



Prospective Analysis of Canadian Forces Basic Training Attrition

Jennifer E.C. Lee
*Psychosocial Health Dynamics
Personnel and Family Support Research*

Donald R. McCreary
*Resilience Group
Individual Readiness Section
Defence Research and Development Canada – Toronto*

Lieutenant-Colonel Martin Villeneuve
*Director General Military Personnel Strategy and Coordination 4
Director General Military Personnel Strategy and Coordination*

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Defence R&D Canada
Director General Military Personnel Research & Analysis

Chief Military Personnel

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Principle Author

(Original signed by)

Jennifer E.C. Lee, PhD

Approved by

(Original signed by)

Catherine Campbell, MASC

Section Head – Personnel and Family Support Research

Approved for release by

(Original signed by)

Kelly Farley, PhD

Chief Scientist – Director General Military Personnel Research and Analysis

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Abstract

The aim of this prospective study was to identify key predictors of attrition from Canadian Forces (CF) basic training. Baseline health data from 5169 CF recruits collected using the Recruit Health Questionnaire (RHQ) were linked with administrative data kept by the CF Leadership and Recruit School (CFLRS) on basic training releases. The sample mostly consisted of Non-Commissioned (NCM) versus Officer candidates (88%), male versus female candidates (85.4%), and individuals under the age of 25 years (63.9%). Overall, the proportion of recruits from this sample who were released from basic training was 8%. They were primarily released on a voluntary basis (80.5%). A wide range of factors falling within each of the following categories were examined as potential predictors of attrition: demographic characteristics, social environment, health status, lifestyle, and personality. Logistic regression analyses pointed to increased odds of attrition among NCM candidates, recruits with one or more dependents, as well as those with an annual household income of less than \$20,000, poor/fair self-rated health, medium/high severity of somatic symptoms, higher neuroticism, lower mastery, and higher agreeableness. All things considered, results underscored the importance of good overall health and resilient personality to basic training success. Incorporating resilience training into the existing basic training curriculum may thus prove to be an effective strategy to reduce attrition from basic training.

Résumé

Cette étude prospective visait à repérer les principaux facteurs prédictifs d'attrition dans le programme d'instruction élémentaire des Forces canadiennes (FC). Des données de base sur la santé de 5 169 recrues des FC ont été recueillies à l'aide du Questionnaire sur la santé des recrues (QSR), puis comparées aux données administratives de l'École de leadership et de recrues des Forces canadiennes (ELRFC) sur les libérations des recrues qui suivaient l'instruction élémentaire. L'échantillon était surtout formé de candidats militaires du rang (MR) (88 %), de sexe masculin (85,5 %) et âgés de moins de 25 ans (63,9 %). Au total, 8 % des recrues de l'échantillon ont été libérées de l'instruction élémentaire, sur une base volontaire pour la grande majorité (80,5 %). Un large éventail de facteurs ont été examinés à titre de facteurs prédictifs d'attrition potentiels dans chacune des catégories suivantes : caractéristiques démographiques, environnement social, état de santé, mode de vie et personnalité. Les analyses par régression logistique indiquent un risque plus élevé d'attrition chez les candidats MR, chez les recrues ayant une ou plusieurs personnes à charge, chez celles dont le revenu du ménage annuel est moins de \$20,000, dont l'auto-évaluation de la santé est moins reluisante et qui présentent de plus graves symptômes somatiques que la moyenne, ainsi que chez les recrues qui présentent une plus forte tendance au névrosisme, une moins bonne maîtrise de soi et une personnalité agréable. Dans l'ensemble, ces résultats montrent que, pour réussir l'instruction élémentaire, il est important d'avoir une bonne santé et une personnalité résiliente. L'intégration de cours de développement de la résilience dans le programme d'instruction élémentaire pourrait donc s'avérer une stratégie efficace pour réduire l'attrition chez les recrues.

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Executive summary

Prospective Analysis of Canadian Forces Basic Training Attrition:

Jennifer E.C. Lee; Donald R. McCreary; Martin Villeneuve; DGMPPRA TR 2010-001; Defence R&D Canada – DGMPPRA; May 2010.

Introduction: Attrition from basic training places a financial strain on the military budget, as the costs of recruitment, food, accommodations, training, wages, and medical assessment and care are not recoverable once recruits are out of the system. Results of research on the factors associated with basic training attrition thus have the potential to provide valuable, evidence-based information for guiding the design of interventions aimed at minimizing this problem. The aim of this prospective study was to identify key demographic, social environmental, health, lifestyle, and personality factors predicting attrition from Canadian Forces (CF) basic training.

Method: Baseline health data from 5169 CF recruits, collected using the Recruit Health Questionnaire (RHQ), were linked with administrative data on basic training releases kept by the CF Leadership and Recruit School (CFLRS). The sample primarily consisted of Non-Commissioned (NCM) versus Officer candidates, male versus female candidates, and individuals under the age of 25 years who were enrolled in basic training between July 2003 and December 2005.

Results: Overall, the proportion of recruits from this sample who were released from basic training was 8%. They were primarily released on a voluntary basis (80.5%). A wide range of factors falling within each of the following categories were examined as potential predictors of attrition: demographic characteristics, social environment, health status, lifestyle, and personality. Logistic regression analyses pointed to increased odds of attrition among NCM candidates, recruits with one or more dependents, as well as those with an annual household income of less than \$20,000, poor/fair self-rated health, medium/high severity of somatic symptoms, higher neuroticism, lower mastery, and higher agreeableness.

Discussion: All things considered, results underscored the importance of good overall health and resilient personality to basic training success. Incorporating resilience training into the existing basic training curriculum may prove to be an effective strategy to reduce attrition from basic training.

There have been important changes in CF recruiting since 2005, such as the elimination of the physical fitness test as a recruiting requirement and implementation of an in-house program at the recruit school to help candidates who do not initially meet the minimum standard to improve their fitness in accordance with the standard. It thus remains unclear whether findings of the current study generalize to more recent cohorts of recruits. As a next step, there are plans to carry out similar analyses on RHQ data collected more recently to determine whether this is the case.

Sommaire

Prospective Analysis of Canadian Forces Basic Training Attrition:

Jennifer E.C. Lee; Donald R. McCreary; Martin Villeneuve; DGMPPRA TR 2010-001; R & D pour la défense Canada – DRASPM; Mai 2010.

Introduction : L'attrition dans le programme d'instruction élémentaire constitue un boulet financier à traîner pour la Défense nationale. En effet, les sommes dépensées pour le recrutement, l'alimentation, le logement, la formation, la rémunération ainsi que les évaluations et les soins médicaux ne sont pas recouvrables une fois les recrues libérées. Ainsi, les résultats de recherches sur les facteurs associés à l'attrition chez les recrues pourraient bien donner de précieux renseignements fondés sur des preuves, d'après lesquels on pourrait établir des procédures d'intervention pour réduire ce problème. Cette étude prospective avait pour but de déterminer, en lien avec les caractéristiques démographiques, l'environnement social, l'état de santé, le mode de vie et la personnalité, les principaux facteurs prédictifs d'attrition dans le programme d'instruction élémentaire des Forces canadiennes (FC).

Méthode : Des données de base sur la santé de 5 169 recrues des FC, recueillies à l'aide du Questionnaire sur la santé des recrues (QSR), ont été comparées aux données administratives de l'ELRFC sur les libérations à l'instruction élémentaire. L'échantillon était surtout formé de candidats militaires du rang (MR), de sexe masculin et âgés de moins de 25 ans admis dans le programme d'instruction élémentaire entre juillet 2003 et décembre 2005.

Résultats : Au total, 8 % des recrues de l'échantillon ont été libérées de l'instruction élémentaire, sur une base volontaire pour la grande majorité (80,5 %). Un large éventail de facteurs ont été examinés à titre de déterminants prédictifs d'attrition potentiels dans chacune des catégories suivantes : caractéristiques démographiques, environnement social, état de santé, mode de vie et personnalité. Les analyses par régression logistique indiquent un risque plus élevé d'attrition chez les candidats MR, chez les recrues ayant une ou plusieurs personnes à charge, chez celles dont le revenu du ménage annuel est moins de \$20,000, dont l'auto-évaluation de la santé est moins reluisante et qui présentent de plus graves symptômes somatiques que la moyenne, ainsi que chez les recrues qui présentent une plus forte tendance au névrosisme, une moins bonne maîtrise de soi et une personnalité agréable.

Analyse : Dans l'ensemble, ces résultats soulignent l'importance, pour réussir l'instruction élémentaire, d'avoir une bonne santé et une personnalité résiliente. Ainsi, l'intégration de cours de développement de la résilience dans le programme d'instruction élémentaire pourrait s'avérer une stratégie efficace pour réduire l'attrition dans le programme d'instruction élémentaire.

Le système de recrutement des FC a vu de nombreux changements importants depuis 2005, comme l'abolition du test d'aptitude physique obligatoire préalable au recrutement assortie de la mise en place, à l'école des recrues, d'un programme interne conçu pour permettre aux candidats qui, à l'enrôlement, ne répondent pas aux normes minimales à ce chapitre, d'améliorer leur condition physique de manière à y parvenir. Aussi reste-t-il à déterminer si ces résultats peuvent s'appliquer aux plus récentes cohortes. La suite logique consistera donc à planifier des analyses similaires sur des données recueillies à partir de QSR plus récents afin de vérifier ce point.

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1 Introduction

1.1 Background

Given the considerable investment of both time and money put into the training and education of military personnel, a large amount of effort is expended on better understanding and managing the factors that give rise to attrition in the military context. In recent years, there has been increased concern over early attrition in the Canadian Forces (CF). Results of one analysis revealed that the overall attrition rate for Regular Force members rose from 6.8% in Fiscal Year (FY) 2005-2006 to 8.3% in FY 2006-2007 (Fang & Latchman, 2008). In particular, the rate of attrition in Non-Commissioned Members (NCM) with less than one year of service (YOS) (i.e., new recruits) was found to be higher than in members with YOS greater than one, but below the pensionable 20 YOS. These findings emphasize the need for research to improve understanding of the factors associated with early attrition in recruits.

