	.04

\* sig. &lt;.05

\*\* sig. &lt;.01

## DISCUSSION

The present study sought to investigate the factors that facilitate or hinder adaptation during important life transitions in a sample of 611 older adolescents and young adults (mean age=21, s.d.= 4) undergoing basic training in the military. Ecological theory posits that adaptation during transitions across micro-systems (the direct context in which the individual is embedded) and meso-systems (the cultural or sub-cultural context in which an individual's relationships is embedded) can be facilitated or hindered by the availability of certain resources. Although screening for potentially successful applicants in the military has historically focused on identifying factors that predict technical proficiency, recent anecdotal evidence as well as research has suggested that technical proficiency is often not enough in predicting positive adaptation. This is especially true in an evolving military landscape where behavioural and emotional adaptation are important aspects to consider, and the emotional costs of adaptation failures can be catastrophic.

Two important resource domains were investigated: (1) Organismic Intra-personal resources consisting of an individual's personality traits and (2) Contextual resources consisting of an individual's social relationships. These elements of organismic and contextual resources were used to predict performance using three ecologically valid outcomes: training completion (whether subjects passed or failed training), training performance (how well they did on their training), and psychosocial adjustment. Moreover, it was important to not only elucidate *whether* personality or social relations

had better predictive validity in predicting outcomes, but also *which* specific personality traits and which elements of peer relations had the most predictive power.

The uniqueness of the present study resides in several factors. First, the study was longitudinal in design and used both starting points and patterns of change across time as predictors, allowing evaluation of the net effect of a significant developmental event such as Basic training on the developing individual. Second, the study was also transitional in design, following individuals navigating a developmentally salient transition from adolescent to adult social roles, and undergoing a primary ecological transition across both micro- and meso-systems. Third, the study used multi-level modelling techniques to assess the joint influence of variables at different levels of social complexity, starting at the self, and moving outward to dyadic best-friendships, sociometric status (i.e. popularity), and including not only the number of relationships, but also the qualities of these relationships to predict outcomes.

The main questions addressed by this study focussed on comparing and contrasting the differential effects of personality and social relationships in an effort to elucidate the relative salience of each of these factors, as well as beginning to glean some insights into how one might shape the other. For example, how does personality shape an individual's social landscape and their ability to create supportive peer relationships? And what is the effect of proximal resources in a novel social environment as distal resources from a home environment lose their influence?

### Finding 1

Hypothesis 1 had predicted patterns of stability and change of personality traits in response to a primary transition from a home to a military setting. Previous research on personality has suggested that personality is an enduring personal difference variable that transcends context, yet, personality has been shown to evolve over time. Specifically, whereas most personality research looks at personality changes across years and decades, it was expected that Basic Training is an intense enough developmental experience because it is a transition on many levels that it can stimulate change in personality across a relatively short 10-week period. It was expected that there would be relative stability of personality traits because personality is thought to transcend situation and context. However, accommodation to the situational demands of Basic Training was expected to be manifested by changes in mean scores to reflect military culture. Where these changes represented increased personal resources and fit to the new cultural context, it was expected that this accommodation would result in improved outcomes.

Finding 1 partially supported this hypothesis and showed differential stability across the Big-Five personality traits with T1 to T3 correlations ranging from a low of .28 for Conscientiousness to a high of .47 for Openness to Experience. Openness to Experience emerged as the most stable trait, followed by Extroversion, Neuroticism, Agreeableness and finally Conscientiousness, which emerged as both the least stable trait and the one that showed the most significant mean changes across settings from T1 to T3. This suggests that accommodation to the military culture was not necessarily manifested by broad changes in personality scores, with only Conscientiousness showing a significant decrease from T1 to T3. The stability coefficients were lower than expected

suggesting that although there were no significant mean changes, there may have been a significant reordering of scores across individual subjects. Moreover, whereas it was expected that changes in personality would reflect increases in Extroversion, Openness, Agreeableness and Conscientiousness, this pattern of change did not emerge in the results.