1.1.1 Importance of Health to Basic Training Success

In previous studies, rates of basic training attrition have been found to vary as a function of demographic variables such as sex and age. In particular, the risk has been found to be highest among women, recruits in the youngest (less than 19 years of age) or highest age groups (more than 23 years of age), and Caucasians (Reis, Trone, Macera, & Rauh, 2007). Identifying demographic subgroups at risk for such outcomes can be useful in order to determine which individuals would most benefit from interventions aimed at reducing basic training attrition. However, this information is of limited value without greater understanding of the mechanisms giving rise to such differences in risk.

While a necessary means through which the organization provides recruits with essential skills for a rewarding career in the military, basic training places heavy physical and psychological demands on recruits. As previously noted, stress resulting from such demands is compounded by factors such as “separation from home and family, lack of access to personal belongings, depersonalization, sleep deprivation, living in closed quarters, frequent and repeated verbal discipline, and lack of personal control over diet and hours of sleeping” (Shepard, Brenner, Bateman, & Shek, 2001, p. 714). In light of such demands, it seems reasonable to expect that success in basic training would rest on the physical and mental health of recruits.

Accordingly, factors such as shortness of breath, poor ratings of general health, limitations to work or other daily activities due to physical health, as well as injuries have all been found to be risk factors for basic training attrition in US Army recruits (Canada, 2007; Canada, Canham-Chervak, Jones, Strauss, Nagaraja, Slone *et al.*, 2007; Kaufman, Brodine, & Shaffer, 2000). Pope and his colleagues (Pope, Hebert, Kirwan, & Graham; 1999) also identified physical fitness and sustaining an injury during training as the top risk factors among Australian Army recruits. In particular, recruits who sustained an injury during training were 10 times more likely to be released from training compared to those who did not sustain an injury, while recruits who were the least fit were 25 times more likely to be released from training compared to those who were most fit.

With regards to mental health, Holden and Scholtz (2002) cited psychiatric problems as being amongst the top four most common reasons for failure to graduate from basic training. In accordance, their research revealed that unsuccessful male NCM candidates scored significantly higher than basic training graduates on measures of psychiatric symptomatology and depression (Holden & Scholtz, 2002).

1.1.2 Additional Predictors of Basic Training Success

Notwithstanding the importance of health to basic training success, it is important to recognize that the process through which health status itself translates to basic training outcomes does not operate in isolation, and it should not overshadow the potential influence of other factors. For instance, lifestyle factors such as alcohol and tobacco use have not only been found to be particularly prevalent among US military recruits (Trent, Stander, Thomsen, & Merrill, 2007), but have been associated with an increased risk of attrition from basic training (Canada *et al.*, 2007). Canada and her colleagues observed a close to five-fold increase in the rate of attrition from basic training among US Army recruits who smoked two or more packs per day. In another study of Marine Corps recruits, it was found that a lower frequency of exercise, frequency of jogging, sweating during exercise, and participation in competitive exercise prior to basic training were significantly associated with being discharged (Reis *et al.*, 2007).

Although to a lesser degree, there is also evidence that certain characteristics of the social environment in which recruits were embedded prior to training (i.e., past and current exposure to environmental stressors) are associated with an increased risk of basic training attrition (Canada *et al.*, 2007; Wolfe, Turner, Caulfield, Newton, Melia, Martin *et al.*, 2005). Canada and her colleagues found that female US Army recruits with a history of rape, or who had witnessed a fatality, were significantly more likely to be released from basic training. In line with these findings, Wolfe and her colleagues found that US Marine recruits who had a history of interpersonal trauma (e.g., rape, physical abuse, or sexual abuse) prior to joining were 1.5 times more likely to be released from basic training. Separate analyses of retention patterns by sex revealed no statistically significant difference between male recruits with and without a history of interpersonal trauma, while female recruits with a history of interpersonal trauma were 1.6 times more likely to be released from basic training.

Other researchers argue that dispositional or personality factors may play a role in basic training outcomes. Using the Rorschach approach¹ for personality assessment, Hartmann and Gronnerod (2009) found that candidates demonstrating inner tension and feelings of helplessness and anxiety activated by stress in the situation, as well as those demonstrating illogical and incoherent thinking, were less likely to graduate training for the Norwegian Naval Special Forces. By contrast, those characterized as having strong social perception, empathy and adequate interpersonal relations were more likely to graduate. Similarly, in one study of US Army Special Forces training outcomes, candidates who scored high on hardiness – a personality style characterized by a strong sense of commitment, high sense of control, and openness to change (Maddi, Khoshaba, Persico, Lu, Harvey, & Bleecker, 2002) – had a small, but statistically higher chance of graduating from the program (Bartone, Roland, Picano, & Williams, 2008). Thus,

¹ In the Rorschach approach of personality assessment, participants' perceptions of ambiguous inkblots are recorded and analyzed using pre-established, scientifically-derived algorithms.

including personality factors as potential predictors opens the door to the consideration of not only risk, but also of protective factors in research on basic training attrition.

1.2 A Multifactorial Approach to Predicting Basic Training Success

In light of the wide range of factors found to predict basic training outcomes in previous research, it is clearly important that the issue of basic training attrition be examined from a multifactorial perspective. In fact, a multifactorial approach is necessary in order to identify the most critical factors influencing basic training outcomes. Yet, only a handful of studies have examined health along with lifestyle, personality and social factors, as predictors basic training attrition (Canada, 2007; Canada *et al.*, 2007; Larson, Booth-Kewley, & Ryan, 2002).

Larson and his colleagues (Larson *et al.*, 2002) found that mental health, such as depression, anxiety and misconduct, followed by asthma and tobacco use were most strongly correlated with basic training attrition among US Navy recruits. However, a composite index computed from of the full range of factors examined in their study² was the strongest correlate of attrition. Moreover, this set of items proved to be more powerful than US military primary attrition management tools in predicting attrition from basic training (Larson *et al.*, 2002).

Canada and her colleagues (2007) focused on some additional psychological and social predictors of basic training attrition, including childhood (e.g., heritable traits, childhood environment, childhood socioeconomic status) and current individual factors (e.g., behaviours, psychological factors, environmental stressors, demographics, health status, and social support). Out of the range of factors examined, the most highly significant predictors of basic training attrition from the US Army included racial background, as well as measures of health status. Thus, while mental health indices were among the top predictors of attrition from US Navy basic training (Larson *et al.*, 2002), demographic and physical health-related factors appeared to be of greatest importance to attrition from US Army basic training (Canada *et al.*, 2007). Consequently, these findings not only draw attention to the importance of examining a wider range of factors as potential predictors of basic training attrition, they also emphasize how factors of importance may differ from one context to the next.

1.3 Aim

To date, it remains unclear whether a set of factors similar to those examined in previous studies (i.e., Larson *et al.*, 2002; Canada *et al.*, 2007) may be used to predict attrition from basic training in the Canadian Forces context. Therefore, the aim of the present study was to improve understanding of the factors associated with basic training attrition in the CF. Several factors, such as those reviewed above are routinely assessed in the CF recruit population using the Recruit Health Questionnaire (RHQ)—a paper-based measure administered on a voluntary basis to all Canadian Forces (CF) recruits attending basic training at the CF Leadership and Recruit School (CFLRS) since July 2003. While the RHQ was originally developed to obtain baseline health

² Factors examined in this study included depression/anxiety, asthma, tobacco, misconduct, ear/nose/throat problems, bone or joint problems, headache, hospitalized, current illness, and flat feet (Larson *et al.*, 2002)

information from CF recruits and improve health monitoring in the CF, the tool thus has great potential to improve our understanding of the predictors of basic training outcomes. Based on the review of the literature, all variables assessed in the RHQ were scanned to identify potential predictors to include in an analysis of basic training attrition. A schema summarizing all categories of variables included in the analysis is provided in Figure 1.

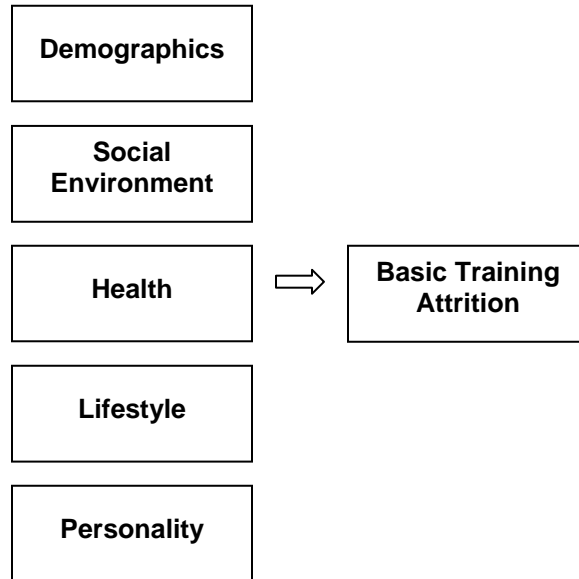


Figure 1: Summary of Factors Predicting Basic Training Attrition

In broad terms, selected variables included a wide range of demographic, social environmental, lifestyle, health and personality factors which are theoretically and/or empirically associated with either an increased or decreased risk of attrition from basic training based on the literature. To identify key predictors of basic training attrition in the CF within and across each of these categories, data collected with the RHQ were then linked with administrative data on basic training outcomes, and were subjected to a series of prospective logistic regression analyses.

2 Method

2.1 Respondents

The study sample was drawn from the population of CF recruits who participated in the RHQ in their first week of basic training between July 2003 and December 2005. Due to incomplete and/or inaccurate information, it was not possible to link RHQ data with administrative data on basic training outcomes for all RHQ participants. More specifically, some RHQ participants did not provide (or provided inaccurate) information on the variable that was used to link RHQ data to basic training outcomes data (i.e., Service Numbers). In the end, the study sample included 5169 CF recruits. This sample represented 74% of all RHQ participants and 65% of all recruits who attended the CFLRS for basic training during this time³. This sample consisted of NCM (88%) as well as Officer candidates (12%). Throughout this report, the term CF recruits will be used to refer to the combined sample of NCM and Officer candidates. Participants were primarily male (85.4%) and under the age of 25 years (63.9%). A complete breakdown of the sample by demographic groupings is presented in Table 1. The demographic profile of the sample was similar to that of all RHQ participants (as shown in Table 1). Based on information provided by the CFLRS, it was also comparable to that of the full population of CF recruits who attended basic training at that time in terms of sex⁴. However, Officer candidates (by comparison to NCM candidates) were underrepresented⁵. Given that lower early attrition rates have been observed among CF Officers (Fang & Latchman, 2008), this characteristic of the study sample may have resulted in a biased estimate for basic training attrition.

³ This response rate is based on information provided by the CFLRS regarding the number of individuals who were enrolled in basic training at the CFLRS between July 2003 and December 2005.

⁴ According to information provided by the CFLRS, the population of CF recruits (NCM and Officer candidates) who attended basic training between July 2003 and December 2005 consisted of 84.9% men and 15.1% women.

⁵ According to information provided by the CFLRS, the population of CF recruits who attended basic training between July 2003 and December 2005 consisted of 76.8% NCM candidates and 23.2% Officer candidates.

Table 1: Demographic Profile of Respondents of the Recruit Health Questionnaire

	Demographic Variable	Percent RHQ Sample (N = 6986)	Percent Study Sample (N = 5169)
Age	17 – 19 years	29.4	22.5
	20 – 24 years	37.5	41.4
	25 – 29 years	18.8	21.0
	30 – 34 years	8.2	8.9
	35 – 39 years	3.7	3.8
	40 – 44 years	1.8	1.8
	45– 50 years	0.6	0.6
Dependents	No	78.4	76.7
	Yes	21.6	23.3
Education	Some secondary	11.4	13.4
	Completed secondary	36.8	35.8
	Some community college/CEGEP	13.0	13.5
	Completed community college/CEGEP	16.4	17.7
	Some university courses	9.1	6.5
	Completed university degree	11.2	11.2
	Postgraduate studies	2.0	1.9
Household Income	Less than \$20,000	18.6	20.0
	\$20,000 to \$49,999	28.4	30.8
	\$50,000 to \$99,999	25.1	24.4
	More than \$100,000	12.7	10.0
	Don't know	15.1	14.7
Language	English	72.0	70.4
	French	28.0	29.6
Marital Status	Married/Living with partner	24.8	27.4
	Single/Other (divorced, separated, widowed)	75.2	72.6
Rank	NCM candidates	73.9	88.0
	Officer candidates	26.1	12.0
Sex	Male	84.1	85.4
	Female	15.9	14.6

In considering observations on household income, it is important to acknowledge that many of the CF recruits may still have been residing with their parents or guardians prior to enrolling in basic training. Moreover, the number of individuals living in the household who rely on this income was not specified.

2.2 Procedure

The RHQ is administered on a continuous basis to CF recruits attending the CFLRS in St.-Jean, Quebec. It is administered in group sessions by representatives of the school during the first week of basic training. Details about the administration procedure are provided elsewhere (Lee, 2008). For the purpose of this report, only details regarding the predictors selected for analysis and analytical approaches are outlined.

2.3 Measures

2.3.1 Predictors of Basic Training Attrition

Among the variables assessed in the RHQ, a wide range of factors were selected as potential predictors of basic training attrition. These fell into the broader categories of demographic, social environmental, lifestyle, health, and personality factors. Details on potential predictors are provided below, organized by category.

2.3.1.1 Demographic Background

Potential demographic predictors were a range of variables found to be predictive of basic training outcomes in previous studies (Reis *et al*, 2007), as well as those of hypothesized importance. More specifically, they included:

- a. Age (17 to 19 years, 20 to 24 years, 25 to 29 years, 30 to 34 years, 35 to 39 years, 40 to 44 years or 44 to 49 years);
- b. Dependents (having none or at least one dependent);
- c. Education (some high school, completed high school, some college or CEGEP, completed college or CEGEP, some university, completed university or postgraduate);
- d. Income (having a household income of less than \$20,000, \$20,000 to \$49,999, \$50,000 to \$99,999 or more than \$100,000, and don't know);
- e. Language (having English or French as a first official language);
- f. Marital status (married/common law, single/never married or other [divorced, widowed, separated]);
- g. Rank (NCM candidate or Officer candidate); and
- h. Sex.

2.3.1.2 Social environment

Social environmental factors included:

2.3.1.2.1 Childhood Adversity

Six items from the Recruit Assessment Program (RAP) tool assessed childhood adversity (Young, Hansen, Gibson, & Ryan, 2006; Young, Leard, Hansen, Chervak, Hauret, Spooner, & Ryan, 2004). Four items measured childhood experience of abuse prior to the age of 17 years (i.e., emotional abuse, domestic violence, childhood physical abuse, childhood sexual abuse). These items were rated on a 5-point scale (1 = never true, 2 = rarely true, 3 = sometimes true, 4 = often true, 5 = very often true), but were rescaled as no (ratings of 1) or yes (ratings of 2 or more). Another two items assessed whether respondents lived with a depressed or mentally ill individual and with a problem drinker or alcoholic during childhood. Respondents answered these last two items on a dichotomous rating scale (0 = no, 1 = yes). A dichotomous variable was computed from responses to the six items to distinguish respondents who experienced none of these adverse childhood events from those who experienced at least one.

2.3.1.2.2 Childhood Neglect

Two items from the RAP (Young *et al.*, 2004, 2006) measured childhood neglect (i.e., “you felt loved”, “there was someone there to take care of you and protect you”). Both items were rated on a 5-point scale (1 = never true, 2 = rarely true, 3 = sometimes true, 4 = often true, 5 = very often true). A total score was computed by adding rating values of both items. A dichotomous variable was then computed based on a median split to distinguish respondents who experienced more neglect (score of between 2 and 9) from those who experienced less neglect (score of 10).

2.3.1.2.3 Exposure to Violence

Recruits were asked whether they were exposed to seven violent events in their lifetime: being in an accident where they could have been killed but were not badly hurt, being in an accident where they were injured and had to spend at least one night in the hospital, seeing a close family member or friend being badly injured or killed, seeing a stranger being badly injured or killed, being seriously attacked, beaten up, or assaulted, being threatened with a knife, gun, club, or other weapon, and being raped. Answers were provided on a 2-point scale (0 = no, 1 = yes). A dichotomous variable was computed from responses to the seven items to distinguish respondents who were not exposed to a violent event from those who were exposed to at least one violent event in their lifetime.

2.3.1.2.4 Negative Life Events

A 50-item checklist based on the work of McCreary and Sadava (1998) was used to assess stressful events experienced in the past year. Respondents indicated which events they had experienced by checking them off. The number of events checked off was recorded and used as an index of negative life events. A dichotomous variable was computed to distinguish

respondents who experienced a lower number of life events from those who reported a higher number of life events based on a median split (i.e., up to three events versus four or more events).

2.3.1.2.5 Social Support

Social support was assessed using the Social Support Survey (SSS), which was developed for the Medical Outcomes Study (MOS; Sherbourne & Stewart, 1991). It consists of 19 items reflecting various types of social support to be rated by respondents on a 5-point scale in terms of how often each is currently available to them when they need it (1 = none of the time, 2 = a little of the time, 3 = some of the time, 4 = most of the time, 5 = all of the time). An overall functional social support index was obtained by computing the sum of all items. This index was found to have high internal consistency in this study sample (Cronbach's alpha of .97).

2.3.1.3 Lifestyle

Several major lifestyle factors were examined:

2.3.1.3.1 Physical Activity

Physical activity was assessed by a measure drawn from the Canadian Community Health Survey (CCHS) (Statistics Canada, 2001), which estimates physical activity levels based on energy expenditure. Thus, respondents indicated their engagement in as well as the duration of their engagement in different activities in the three months prior to basic training (e.g., gardening, downhill skiing, jogging or running). The value reported for daily duration of engagement in each activity was weighted by its specified corresponding value of energy expenditure, and the sum across all activities was computed to provide an index of daily total energy expenditure (EE). Based on pre-specified cutoff values (Statistics Canada, 2005), respondents were identified as inactive (total EE of less than 1.5), moderately active (total EE of 1.5 to 2.9), or physically active (total EE of 3 or more).

2.3.1.3.2 Fruit and Vegetable Consumption

The daily fruit and vegetable consumption was also assessed by a measure drawn from the CCHS (Statistics Canada, 2001). This measure has been found to be significantly associated with other indices of eating habits, such as the Healthy Eating Index (which taps into more aspects of diet quality) (Garriguet, 2009). Respondents were asked to indicate the number of times they usually consume fruit juices, fruits, green salad, potatoes, carrots, and other vegetables per day, week, month, or year. Respondents were then grouped according to whether they consumed fruits and vegetables less than 5 times per day, between 5 and 10 times per day, and 10 or more times per day.

2.3.1.3.3 Smoking

Smoking status was assessed by asking respondents whether they were current, ex-, or never-smokers. Respondents were also asked whether they had smoked more than 100 cigarettes (approximately four packs) in their lifetime. In line with the approach adopted in the CCHS

(Statistics Canada, 2001), respondents who identified themselves as current or ex-smokers were only categorized as such if they indicated having smoked more than 100 cigarettes in their lifetime. Otherwise, they were grouped with never smokers.

2.3.1.3.4 Alcohol Use

Frequency of alcohol use in the past year was assessed using an item drawn from the CCHS (“During the past 12 months, how often did you drink alcoholic beverages?”) (Statistics Canada, 2001). Choices included never, less than once per month, once a month, 2-3 times per month, once a week, 2-3 times per week, 4-6 times per week, and every day.