This pattern of results is contrasted with previous research. In a meta analysis of 152 studies in which personality was assessed on at least two occasions, Roberts and DelVecchio (2000) found that the average correlations between scores at T1 and T2 which were on average 6 to 7 years apart was .31 in infancy and early childhood, .54 in the college years, .64 at age 30, and .74 from age 50 on, suggesting that personality becomes more stable with age. When contrasted with this meta-analysis, the relatively low correlations found in this study suggest that Basic Training is a developmentally salient experience that promotes intraindividual change and development. Thus, even though this and previous research has confirmed the argument for relatively enduring personality traits across contexts, there is also important intrapersonal evolution during major life transitions in response to changing environmental demands as seen in these results. Moreover, even though the successive measures of personality were only 10 weeks apart, significant changes were already evidenced in response to the new military context.

Surprisingly, the one personality trait that displayed the least stability and the most significant mean change from T1 to T3, Conscientiousness, actually showed a mean decrease over time. Initially, it was expected that part of adaptation to military culture would be increased Conscientiousness scores, and therefore, these results seem



counterintuitive because at first glance they suggest that accommodation to the military means decreased Conscientiousness and a decrease in resources. However, a more plausible alternative interpretation of this group-wide decrease emerges when the pattern of change for Conscientiousness is contrasted with training performance scores. It is probable that what appears to happen is that subjects become more stringent in their standards of Conscientiousness during their training and therefore rate themselves as lower at T3 because they have internalized expectations for incredibly high standards which they did not have before. Anecdotal support for this interpretation comes from a salient example of the expectations during morning inspections. Few people, if any, in a normal context would take 1 hour to make their beds, use a ruler to place the folds, and an iron to remove the creases and a lint brush to remove stray hairs without being considered pathologically compulsive. However, this is a common morning ritual during military training, where some trainees even go so far as to sleep on the floor in order to avoid messing up their beds.

There may be other factors as well that may influence the patterns of stability noted in this study. McCrae & Costa et al (2000) have reported that there are age-group differences in scores on the Big Five personality dimensions. Specifically, Neuroticism, Extroversion (especially excitement seeking) and Openness to experience all decline modestly from adolescence to middle age, whereas Agreeableness and Conscientious increase modestly over this same age range (McCrae et al., 1999, 2000). Therefore, it can be concluded that part of the individual maturational process is a change in this direction for the individual Big-five traits. However, in this study, even though stability coefficients and successive correlations were not very high, there were no mean changes

in personality traits associated to this developmental transition beyond decreases in Conscientiousness. This suggests that in this study, contextual pressures outweigh developmental maturational pressures seen in longer term studies.

Caspi (1998) has argued that several factors tend to promote change in personality traits over time. First, a gene-environment interaction helps shape the social environment individuals seek out and create for themselves. For example, an extrovert's early sociability will elicit friendly responses from others, and they will seek out and create environments to their liking including places they can socialize, and where their initial tendency to be extroverted will be reinforced and rewarded. Second, Caspi (1998) argued that personality may change in response to changes in the social environment, including major life events such as a role or developmental transition. Third, there is an increased impetus for change when there is a misfit between an individual and their social environment. There is an increased likelihood for personality to change in response to the demands of the new social environment if the new environment has rigid social structures and rules, as well as severe consequences for deviance to the expected norms.

Hypothesis 1 had also predicted that changes in personality scores across time would be suggestive of accommodation to the military and would therefore be associated to improved outcomes when these changes represented increased resources or a better fit to military culture norms. Contrary to what was initially expected, Finding 1 also showed that changes in personality traits were not associated with either training completion or adjustment outcomes suggesting that accommodation was not necessarily evidenced by changes in trait scores. Finding 1 did show, however, that both initial personality trait

scores as well as changes in some scores were associated to overall performance and that the salience of personality increased over time.

For Conscientiousness, these changes tended to be associated to poorer performance. Upon closer examination, however, it is clear that this finding is in line with the hypotheses because a decrease in Conscientiousness scores reflects a decrease in self-perceived organismic resources and was thus also associated to poorer performance. Those subjects who had managed to maintain high Conscientiousness scores, and thus a high level of organismic resources, also performed better.