2.3.1.4 Health

Selected indices of health included:

2.3.1.4.1 Health Professional Consultations

Three questions asked about people’s consultations with a health professional over the previous 12 months. Respondents were asked to report the number of times that they had consulted a health professional in the past year, and whether they had consulted a health professional specifically about their emotional health (yes, no). They were also asked to indicate whether the health professional identified depression or anxiety as the cause of the problem for which they had sought care.

2.3.1.4.2 Body Mass Index

Respondents of the RHQ reported their height (in feet and/or inches, or metres and/or centimetres) and weight (in pounds or kilograms) in order to compute the Body Mass Index (BMI) ($\text{weight in kilograms} / [\text{height in metres}]^2$). Based on established World Health Organization (WHO) cutoff values (WHO, 1995; 1998), respondents were classified as underweight (BMI of less than 18.5), normal weight (BMI between 18.5 and 24.9), overweight (BMI between 25 and 29.9), or obese (BMI of 30 or more).

2.3.1.4.3 Self-Reported Health

As an indicator of general health status, respondents were asked to rate their health (“In general, would you say your health is...?”). Answers were provided on a 5-point scale (1 = poor, 2 = fair, 3 = good, 4 = very good, 5 = excellent). This method of assessing general health is a commonly used epidemiological approach and has been shown to have excellent reliability and validity. In addition, it is capable of predicting future illness and mortality, even after controlling for a wide variety of medical variables (Ferraro & Farmer, 1999; Idler & Benyamini, 1997).

2.3.1.4.4 Injuries

Information was collected on whether respondents had sustained a repetitive strain injury (RSI) (e.g., carpal tunnel syndrome, tennis elbow, and tendonitis), or an acute injury (e.g., broken bone, a bad cut or burn, sprain) in the past 12 months.

2.3.1.4.5 Depression, Panic Disorder, Other Anxiety Disorder, and Somatic Symptoms

Depression, panic disorder, other anxiety disorder, as well as somatic symptoms were measured in the RHQ using the Patient Health Questionnaire (PHQ) (Spitzer, Kroenke, Williams & the PHQ Primary Care Study Group, 1999). In general, items represent various symptoms characterizing each disorder. Respondents indicated to what extent they experienced each symptom. All subscales of the PHQ demonstrated adequate internal consistency in this study sample (Cronbach's alphas ranging from .78 to .82), with the exception of the subscale measuring somatic symptoms (which yielded a marginal internal consistency coefficient of .63).

Based on established cutoff scores, respondents were categorized according to whether they experienced mild, moderate, moderately severe, and severe depression symptoms (Kroenke, Spitzer, & Williams, 2001), and whether they experienced a minimal, low, medium, or high severity of somatic symptoms (Kroenke, Spitzer, & Williams, 2002). Also, respondents who screened positive for panic disorder or for another anxiety disorder were distinguished from those who screened negative for these disorders based on the specifications provided by Kroenke and Casper (2003).

2.3.1.4.6 Posttraumatic Stress Disorder

The posttraumatic stress disorder (PTSD) Checklist-Civilian Version (PCL-C) was used to screen for PTSD. Respondents indicated how much they had been bothered by 17 PTSD symptoms in the past month using a 5-point scale (1 = not at all, 2 = a little bit, 3 = moderately, 4 = quite a bit, 5 = extremely). Total scores were obtained by computing the sum of ratings. Internal consistency of the PCL-C was high in this study sample (Cronbach's alpha of .91). Respondents who screened positive for PTSD were distinguished from others based on a recommended cutoff score of 50 or more (Blanchard, Jones-Alexander, Buckley & Forneris, 1996).

2.3.1.5 Personality

A number of measures of personality or of psychological disposition were embedded into the RHQ, each of which is either hypothesized to be, or has been found to be, associated with basic training outcomes in previous work. In some cases, personality factors have been hypothesized to act as risk factors for attrition (e.g., neuroticism, personal need for structure, and negative affect); in other cases, they have been hypothesized to act as protective factors (agreeableness, conscientiousness, extroversion, openness, hardiness, mastery, optimism, positive affect, and self esteem). Unless otherwise stated, items used to assess personality traits were presented in the form of statements to be rated in terms of level agreement using a 5-point Likert-type scale (1 = strongly agree, 2 = agree, 3 = neither agree nor disagree, 4 = disagree, 5 = strongly

disagree). All measures reported here have been demonstrated to be both reliable and valid indices of the psychological constructs they represent.

2.3.1.5.1 Alexithymia

Alexithymia is defined as a state of deficiency in understanding, processing, or describing emotions, and is believed to place individuals at increased risk for medical and psychiatric disorders (Taylor, Bagby, & Luminet, 2000). Using the 20-item Toronto Alexithymia Scale (TAS-20), three major dimensions of alexithymia were assessed in the RHQ: difficulty describing feelings (DDF) (5 items; e.g., “I find it hard to describe how I feel to other people”), difficulty identifying feelings (DIF) (7 items; e.g., “I have feelings I can’t quite identify”), and externally-oriented thinking (EOT) (8 items; e.g., “I prefer talking to people about their daily activities rather than their feelings”) (Taylor, Bagby, & Parker, 2003). Subscales assessing difficulty describing feelings and difficulty identifying feelings each demonstrated adequate internal consistency in this study sample (Cronbach’s alphas of .76 and .96, respectively); however, the subscale assessing externally-oriented thinking demonstrated poor internal consistency (Cronbach’s alpha of .50).

2.3.1.5.2 Big Five Personality Traits

A version of the Big Five Inventory (BFI) (John & Srivastava, 1999) adapted for the CF population (Thompson & Smith, 2002) was used to assess each of the major personality traits specified in the Five-Factor model of personality: agreeableness (i.e., the tendency to be pleasant and accommodating in social situations), conscientiousness (i.e., having a dependable and careful nature while completing tasks), extroversion (i.e., the tendency to be expressive and energetic), neuroticism (i.e., a proneness for general emotional instability), and openness (i.e., the tendency to seek out and accept novel experiences). This scale consists of 9 items measuring agreeableness, 9 items measuring conscientiousness, 8 items measuring extroversion, 8 items measuring neuroticism, and 6 items measuring openness, which are presented as a series of short statements following the broader statement “I see myself as someone who...” The five subscales demonstrated high internal consistency (Cronbach’s alphas from .71 to .86).

2.3.1.5.3 Hardiness

Hardiness refers to the tendency to have a high sense of commitment, strong sense of control, and to be open to change (Maddi *et al.*, 2002). The 11-item scale used to assess hardiness in the RHQ was adapted from Bartone’s 15-item Hardiness scale (Bartone, 1999; Thompson & Smith, 2002), and consisted of statements to be rated by respondents on a 4-point scale (1 = not true at all, 2 = a little true, 3 = quite true, 4 = completely true). It was found to have high internal consistency in this study sample (Cronbach’s alpha of .83).

2.3.1.5.4 Mastery

Mastery, which refers to the degree that individuals have a sense of control over their life circumstances (Pearlin & Schooler, 1978), was assessed using a 7-item scale drawn from the CCHS (Statistics Canada, 2001). This scale yielded a Cronbach's alpha of .92, demonstrating adequate internal consistency.

2.3.1.5.5 Optimism

The degree to which respondents have a positive or optimistic outlook on life was assessed with the Revised Life Orientation Test (LOT-R) (Scheier, Carver, & Bridges, 1994). The LOT-R demonstrated good internal consistency in this study sample (Cronbach's of .75).

2.3.1.5.6 Personal Need for Structure

Personal Need for Structure (PNS) is conceptualized as a cognitive style characterized by a preference for structure and clarity (Thompson & Smith, 2002). Respondents' level of PNS was measured using a 12-item scale developed by Thompson, Naccarato, and Parker (as cited in Thompson, Naccarato, Parker & Moskowitz, 1992). The PNS was found to have adequate internal consistency, based on a Cronbach's alpha of .75.

2.3.1.5.7 Positive and Negative Affect

Affect refers to the experience of feeling or emotion, and has been found across cultures to comprise both positive and negative dimensions. Affect was assessed in the RHQ using the Positive and Negative Affect Schedule (PANAS; Watson, Clark, & Tellegen, 1988). The scale consists of 20 items - 10 adjectives reflecting positive affect (e.g., attentive, proud, interested) and 10 adjectives reflecting negative affect (e.g., upset, distressed, afraid). Respondents were asked to indicate the extent to which they felt in line with each adjective, on average. Both subscales demonstrated high internal consistency (Cronbach's alpha of .97 for positive affect and .98 for negative affect).

2.3.1.5.8 Self-Esteem

The self-esteem index used in the RHQ was taken directly from the CCHS (Statistics Canada, 2001). The scale includes five items representing various positive attributes and one item representing a negative attribute. The items were selected from the Rosenberg self-esteem scale (1965). This scale yielded a Cronbach's alpha of .94, demonstrating adequate internal consistency.

2.3.2 Basic Training Outcomes

For an indicator of basic training attrition, administrative data collected by the CFLRS were obtained on whether or not recruits were released from basic training (yes or no). A numerical value of 0 was assigned to recruits who were not released, while a value of 1 was assigned to recruits who were released from basic training so that a predictive model of basic training attrition could be derived.

2.4 Analyses

2.4.1 Data Preparation and Analytical Strategy

Unadjusted (i.e., analyses examining the relationship of a single variable with an outcome) and multiple (i.e., analyses examining the relationship of multiple variables with an outcome) logistic regression analyses were carried out to identify key predictors of basic training attrition. More details are provided in the next section on the purpose and interpretation of logistic regression analysis.

Prior to carrying out the analyses, data were screened for missing values and violations of assumptions inherent to logistic regression analysis. It was found that the number of missing cases ranged from none (for attrition) to 604 (11.7%) (for probable panic disorder, based on the PHQ). A missing value analysis was performed to determine whether data were missing completely at random (MCAR) across the full set of variables. Results suggested that data were not MCAR. Moreover, cases having complete data across all variables represented only 44.7% of the full sample. Under such circumstances, imputation of missing data is not recommended. Therefore, cases with missing data on one or more variables included in each analysis were deleted listwise.

Data were screened for accuracy, uneven splits (i.e., variables with a ratio of greater than 9:1 between categories; Tabachnick & Fidell, 2001), univariate outliers (cases having an extreme value on a particular variable), and multivariate outliers (cases having an unusual profile of values on a set of variables). Some variables were found to have highly uneven splits. When it was possible, categories were collapsed to result in more even splits. Otherwise, variables were excluded from multiple logistic regression analyses of basic training attrition. However, these variables were subjected to the unadjusted analysis for exploratory purposes⁶. Multivariate outliers were identified using a criterion of $p < .001$ for Mahalanobis distance.

Due to a low number of releases among both females and Officer candidates, it was not possible to run separate analyses by sex or rank. Analyses were therefore carried out on the full sample, with acknowledgement that the mechanisms explaining attrition among these subgroups might vary.

All variables were subjected to an unadjusted logistic regression analysis to examine their relationship with basic training attrition. However, it was necessary to select variables to include in the final multiple logistic regression analysis ad hoc. The alternative approach of including all of the variables in the analysis to determine which ones among the set significantly predict attrition was not feasible, as it would have resulted in the listwise deletion of a very large number of cases. For this purpose, variables were first sorted according to whether they represented the following categories of predictors: demographic background, social environment, lifestyle, health status, or personality. Then, as an intermediate step in variable selection, five separate multiple logistic regression analyses were carried out (one for each category of predictors) to identify the strongest predictors of basic training attrition among the set of variables representing each category. Results of these analyses are presented in Appendix A. Variables identified

⁶ Results of unadjusted analyses including variables with uneven splits should be interpreted with caution.

as significant predictors in these intermediate analyses were included in the final multiple logistic regression analysis. Backwards stepwise deletion based on Wald's statistic was applied to refine and simplify the model to only key predictors.

2.4.2 Interpretation of Logistic Regression Analyses

Through logistic regression analysis, it is possible to determine whether a particular outcome can be predicted on the basis of a given factor or set of factors (i.e., the predictors) (Tabachnick & Fidell, 2001). Results are interpreted by examining several things.

First, whether the factor or set of factors predict(s) the outcome of interest at a level that is better than chance is determined. In the present study, χ^2 values and corresponding levels of significance (denoted as p) resulting from each analysis indicated whether this was the case. More specifically, a χ^2 with a corresponding p value of less than .05 was considered to point to significant findings.

Second, for analyses including a set of factors (as opposed to an individual factor) to predict the outcome, the extent to which a particular factor in this set significantly contributes independently to the overall prediction of the outcome can also be determined. In the present study, Wald statistics and their corresponding p values indicated whether this was the case. A Wald statistic with a corresponding p value of less than .05 was considered to point to a significant finding.

Third, the manner in which a particular factor predicts the outcome is determined. In the present study, this was carried out by examining odds ratios for each individual factor. An odds ratio represents the factor by which the odds of a particular outcome change, given a one unit increase in a given factor. In other words, an odds ratio of X suggests that, for every one unit increase in a given factor, the odds of the outcome are multiplied by X . Thus, an odds ratio of 1 indicates there is no change (and, hence, no prediction), an odds ratio greater than 1 indicates that there is an increase in odds, and an odds ratio of less than one indicates that there is a decrease in odds. When variables are categorical (e.g., sex), the interpretation of an odds ratio is relatively simple, as it indicates the odds of a particular outcome in one category (e.g., women) relative to another (e.g., men). When factors are continuous (e.g., years of age), the odds ratio indicates how the odds of a particular outcome change as the continuous variable increases by one unit throughout the full range of its possible values (e.g., 2 years compared to 1 year or 81 years compared to 80 years). Therefore, a continuous factor that yields an odds ratio close to 1 (e.g., 1.05 or 0.95) is not necessarily unimportant, since the differences in odds between its lowest and highest values may be quite large. In the present study, the 95% confidence limits of odds ratios were also examined to determine the extent to which the odds ratios associated with each factor were reliable. Here, confidence limits that were closer suggested that odds ratios were more reliable.

3 Results

3.1 Descriptive Analyses

Among this sample of CF recruits, the proportion of individuals who were released from basic training was 8.0%. A large proportion of attrition was due to release requests (80.5%). Recruits identified as not being advantageously employable (i.e., released due to an inherent inability to meet standards, inability to adapt to military life, the development of personal weaknesses or other personal problems that seriously impair usefulness to or impose an excessive administrative burden on the CF) represented 13.9%, while recruits released for medical reasons represented 3.9% of all releases (Table 2).

Table 2: Frequency and Proportion of Basic Training Release Types

Type of release	Frequency	Valid Percent
On Medical Grounds (being disabled and unfit to perform his duties in his present trade or employment, and not otherwise advantageously employable under existing service policy)	16	3.9
On Request – Other Causes	331	80.5
Not Advantageously Employable	57	13.9
Other (e.g., Fraudulent Statement on Enrolment, Irregular Enrolment, Unsuitable for Further Service)	7	1.7
Total releases/Total cases	411/5169	8/100

With the exception of demographic variables (the descriptive results of which are presented in Table 1), descriptive statistics of all variables examined as predictors of basic training attrition are presented in Table 3. Means (M) and standard deviations (SD) are presented for continuous variables, and percentages are presented for categorical variables.

Table 3: Descriptive Statistics of Potential Predictors of Basic Training Attrition

Predictor	
Social Environmental Factors	
Social support	$M = 79.3, SD = 16.7$
Childhood adversity (none)	30.1%
Life events (< 4)	51.3%
Exposure to violence (none)	32.8%
Childhood neglect (lower)	55.3%
Lifestyle Factors	
Physical activity	
Inactive	19.6%
Moderately active	19.6%
Active	60.8%
Smoking	
Never	56.6%
Ex-smoker	19.4%
Current smoker	23.9%
Frequency of alcohol use	
Never	6.0%
2-3 times per year	15.8%
Monthly	9.5%
2-3 times per month	24.3%
Weekly	19.6%
2-3 times per week	19.0%
4-6 times per week	4.9%
Daily	0.9%
Fruit/vegetable consumption	
Insufficient	29.3%
5-10 daily servings	46.1%
10+ daily servings	24.6%
Health	
Acute injury (none)	87.1%
Repetitive strain injury (none)	93.2%
BMI	
Normal	55.8%
Overweight	35.9%
Obese	8.3%
Sleep problems	
Never	53.2%
Sometimes	39.4%

Predictor	
Most of the time	7.4%
Self-rated health	
Excellent	19.5%
Very good	47.4%
Good	29.8%
Poor/Fair	3.3%
Somatic symptoms	
Minimal	69.7%
Low	26.1%
Medium/High	4.2%
HP consultation general (none)	55.3%
HP consultation for emotional problem (none)	96.4%
Depression identified as cause (no)	99.3%
Anxiety identified as cause (no)	99.3%
Positive screen PTSD (no)	95.3%
Positive screen panic disorder (no)	99.2%
Positive screen other anxiety disorder (no)	99.1%
Depression symptoms	
Mild	82.3%
Moderate	13.2%
Moderately severe/Severe	4.5%
Personality Factors	
Agreeableness	$M = 34.9, SD = 4.3$
Conscientiousness	$M = 34.2, SD = 4.7$
Extroversion	$M = 27.6, SD = 5.2$
Neuroticism	$M = 20.2, SD = 5.1$
Openness	$M = 23.7, SD = 3.0$
Personal need for structure	$M = 36.0, SD = 6.2$
Dispositional optimism	$M = 21.1, SD = 3.9$
Positive affect	$M = 39.5, SD = 5.2$
Negative affect	$M = 21.6, SD = 7.2$
Self-esteem	$M = 19.9, SD = 3.6$
Mastery	$M = 20.3, SD = 4.6$
Hardiness	$M = 33.8, SD = 5.3$
Difficulty identifying feelings	$M = 14.1, SD = 5.8$
Difficulty describing feelings	$M = 12.9, SD = 4.5$
Externally-oriented thinking	$M = 20.4, SD = 4.3$

Note. HP=health professional, M = mean, SD = standard deviation.

3.2 Predicting Basic Training Attrition

As previously mentioned, results of the intermediate analyses through which key predictors were identified within each category of predictors (i.e., demographics, social environment, health status, lifestyle, and personality) are presented in Appendix A. For each category of predictor, all variables found to be associated with attrition were included in a final multiple logistic regression analysis, presented below.

3.2.1 Final Multiple Logistic Regression Model

Based on the previous analyses, the following variables were included in the analysis: rank, language, dependents, income, social support, life events, somatic symptoms, self-rated health, depression, agreeableness, neuroticism, and mastery. These variables were entered into a logistic regression analysis with backwards stepwise deletion based on Wald's statistic. This led to the removal of language and depression from the model. Results of the final model are presented in Table 4.

Table 4: Summary of Results of Final Adjusted Model Predicting Basic Training Attrition

Predictor (reference category)	Wald	OR	Lower CI	Upper CI
Rank (NCM candidate)	13.38***	0.28	0.14	0.56
Dependents (none)	5.81*	1.40	1.07	1.84
Income (<\$20,000)	11.87*			
\$20,000-\$49,999	4.61*	0.71	0.52	0.97
\$50,000-\$99,999	10.70***	0.54	0.38	0.78
\$100,000 or more	3.06	0.64	0.39	1.05
Don't know	3.77	0.68	0.45	1.00
Self-rated health (excellent)	9.95*			
Very good	0.72	0.85	0.59	1.23
Good	0.03	0.97	0.66	1.43
Poor/Fair	4.65*	1.85	1.06	3.25
Somatic symptoms (minimal)	13.65***			
Low	2.72	1.26	0.96	1.67
Medium/High	13.42***	2.31	1.48	3.61
Neuroticism	8.63**	1.04	1.01	1.07
Mastery	20.01***	0.94	0.91	0.96
Agreeableness	5.42*	1.04	1.01	1.07

Note. CI = confidence interval, OR = odds ratio.