Neuroticism at T1 was a negative predictor of training performance for both men and women and showed relatively high stability ratings and little mean change over time whether subjects did well or poorly. Changes in Neuroticism scores over time were not associated with performance. Thus, individuals with higher Neuroticism scores before commencing training were more likely to have difficulty with their training and emerge with poor course results. As well, Neuroticism seems to be a relatively enduring personality trait and has high salience for predicting poor performance (although, surprisingly, not training completion). Moreover, the relationship between Neuroticism scores and performance tended to increase from T1 to T3, suggesting that the salience of emotionally unstable behaviour increases in predicting outcome as training progressed. As well, Neuroticism prior to joining the military strongly correlated to experiencing more intensely negative psychosocial symptoms across all times.

Openness to experience was also stable across time with a relatively high stability coefficient and no significant mean changes. In this sample, women tended to have higher Openness scores. Surprisingly, Openness did not predict performance however,

and did not emerge as an important individual resource for predicting performance.

This is surprising because of all of the personality traits, Openness was proposed to represent a certain mental flexibility which would tend to make individuals more adaptable to change and should constitute an important resource for facilitating both instrumental outcome and social adaptation.

Although there was a significant decrease in self-ratings of conscientiousness for the whole group, poor performers tended to show the largest decreases in self-rated conscientiousness over the course of training, whereas high performers tended to be stable.

There was a significant gender difference in Extroversion scores with women tending to be more extroverted and sociable than men, especially among those who performed well. Although initial Extroversion scores were not associated to performance, among both men and women, performance was related to more stable extroversion scores for high performers vs a significant decrease in extroversion scores for low performers.

Higher initial Agreeableness ratings at T1 were related to higher performance scores during training although Agreeableness tended to decrease over time for both men and women, possibly because training aims at promoting assertiveness and more goal leadership orientation. Thus, Agreeableness upon entering training seems to be an important personal resource even though the military context tends to make individuals less Agreeable over time.

Interestingly as well, although individual personality traits were not associated to psychosocial adjustment, the broad personality score comprising all five personality traits

did predict adjustment. The relative salience of personality traits as buffers against psychosocial maladjustment increases and the trend is for correlation coefficients between personality and adjustment to increase from T1 to T3 for almost all personality traits (see Appendix 1). Moreover, personality traits at T3 are better predictors of psychosocial adjustment than personality at T1 suggesting that the essential component in adaptation is not necessarily preexisting personality traits, but rather the ability to transpose those traits across contexts from distal to proximal, and develop essential resources later on within the more proximal context.

Overall, although personality traits alone were not very good predictors of outcome, one aspect that did emerge across different traits is the importance of steadiness. Steadiness is a person's ability to maintain their integrity in the face of situational challenges. Inasmuch as some flexibility and accommodation is necessary to fit in to a new social group and adapt to situational demands and challenges, steadiness, or the ability to remain Conscientious, Extroverted and Emotionally Stable during Basic training was associated with better course results. For these three personality traits, higher performers showed no changes in personality scores, whereas low performers showed decrease in Conscientiousness and Extroversion, and increases in Neuroticism. This suggests again that what is important is not necessarily the acquisition of new proximal resources that counts as much as the ability to maintain or transpose pre-existing resources to a new context.

One important finding of interest in this study is change in salience in personality traits. Personality traits at T1 had either weak or non-existing correlations with either training completion or adjustment. However, personality traits at T3 when subjects were

in their last week of training were strongly correlated to psychosocial adjustment.

This finding challenges the reigning wisdom in personality research because the general position in the personality literature is that personality is enduring and not very changeable. In fact, the very definition of personality insists that it is differentiated from state or contextual exigencies by the very fact that it endures across time and context. Yet, in this study, preexisting personality traits have less salience than the personality traits that are moulded or acquired during training. With the exception of Extroversion, each of the Big 5 personality correlated higher with psychosocial adjustment at T3 than at T1. Extroversion had a curvilinear trend with the correlation increasing with T2 psychosocial adjustment but decreasing slightly at T3. Interestingly however, even though the salience and predictive value of personality traits increases during training, the mean values of the personality traits themselves did not change.

## Finding 2

Hypothesis 2 had predicted that high quality friendships would facilitate transitions because they provide an important contextual resource. Because development is facilitated through interpersonal interactions, the quality of those interactions were predicted to have a positive influence on adaptation measured by all three outcome variables. Interestingly, Finding 2 showed that the different friendship functions of instrumental support, emotional support, and companionship did not differentially contribute to adaptation and were highly related to each other and were therefore aggregated into a single positive friendship score. It seems that adaptation was sufficiently accounted for by the two broad factors: overall positivity (an aggregate score

of the above friendship qualities) and overall negativity (measured by friendship conflict and maintenance difficulties). Moreover, as the stress of training and isolation from previous support networks increased (i.e. friends and family back home), the salience of the buffering effects of positivity and the exacerbating effects of negativity increased among new military friendships and there was a marked increase in correlations between friendship quality and psychosocial adjustment across time, with correlations ranging from .01 to .09 at T1 and increasing to .30 to .44 at T3.

Because of the nature of the military context focuses on fostering instrumental interdependence, negative peer relations also translated into lower performance scores and higher rates of training failure. In fact, it appears as though there exists a conflict prone personality that is susceptible to both maladjustment and increased interpersonal conflict, and in a context that promotes interdependence, this also leads to instrumental failure. Subjects who remained relatively well-adjusted over the course of training were more likely to have highly positive friendships and low levels of relationship conflict, both initially and across the course of training. However, regardless of initial maladjustment scores, individuals who ended high on maladjustment tended to increase their level of interpersonal conflict with their friends over time and saw their relationships deteriorate in terms of the positive qualities over the course of training. Thus, in terms of friendships, because it is difficult to transpose friendships across contexts, the salience of proximal friendships quickly outweighs the salience of distal friendships, even though initial friendships prior to joining the military did independently predict success and performance, likely because these relationships contribute to internal

working models or schemas of healthy relationships that are then created within the military.

It was also interesting to examine what happens when individuals must create a new peer support network in a novel environment. Can they create friendships that can fulfill their support needs? As it turns out, in this context, initial friendship qualities are less important in predicting successful adaptation than is the ability to create high quality, low conflict friendships once the individual has migrated to the new developmental context. The poorer the friendship qualities of the new military relationships, the less capable the person was in recreating micro and meso systems that could fulfill key personal needs and the poorer their adjustment and performance.

Hypothesis 2 had also predicted that development transitions would be enhanced as a direct function of the number of primary dyads with others. Specifically, it was expected that Popularity would predict instrumental outcomes. This hypothesis was supported and it was shown that popularity was related to higher training completion rates.

Thus, friendships (both quantity and quality) gain salience over the course of training. The closer subjects got to the end of training, the more salient their social relationships became for their overall success, performance, and psychosocial adjustment. Perhaps this is because the salience increases as the subjective level of stress experienced by subjects increases and isolation from previous support systems increases. Even though friendship qualities predicted adjustment and mitigated the emotional consequences of this life transition, it was sociometric variables that predicted training completion and performance. In other words, although friendship qualities are more important for



psychosocial health, the sheer number of people one can count are more important in the achievement of goals. The ability to get along with other people and generate positive relations with many seems more salient in terms of performance variables than creating positive relations with one good friend, which is important for mental health.