* $p < .05$, ** $p < .01$, *** $p < .001$

Some multivariate outliers were identified, but these represented less than 5% of cases and their removal from the sample did not significantly alter results. They were therefore included in the final analysis. The final model significantly predicted attrition, with $\chi^2(14) = 163.62, p < .001$. Results demonstrated that the odds of attrition were greater among recruits who:

- a. Were NCM rather than Officer candidates;
- b. Had at least one dependent;
- c. Had an annual household income of less than \$20,000 rather than \$20,000 – \$99,999;
- d. Reported poor/fair rather than excellent health;
- e. Reported a medium/high rather than minimal severity of somatic symptoms;
- f. Scored higher on neuroticism;
- g. Scored lower on mastery; and
- h. Scored higher on agreeableness.

In more specific terms, results suggested that Officer candidates only had about one third (0.28) of the odds of NCM candidates to be released from basic training, and that recruits having an annual household income of between \$20,000 and \$99,999 had only about half (0.54) of the odds of those having an annual household income of less than \$20,000 of being released. Also, compared to recruits with no dependents, those with one or more demonstrated 1.4 times the odds of being released.

Those with poor to fair self-rated health, or with a medium to high severity of somatic symptoms, demonstrated about twice (1.85 and 2.31, respectively) the odds of being released from basic training of those with excellent self-rated health or a minimal severity of somatic symptoms, respectively.

With regards to personality factors, results demonstrated that for every one point increase in score on the scales assessing neuroticism and agreeableness, recruits had 1.04 times the odds of being released from basic training. However, for every one point increase in score on the scale assessing mastery, they had 0.94 times the odds. In other terms, every one point increase in score on the scales assessing neuroticism and agreeableness was associated with a 4% increase in the odds of being released from basic training, while every one point increase in score on the scale assessing mastery was associated with a 6% decrease in the odds of being released from basic training.

4 Discussion

The aim of the present study was to improve understanding of the factors associated with basic training outcomes in the Canadian Forces. More specifically, a multifactorial approach was taken to examine the contribution of a wide range of demographic, social environmental, lifestyle, health, and personality factors to basic training attrition. Results demonstrated that demographic, health status, and personality factors contributed strongly to the prediction of basic training outcomes. On the other hand, the social environment and lifestyle of recruits did not appear to be as important to such outcomes when the contribution of all factors was considered.

4.1 Summary of Findings

With regards to the demographic factors, results demonstrated that recruits who were released from basic training were more likely to be NCM candidates, to have dependents and to have an annual household income of less than \$20,000 (rather than \$20,000-\$99,999) prior to basic training. In contrast with previous research demonstrating important differences in rates of basic training discharge by sex and age (Reis *et al.*, 2007), these variables were not found to be associated with basic training attrition in the present study. Rather, findings show that disparities in socioeconomic status (SES) may underlie basic training success. Similarly, previous research has shown that recruits of lower SES demonstrate poorer results on a wide range of performance measures in their career (Booth & Schmiegel, 1998). While more research is needed to identify the mechanisms that link socioeconomic factors and basic training outcomes, one possibility might entail a greater difficulty of individuals with lower SES to adjust to military life. More specifically, familial demands combined with more limited financial resources among individuals with a greater number of dependents and lower household income may conflict with the amount of time spent away from home and the energy required for basic training. It is well documented that individuals of lower SES experience a greater number of environmental and social stressors (Taylor, 1997). Consequently, they may be in a disadvantaged position to face some of the additional challenges inherent to basic training.

The positive relationship between adverse childhood events and basic training attrition was similar in magnitude to that observed in a previous study of US Marine Corps recruits when other predictors were not considered (Wolfe *et al.*, 2005) (as shown in Table 6, in Appendix A). On the other hand, these were of lesser importance in the final model. Similarly, none of the lifestyle factors emerged as significant predictors of basic training attrition in the adjusted analysis, despite the fact that physical inactivity and smoking were significantly associated with attrition in the unadjusted analysis (as shown in Table 7, in Appendix A). As noted earlier, two studies of US military recruits found tobacco use and lower physical activity to be associated with an increased risk of attrition from basic training (i.e., Canada *et al.* [2007] and Reis *et al.* [2007], respectively). In contrast to results of the present study, however, these factors also emerged as significant predictors in analyses that adjusted for the contribution of other factors in these previous studies.

Aside from SES-related factors, some of the strongest predictors of basic training attrition were related to health status. In particular, recruits who reported poor/fair health or who reported a medium/high severity of somatic symptoms had approximately twice the odds of being released from basic training as those who reported excellent health or a minimal severity of somatic symptoms, respectively. However, basic training outcomes were not found to be associated with BMI category or previous injuries, as they have been in previous studies (Canada, 2007; Canada *et al.*, 2007; Kaufman *et al.*, 2000; Pope *et al.*, 1999). Rather than more specific physical aspects of health, results thus pointed to the importance of general health status and somatic symptoms. Arguably, both of these represent factors that tap into health, as a broader construct comprising both physical and psychological dimensions. For instance, self-rated health represents a global measure of health status that encompasses all factors considered by the individual to reflect health. Also, the scale used to assess somatic symptoms was designed with the original intent of assessing medically unexplained symptoms and has been found to have good predictive validity for psychological distress (Interian, Allen, Gara, Escobar, & Diaz-Martinez, 2006).

In further support of the importance of psychological factors to success in basic training, dimensions of personality (notably, neuroticism, agreeableness, and mastery) were also associated with attrition from basic training. More specifically, recruits who obtained higher scores on the neuroticism scale demonstrated an increase in the odds of attrition. In fact, the odds of attrition increased by 4% for every one point increase in score on this scale. By contrast, recruits who obtained a higher score on mastery demonstrated lower odds of basic training attrition, with a decrease of 6% in the odds of attrition for every one point increase in score on this scale. These results are in line with the literature on psychological resilience, which stipulates that certain personal attributes, including the tendency to have a strong sense of control over one's life circumstances, facilitate the extent to which individuals thrive when faced with challenging situations (Bandura, 1982; Carver & Scheier, 1987; Kobasa, 1979).

Defined as the tendency to be pleasant and accommodating in social situations, agreeableness was associated with an increase in the odds of attrition. Agreeableness is generally considered to give rise to more positive social interactions, and adaptive coping responses in the face of stress (Thompson & Smith, 2002). As such, this dimension of personality might have been expected to be associated with more favourable basic training outcomes. Instead, this personality trait was found to be associated with an increase in the odds of basic training attrition (4% for every one point increase in score on the scale). A meta-analysis of the relationship of a similar measure of agreeableness (embedded in the Trait Self-Descriptive Inventory) with various criteria for work performance also pointed to mixed findings. More specifically, while agreeableness was found to be associated with better job performance and engagement in fewer counter work behaviours, no relationship was observed with training performance outcomes overall (Darr, 2009). In the present study, agreeableness was not associated with basic training outcomes unless the analysis adjusted for the contribution of other factors (as shown in Table 9, in Appendix A), suggesting that its relationship with basic training outcomes is moderated by other factors. Based on results of a meta-analysis, which revealed a weak albeit inverse relationship between agreeableness and work turnover, Zimmerman (2008) similarly concluded that moderators may exist in this relationship. It is thus possible that agreeableness is helpful in some contexts, but detrimental in others. Further work on the relationship between agreeableness and basic training outcomes is warranted.

In sum, findings of the present study generally favour psychological factors over physical aspects of health and lifestyle as predictors of basic training outcomes. Several factors may have contributed to this finding. First, the lack of significant findings involving physical aspects of health and lifestyle may have resulted from a ceiling effect, with a general tendency for CF recruits to demonstrate optimal physical health and lifestyle. Consistent with this perspective, results of previous analyses have suggested that CF recruits demonstrate a lower prevalence of obesity, smoking, and injuries (in the past year), as well as a higher prevalence of physical activity compared to the general Canadian population (after adjusting for differences in age and sex; Lee, Whitehead, & Dubiniecki, 2009). As a result, there may be no observable impact of physical and lifestyle health risk factors on basic training attrition in this population. Second, the measures used to assess injuries, physical fitness, and cigarette smoking in the present study were less specific. For instance, recruits simply reported whether or not they sustained an acute injury or a RSI in the previous year, whereas participants of Reis *et al.*'s (2007) study also reported whether or not their recovery from this injury was complete. Also, recruits' level of physical activity rather than physical fitness was assessed. While these variables are strongly related, they are not necessarily equivalent. Third, many of the previous studies focused exclusively on physical health and lifestyle indicators (e.g., Pope *et al.*, 1999; Reis *et al.*, 2007). It therefore remains unclear whether similar observations would have been made had these studies accounted for the contribution of other factors to basic training outcomes.

4.2 Implications

Results of the present analyses shed some light onto the individual characteristics leading to success in basic training. Attrition from basic training places a financial strain on the military budget, as the costs of recruitment, food, accommodations, training, wages, and medical care are not recoverable once recruits are out of the system (Reis *et al.*, 2007). Results of research of this nature thus provide valuable, evidence-based information for guiding the design of interventions aimed at minimizing basic training attrition. For instance, research of this nature can shed light onto the types of individuals to target in recruitment strategies, potential selection criteria to use for candidates, or areas on which training might expand. As they emphasize the importance of psychological health and personality, results presented in the current report are particularly relevant in terms of the selection and training of recruits.

The observed importance of psychological health and personality to basic training success could be seen as pointing to the potential value of implementing psychological and personality screening in CF recruiting procedures. Personality testing is already applied with success as part of routine in-service personnel selection and screening procedures for some CF occupations/sub-occupations. For example, a successful psychological screening program that incorporates personality assessment has been developed for sniper selection. However, the more clinically-oriented use of psychological and personality testing for screening individuals in or out of the military remains the subject of great debate. Jones, Hyams and Wessley (2003) noted that no current instrument is sufficiently powerful to assess psychological vulnerability in the military context. Problems include the high number of cases falsely identified as meeting the threshold for psychopathology, and ensuing potential for individuals to be unnecessarily rejected for military service (Jones *et al.*, 2003). Also, while significant relationships between psychosocial factors and basic training outcomes have been observed in previous studies, the relevance of findings in practice is less clear.