### Finding 3

Hypothesis 3 had predicted that personality and initial friendship qualities would interactively shape the social environment within the military. Specifically, it was hypothesized that prosocial personality traits such as Agreeableness and Extroversion would contribute to the formation of high quality social relationships and result in higher levels of peer acceptance. Surprisingly, finding 3 revealed that the relationship between personality factors and social relationships was relatively weak. Zero order correlations ranged from .09 to a high of .17. Even though some zero-order and regression coefficients ( $\beta$ s) were significant, the amount of variance accounted for in these analyses was rarely more than 1% for any single personality variable. For the regression equations, the most significant predictor of subsequent friendship qualities was initial friendship qualities. Initial Neuroticism scores predicted subsequent negative friendship qualities suggesting that individuals with high rates of emotional instability were more likely to create conflictual relationships within the military. Surprisingly, Openness also emerged as a predictor of negative friendship qualities, although Openness is generally considered to be a prosocial personality trait. Extroversion and Conscientiousness emerged as predictors of subsequent positive friendship qualities. Thus, Hypothesis 3

was partially supported suggesting that certain prosocial personality traits can shape a positive peer environment and Neuroticism tends to create negative peer environments, exacerbating a pre-existing vulnerability because of a potential lack of organismic resources by a creating a peer environment depleted of contextual resources. However, what seems to far outweigh this relationship, is the fact that subjects seemed to transpose their friendship qualities across contexts and recreate similar type friendships with new peers. This is significant because changing an individuals organismic resources and helping them improve intra-personal skills, may not necessarily help them to improve inter-personal relationships.

#### Closing comments and directions for future research

In the literature, personality-performance correlations are often low, rarely exceeding the .3 ceiling (Barrick & Mount, 1991; Schmitt, Gooding, Noe & Kirsch, 1984; Tett, Jackson, & Rothstein, 1991). In the present study, both the magnitude and the frequency of significant correlations were noticeably lower than those in the literature. Several possible explanations are presented below.

First, training performance cannot be equated with job performance. The factors involved in predicting training completion do not necessarily predict training performance, or for that matter, later job performance. Thus, it is possible that personality is more predictive of typical performance than peak or maximal performance that is required in intense training such as during Basic Military Training. As the first hurdle in their military careers, Basic Training abounds with stress (both physical and mental) and is consequently more appropriately defined as a maximum performance

situation (Bradley et al, 2002; Sackett, Zedeck, & Fogli, 1988) and thus is more likely to be predicted by other factors such as cognitive ability, physical fitness and motivation.

As well, the fact that there were significant changes in Personality over the course of the 10 week training programme thus raising the question whether personality 'traits' or context determined personality variables are being measured. More specifically, this sample was studied during a period of personal and developmental transition. This fact may also have had an effect on the strength of the relationship between personality (which is in flux during this assessment) and criterion variables.

Second, many of the measures of training performance represent multi-dimensional constructs. Basic Military training is a multi-faceted training activity which includes assessments on academic instruction, drill, weapons handling, leadership, uniform inspections, general attitude (especially for officer candidates who are evaluated on "officer-like qualities"), physical fitness etc. These evaluated facets are, in turn, multi-dimensionally composed of multi-faceted sub-assessments. For example, leadership is multi faceted, and so is physical fitness, and so are the elements evaluated during daily and weekly inspections. These multi-faceted measures are then aggregated into a single score of overall training performance. In the search for statistical cleanliness, the richness of these multifaceted performance variables may be neglected. Therefore, it is possible that certain aspects of these performance measures are related to some personality traits, but when these dimensions are combined to form composite or overall measures, these predictor-criterion correlations are obscured (Bradley, et al, 2002). Hough, (1992), suggested that part of the problem with much of the earlier research using personality to predict performance was that specific personality constructs (eg. Facets &

traits) were combined to form generalized personality constructs and, when correlated with broad measures of overall performance, positive and negative relations cancelled one another.

Third, if a situation is very restrictive and the impetus for assimilation is high, it can be ore difficult to predict behaviour from personality because the strong contextual demands will have a greater influence on behaviour and may obscure personality tendencies (Bradley, et al., 2002). During basic training, part of the training philosophy requires a “breaking down and rebuilding” of the individual’s personality in order to better fit into the organizational culture. Previous research has already commented on the deleterious effects experienced by “misfits” or individuals who have not conformed to social norms. In this context, common organizational values, attitudes, and appropriate behaviours are clearly specified, encouraged, and very powerfully shaped by the context of military training by strict reward and punishment contingencies. Outliers and misfits traditionally do not mould well into this culture. Moreover, for very demanding military specializations, training failure rates over the course of specialist training can sometimes go as high as 90% or more.

Finally, along the same vein, restricted ranges in the predictor variables may also account for the low correlations. Individuals who wish to join the military may share similar traits because of the perceived match between their personal values and the values of the military. Thus, there may already be a propensity for homogenization of characteristics of individual and of the organization, especially within organizations that have clearly defined cultural identities such as the military (Schiein & Diamante, 1988; Schneider, 1987). Further, individuals are selected into the military based on certain

characteristics (eg. Academic grades, extracurricular activities, performance during selection interviews etc) which again limit the range of variability in personality styles and further narrows the diversity of the sample population (Bradley, 2002). There are many points during the selection process before training even begins during which attrition (either by selection or by natural attrition and self-selection) can occur: during the initial selection, during the wait to be enrolled, during the wait for commencement of training after enrolment which can sometimes be as long as one year.

One additional comment that is important to make in this regard is that the qualities required to successfully complete training may or may not be similar to the qualities actually required to perform the specific technical trade. Job requirements sometimes call for different technical aptitudes and competencies as well as different personality traits. Basic Training completion and performance does not necessarily predict a candidate's later job performance in their specific military technical specialty. Some military specialties may call on the individual profile of persons who may not be well adjusted in the general population. For example, Harman, Sunde, Kreistensen, and Martinussen, (2003) and Steel et al, (1997) suggest that there may be a link between psychopathology and preference for high-risk military occupations (such as Special Forces personnel, Paratroopers, and Military Divers). Findings of previous research indicate that the predictive validity of personality measures increased when researchers chose measures on the basis of job analysis and the requirements of specific military specialties (Tett, Jackson, & Rothstein, 1991). To this end, the U.S. military has set at the disposal of recruiters and selection officers descriptions of the qualities viewed as essential for certain military specialties (Borman & Rose, 1986) since recruits are

specifically selected to fill certain trade openings and transfers to other military occupations are not always easy and rather discouraged. In Norway, selection of Norwegian Special Forces personnel are also carried out with specific job analysis criteria being specified and selected for which include personal abilities and characteristics identified by officers in charge of NSF units.

However, there is no such equivalent to the compendium of characteristics available for the in Canadian Military. What is presently selected for are cognitive aptitudes for specific technical trades evaluated by a general aptitude test. To this end, some researchers have called for expanding the criterion space and giving more attention to adaptive behaviours and personality factors (Hackett, 2002; Pulakos, et al., 2000). Undoubtedly, many CF jobs require versatility and adaptability (Hackett, 2002) and increasingly so in the modern geopolitical context. Several of the dimensions of adaptability identified by Pulakos et al., (2000) appear to be emotional and personality related rather than reliant on cognitive abilities or technical aptitudes. Moreover, these aptitudes may be critical such as the capacity to handle emergencies and crises, demonstrating interpersonal, cultural and physical adaptability in the face of foreign environments. These become all the more salient as Canadian Forces personnel are increasingly being deployed overseas for UN and NATO peacekeeping and peace-making missions which require more diplomacy and interpersonal intelligence than outright armed conflict. The nature of the missions has changed and requires soldiers to be more emotionally intelligent than they were in previous generations. In fact, adaptive performance may, in this new military context, predict long-term organizational and personal effectiveness more than traditional technical proficiency.

An expanded (multidimensional) performance domain is likely to require an expanded predictor set. For example, adaptability may be best predicted by emotional stability, behavioural flexibility, and situational awareness (Schmitt et al., 2003). Hough and Furnham (2003) call for a closer examination of proactive personality traits (Bateman & Crant, 1993; Crant & Bateman, 2000), socio-political intelligence (Hogan & Hogan, 1992), emotional intelligence (Goleman, 1998; Mayer, Salovey, Caruso, 2000), and situational judgement (McDaniel, Morgeson, Finnegan, Campion, & Braverman, 2001). In fact, McDaniel et al (2001) reported a mean correlation of  $r=.57$  between situational judgement and overall performance. Moreover, they showed that this relationship was independent of overall cognitive abilities or “g” providing incremental validity.