Although relying on psychological and personality screening for the selection of individuals into the military is premature, there is still some value to incorporating such tests in CF recruiting procedures. In addition to showing promise for the selection of personnel into some military occupations, psychological and personality assessment could be of value for psychological surveillance (Jones *et al.*, 2003). In this capacity, results of the present study would point to certain factors that might act as “red flags” for potential basic training attrition. They would also point to certain desirable personal attributes, such as mastery, which might buffer the impact of individual risk factors on basic training attrition.

Mastery refers to a cognitive style (or way of thinking) characterized by the belief that one’s life chances are primarily under the control of his or her own ability and hard work (Pearlin & Schooler, 1978). Individuals with high levels of mastery have been found to be less negatively impacted by adversity (Lachman & Weaver, 1998). As such, the concept is strongly tied to psychological resiliency, which reflects the notion that certain personality characteristics enable individuals to achieve better psychological and physiological health outcomes despite the challenges they may face. While personality traits are often regarded as relatively stable over the life course, there is growing debate as to whether certain traits, which reflect patterns of attitudes and skills (e.g., hardiness, mastery, optimism), can be learned. A seminal study by Khoshaba and Maddi (1999) demonstrated that workers who thrived despite having faced a high level of organizational change in the workplace as well as a high level of stress during childhood reported having had parents who modeled supportive relationships and encouragement, suggesting that hardiness is learned rather than inborn. Consequently, they developed a training program to enhance hardiness. Based on a workbook, the program includes exercises to promote hardy coping, socially supportive interactions, and self-care, and has shown promise in educational and occupational settings (Maddi, 2007). In addition, there is evidence that leaders who demonstrate hardiness can influence subordinates to think and act in more resilient manners (Bartone, 2006).

One approach to reduce basic training attrition may therefore be to incorporate resilience training or mentorships into the training curriculum. The existing curriculum could simply integrate exercises aimed at the development of more positive attitudes and more effective problem-solving and coping skills, similar to those included in Maddi’s (2007) hardiness training program. In this capacity, psychological and personality assessment of “red flags” could inform the extent to which such training is necessary across recruit cohorts. Above and beyond possibly helping recruits to better succeed in basic training, such training would provide them with skills that could serve them throughout their career in the military.

4.3 Study Strengths and Limitations

In addition to previously discussed limitations related to a potential ceiling effect and issues with the specificity of lifestyle measures, the fact that results of the present study may not generalize to all CF recruits, nor to more recent cohorts of CF recruits must be recognized. The study sample represented only 74% of all RHQ respondents and 65% of all CF recruits who attended the CFLRS for basic training from 2003 to 2005. Moreover, data analyzed in the present study were collected over 5 years ago. Since this time, CF recruiting policy has undergone tremendous change. In October 2006, the physical fitness test was eliminated as a recruiting requirement, and an in-house program was implemented at the recruit school to help candidates who do not initially reach a minimum standard reach acceptable fitness levels. This change in policy has raised

concern over the potential consequences on training-related injuries and attrition. In a related fashion, physical health and lifestyle factors may prove to be more important predictors of basic training attrition among recruits who attended basic training after this change was implemented. As a next step, there are plans to carry out similar analyses on RHQ data collected after October 2006 to determine whether this might be the case.

Despite these limitations, notable strengths of the present study include the prospective study design and use of different data sources. The collection of baseline data in the first week of basic training, before any formal examination or evaluation, helped to ensure that recruits' responses were not biased by basic training performance. Finally, the use of different data sources (i.e., data collected using the RHQ as well as administrative data collected by the CFLRS) ensures that the magnitude of observed relationships was not inflated by way of common method variance; that is, the degree to which variables are related simply due to the fact that a common method was used in collecting data.

5 Conclusion

Overall, findings underscore the importance of taking a multifactorial approach in analyses predicting basic training outcomes. Basic training is a critical time for the development and training of soldiers, but it also represents a time of considerable stress (Cohn & Pakenham, 2008). This may in part account for the fact that psychological health and personality factors were among the strongest predictors of basic training attrition among CF recruits. Such findings highlight the potential value of incorporating resilience training into the CF recruit training curriculum. While it has yet to be determined whether this is still the case since the implementation of changes to policy on physical fitness testing, the present study emphasizes the fact that the factors influencing basic training outcomes do not operate in isolation. Rather, it would appear that the processes underlying basic training attrition are complex. The current study primarily focused on baseline health, lifestyle, characteristics of the social environment, and personality as distal factors involved in the process of attrition from basic training. Examining the role of more proximal factors involved in these outcomes, and developing an integrative framework to characterize the processes involved in basic training outcome represent fruitful directions to take in future research in this area.

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Annex A Results of Basic Training Attrition Analyses by Categories of Predictors

A.1 Demographic Background

Relationships between each potential demographic predictor and attrition were examined through a series of logistic regression analyses. As shown in Table 5, rank, number of dependents, education, and income significantly predicted attrition without adjusting for the contribution of other variables.

Table 5: Results of Unadjusted Analyses and Adjusted Analysis of Demographic Factors Predicting Basic Training Attrition

Predictor (reference category)	Unadjusted Analyses			Adjusted Analysis		
	Wald	OR	Lower-Upper CI	Wald	OR	Lower-Upper CI
Age (17-24)	3.41			9.95		
20 – 24	0.04	1.03	0.79-1.34	1.35	1.21	0.88-1.67
25 – 29	0.18	0.93	0.68-1.28	3.10	1.45	0.96-2.18
30 – 34	0.68	0.84	0.54-1.28	1.30	1.38	0.80-2.38
35 – 39	0.01	0.98	0.55-1.72	0.91	1.45	0.68-3.09
40 or more	1.78	1.50	0.83-2.73	9.42**	3.35	1.55-7.23
Sex (male)	< 0.01	1.00	0.75-1.33	1.19	1.21	0.86-1.71
Rank (NCM candidate)	27.61***	0.21	0.12-0.38	10.87***	0.22	0.09-0.54
Language (English)	1.78	0.85	0.67-1.08	6.17*	0.71	0.54-0.93
Dependents (none)	5.12*	1.31	1.04-1.66	4.05*	1.37	1.01-1.87
Marital (single)	0.93	0.89	0.70-1.13	1.84	0.79	0.57-1.11
Education (some high school)	28.41***			10.29		
Completed high school	3.66	0.75	0.56-1.01	4.35*	0.70	0.51-0.98
Some college	3.68	0.70	0.48-1.01	2.98	0.69	0.45-1.05
Completed college	8.01**	0.60	0.42-0.85	8.84**	0.53	0.35-0.81
Some university	4.83*	0.57	0.34-0.94	4.60*	0.55	0.31-0.95
Completed university	23.27***	0.27	0.16-0.46	1.18	0.65	0.30-1.42
Graduate school	3.73	0.36	0.13-1.02	0.77	0.57	0.16-2.01
Income (<\$20,000)	23.49***			21.29***		
\$20,000-\$49,999	7.65**	0.68	0.51-0.89	7.41**	0.64	0.47-0.88
\$50,000-\$99,999	18.61***	0.50	0.36-0.68	19.30***	0.44	0.30-0.63
\$100,000 or more	10.81***	0.48	0.31-0.74	6.81**	0.53	0.32-0.85
Don't know	2.90	0.75	0.54-1.05	4.98*	0.65	0.44-0.95

Note. CI = confidence interval, OR=odds ratio.

* $p < .05$, ** $p < .01$, *** $p < .001$

No multivariate outliers were identified among the set of demographic variables. A test of a model including all demographic variables, revealed that this set of variables reliably predicted attrition, $\chi^2(20) = 83.56, p < .001$. In this model, the odds of attrition were greater among recruits who:

- a. Were NCM rather than Officer candidates;
- b. Had at least one dependent;
- c. Had English rather than French as a first official language; and
- d. Had an annual household income of less than \$20,000 compared to all other categories.

A.2 Social Environment

Without adjusting for the contribution of other variables, significant social environmental predictors of attrition included adverse childhood events (none versus one or more), life events (less than three versus four or more) in the previous year, and social support (continuous) (Table 6).

Table 6: Results of Unadjusted Analyses and Adjusted Analysis of Social Environmental Factors Predicting Basic Training Attrition

Predictor (reference category)	Unadjusted Analyses			Adjusted Analysis		
	Wald	OR	Lower-Upper CI	Wald	OR	Lower-Upper CI
Social support	7.06**	0.99	0.99-1.00	3.87*	0.99	0.99-1.00
Childhood adversity (none)	7.68**	1.42	1.11-1.81	2.85	1.25	0.97-1.62
Life events (< 4)	16.24***	1.52	1.24-1.87	12.18***	1.51	1.20-1.91
Exposure to violence (none)	2.50	1.21	0.96-1.52	0.16	1.05	0.82-1.34
Childhood neglect (lower)	3.97*	1.24	1.00-1.53	0.03	1.02	0.81-1.29

Note. CI = confidence interval, OR=odds ratio.

* $p < .05$, ** $p < .01$, *** $p < .001$

Some multivariate outliers were identified among this set of variables. However, these represented less than 5% of cases and did not result in a significant change in results. These cases were therefore retained in the analyses. A test of a model including all social environmental variables revealed that this set of variables reliably predicted attrition, $\chi^2(5) = 27.29, p < .001$. Results of this model demonstrated that the odds of attrition were greater among recruits who:

- a. Reported receiving less social support; and

- b. Reported four or more rather than fewer life events in the previous year.

A.3 Lifestyle

Screening of data revealed an uneven split on frequency of alcohol use in the past year. More specifically, very few respondents reported consuming alcohol on a daily basis (0.9%). To avoid problems with lessened power in the analyses, these respondents were grouped with those who reported consuming alcohol 4 to 6 times per week.