In this perspective, Basic Training should be seen as a ‘common denominator’ for military personnel. Future research agendas should follow successful trainees during their integration into their specific military occupational specialty and study the relationship between general training performance (such as Basic Training) and specialized training performance (such as trade-specific training) as well as subsequent job performance and psychosocial adjustment under extreme conditions such as during deployments. The consequences of individuals being mis-fit in their military occupations can be staggering: The average career of a Naval Reservist in Canada during the late 1990s was a mere 18 months, with over 50% turnover of personnel after the first six months. The cost of training for highly technical specialties is sometimes as high as \$1million per trainee over the course of training (ex. Air Force Pilots, and Naval Navigators).

Future research needs to focus on including measures of social relationships as a potentially important moderator of the personality and performance relationship. In this study, peer relationship quality had a ten-fold higher predictive value than personality traits in predicting training outcomes (22% vs 2%). And the zero-order correlations between sociometric measures like Popularity and Expansiveness and training completion were  $r=.40$ , and  $r=.44$ , respectively; the highest correlations predicting whether subjects would pass or fail training.

This obviously creates a challenge because social relations may be more changing than personality. However, this study shows that individuals have a tendency to transpose not only personality and organismic resources across contexts, but also contextual resources in the shape of friendship qualities and sociometric status even though these relationships are with different peers. Moreover, the salience of social factors seems to outweigh the salience of any other factor assessed in this study. Assessing a person's social adaptability, or the ability to create high quality social relations, may give researchers the ability to better discriminate potential adaptation failures and protect individuals from the negative consequences of failure.



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Appendix A:

Intercorrelation Matrices

Predictors and Outcome Variables

## Correlations between Big-Five personality traits and Outcomes

	Training completion	Training Performance	T1 Psycho- Social Adjustment	T2 Psycho- social Adjustment	T3 Psycho- social Adjustment
	N=522	N=307	N=549	N=388	N=304
t1neuroticism	-.108	-.212	.392	.254	.207
t1 extroversion	.078	-.011	-.178	-.054	.028
t1 openness	-.010	-.065	-.043	.031	.023
t1 agreeableness	-.010	.019	-.100	.023	-.030
t1 conscientiousness	.020	.041	-.247	-.135	-.043
	N=322	N=238	N=322	N=256	N=300
t3neuroticism	.036	-.079	.236	.420	.403
t3 extroversion	.051	.139	-.253	-.394	-.232
t3 openness	-.100	-.012	-.068	-.102	-.158
t3 agreeableness	-.013	.020	-.134	-.169	-.257
t3 conscientiousness	-.008	.170	-.275	-.379	-.464

## Zero-Order Correlation matrix between Sociometrics and Outcome

	Training Completion N=583	Training Performance N=365	T2 Adjustment N=387	T3 Adjustment N=304
T2 Popularity	.246 **	.176 **	-.028	-.025
T2 Friendship	.188**	.169 **	-.097	-.070
T2 Expansiveness	.221 **	.111 *	-.087	.002
T3 Popularity	.401 **	.242 **	-.041	-.033
T3 Friendship	.276 **	.147 **	-.068	-.054
T3 Expansiveness	.442 **	.106 *	-.096	-.055

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

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

## Zero-Order Correlations between Friendship Qualities at T1, T2 and T3 and Outcome

	Training Completion	Training Performance	T2 Adjustment	T3 Adjustment
	N=522	N=307	N=388	N=304
T1 Positive Friendship Qual.	.017	-.021	-.085	.003
T1 Neg. Friendship Qual.	-.104 *	-.166 **	.226 **	.092
	N=406	N=281	N=387	N=268
T2 Positive Friendship Qual.	.096 *	.087	-.230 **	-.058
T2 Neg. Friendship Qual.	-.078	-.128 *	.321 **	.179 **
	N=318	N=236	N=255	N=301
T3 Positive Friendship Qual.	-.029	.123 *	-.328 **	-.391 **
T3 Neg. Friendship Qual.	-.095	-.095	.251 **	.291 **

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

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