Physical activity and smoking were the only lifestyle variables that emerged as predictors of attrition (Table 7).

Table 7: Results of Unadjusted Analyses and Adjusted Analysis of Lifestyle Factors Predicting Basic Training Attrition

Predictor (reference category)	Unadjusted Analyses			Adjusted Analysis		
	Wald	OR	Lower-Upper CI	Wald	OR	Lower-Upper CI
Physical activity (inactive)	8.82*			2.87		
Moderately active	2.73	0.77	0.56-1.05	0.46	0.88	0.61-1.27
Active	8.82**	0.68	0.53-0.88	2.68	0.77	0.57-1.05
Smoking (never)	12.79**			4.01		
Ex-smoker	0.16	1.06	0.80-1.40	0.47	1.12	0.82-1.53
Current smoker	12.24***	1.53	1.20-1.94	4.00*	1.33	1.01-1.77
Alcohol use (never)	11.40			9.11		
2-3 times per year	1.49	0.76	0.49-1.18	0.01	0.97	0.57-1.66
Monthly	1.00	0.78	0.48-1.27	0.01	1.03	0.58-1.82
2-3 times per month	4.69*	0.62	0.41-0.96	1.92	0.69	0.41-1.17
Weekly	3.25	0.67	0.43-1.04	0.49	0.83	0.49-1.41
2-3 times per week	5.35*	0.59	0.38-0.92	2.23	0.66	0.38-1.14
4-6 times per week/Daily	0.01	1.03	0.61-1.73	0.05	1.07	0.57-2.04
Fruit/vegetable (insufficient)	0.23			0.02		
5-10 daily servings	0.01	1.01	0.78-1.32	<0.01	0.99	0.76-1.31
10+ daily servings	0.13	0.95	0.70-1.29	0.01	1.02	0.74-1.41

Note. CI = confidence interval, OR=odds ratio.

* $p < .05$, ** $p < .01$, *** $p < .001$

No multivariate outliers were identified among the set of lifestyle variables. As a set, these variables did not significantly predict attrition ($\chi^2 [12] = 15.50$, n.s.).

A.4 Health

Screening of data revealed uneven splits on a number of health variables, including BMI, RSI in the previous year, consultation with physician about emotional health in the previous year, depression diagnosis, anxiety diagnosis, probable PTSD, probable panic disorder, and probable other anxiety disorder. In the case of BMI, few respondents fell into the underweight category (1.7%). These cases were therefore excluded from the analysis. For analyses involving the other variables, it was acknowledged that uneven splits would result in lessened power. These variables were therefore excluded from multiple logistic regression analyses⁷. However, they were subjected to an unadjusted analysis for exploratory purposes.

As demonstrated in Table 8, several health indicators significantly predicted attrition without adjusting for the contribution of other variables. More specifically, significant predictors included self-rated health, sleep problems, obesity status, RSI in the previous year, acute injury in the previous year, somatic symptoms severity, consultation with physician about emotional health in the previous year, depression diagnosis, probable depression, probable PTSD, probable panic disorder, probable other anxiety disorder. None of the variables were significant protective factors (i.e., associated with lower odds of attrition).

Variables with adequate splits were entered simultaneously in a single model. Some multivariate outliers were identified among this set of variables. However, these represented less than 5% of cases. Outliers included recruits who reported moderate to severe depression symptoms or somatic symptoms. Given that it is reasonable to expect only a few cases to fall in these groups, and that results of the analysis without outliers approximated those of the analysis that included all cases⁸, it was decided to retain outliers in the analysis. This set of variables significantly predicted attrition ($\chi^2 [13] = 110.79$, $p < .001$). Only self-rated health, probable depression, and somatic symptom severity emerged as significant unique predictors, demonstrating that the odds of attrition were greater among recruits who:

- a. Reported poor/fair rather than excellent health;
- b. Reported moderately severe/severe rather than mild symptoms of depression; and
- c. Reported a medium/high rather than minimal severity of somatic symptoms.

⁷ In addition to potentially lessening power, inclusion of these variables in the multiple logistic regression analysis resulted in a high number of multivariate outliers, which reflected the low proportion of cases with extreme scores on these variables.

⁸ The only exception is that the contribution of somatic symptom severity to the prediction of basic training attrition no longer achieved statistical significance in the analysis with outliers removed. However, one likely explanation is that power was lessened by removal of outliers, as this resulted in an uneven split.

Table 8: Results of Unadjusted Analyses and Adjusted Analysis of Health Factors Predicting Basic Training Attrition

Predictor (reference category)	Unadjusted Analyses			Adjusted Analysis		
	Wald	OR	Lower-Upper CI	Wald	OR	Lower-Upper CI
Acute injury (none)	9.40**	1.53	1.17-2.01	2.60	1.29	0.95-1.76
Repetitive strain injury (none)	3.94*	1.44	1.01-2.07	—	—	—
BMI (normal)	5.53			3.24		
Overweight	<0.01	1.00	0.79-1.25	0.01	0.99	0.77-1.27
Obese	5.13*	1.49	1.06-2.12	2.90	1.39	0.95-2.03
Sleep problems (never)	41.43***			3.53		
Most of the time	41.39***	2.83	2.06-3.89	3.45	1.46	0.98-2.18
Sometimes	5.70*	1.31	1.05-1.64	0.92	1.13	0.88-1.46
Somatic symptoms (minimal)	65.05***			7.63**		
Low	20.67***	1.71	1.36-2.15	0.37	1.09	0.82-1.46
Medium/High	56.91***	4.06	2.82-5.84	7.31**	1.91	1.19-3.04
Self-rated health (excellent)	56.17***			22.19***		
Very good	0.29	1.09	0.80-1.48	0.03	1.03	0.73-1.46
Good	9.99**	1.65	1.21-2.26	1.88	1.29	0.90-1.86
Poor/Fair	40.91***	4.32	2.76-6.76	17.04***	3.02	1.79-5.11
HP consultation - general (none)	0.10	1.04	0.84-1.28	<0.01	1.00	0.79-1.26
HP consultation - emotional problem (none)	5.17*	1.73	1.08-2.76	—	—	—
Depression identified as cause (no)	11.35***	3.66	1.72-7.79	—	—	—
Anxiety identified as cause (no)	1.70	1.88	0.73-4.87	—	—	—
Positive screen PTSD (no)	23.08***	3.17	1.98-5.07	—	—	—
Positive screen panic disorder (no)	21.45***	5.36	2.63-10.9	—	—	—
Positive screen other anxiety disorder (no)	18.44***	4.31	2.21-8.39	—	—	—
Depression symptoms (mild)	97.66***			18.72***		
Moderate	36.44***	2.25	1.73-2.93	3.80	1.40	1.00-1.96
Moderately severe/Severe	77.56***	4.56	3.26-6.40	18.51***	2.62	1.69-4.07

Note. CI = confidence interval, HP=health professional, OR=odds ratio.

* $p < .05$, ** $p < .01$, *** $p < .001$

A.5 Personality

As shown in Table 9, all personality variables but agreeableness emerged as significant predictors of attrition. Several of these were associated with decreased odds of attrition (i.e., conscientiousness, extroversion, openness, optimism, positive affect, self-esteem, mastery, and hardiness), while the rest were associated with increased odds of attrition.

Table 9: Results of Unadjusted Analyses and Adjusted Analysis of Personality Factors Predicting Basic Training Attrition

Predictor (reference category)	Unadjusted Analyses			Adjusted Analysis		
	Wald	OR	Lower-Upper CI	Wald	OR	Lower-Upper CI
Agreeableness	1.40	0.99	0.96-1.01	10.00**	1.05	1.02-1.08
Conscientiousness	40.36***	0.93	0.91-0.95	1.09	0.98	0.95-1.02
Extroversion	16.74***	0.96	0.94-0.98	0.13	1.01	0.98-1.03
Neuroticism	89.93***	1.10	1.08-1.12	7.27**	1.04	1.01-1.08
Openness	8.34**	0.95	0.92-0.98	0.36	1.01	0.97-1.06
Personal need for structure	27.03***	1.05	1.03-1.06	0.78	1.01	0.99-1.03
Dispositional optimism	56.50***	0.91	0.88-0.93	0.13	1.01	0.97-1.05
Positive affect	49.61***	0.93	0.91-0.95	3.17	0.98	0.95-1.00
Negative affect	71.57***	1.06	1.05-1.08	0.35	1.01	0.98-1.03
Self-esteem	68.89***	0.90	0.88-0.92	0.34	0.99	0.95-1.03
Mastery	92.01***	0.90	0.88-0.92	12.37***	0.94	0.91-0.97
Hardiness	52.01***	0.94	0.92-0.95	1.38	0.99	0.96-1.01
Difficulty identifying feelings	49.87***	1.06	1.05-1.08	1.23	1.02	0.99-1.05
Difficulty describing feelings	16.14***	1.05	1.03-1.07	2.15	0.97	0.94-1.01
Externally-oriented thinking	9.89**	1.04	1.02-1.07	<0.01	1.00	0.97-1.03

Note. CI = confidence interval, OR=odds ratio.

* $p < .05$, ** $p < .01$, *** $p < .001$

Some multivariate outliers were identified among this set of variables. However, these represented less than 5% of cases and did not result in a significant change in results. These cases were therefore retained in the analyses. Together, the 15 personality variables significantly predicted attrition ($\chi^2 [15] = 131.28, p < .001$). However, only three of these variables (agreeableness, neuroticism, and mastery) emerged as significant unique predictors.

List of symbols/abbreviations/acronyms/initialisms

BMI	Body Mass Index
CI	Confidence Interval
CF	Canadian Forces
CFLRS	Canadian Forces Leadership and Recruit School
DND	Department of National Defence
DRDC	Defence Research & Development Canada
HP	Health professional
NCM	Non-Commissioned Member
OR	Odds ratio
PTSD	Posttraumatic stress disorder
RHQ	Recruit Health Questionnaire
R&D	Research & Development
RSI	Repetitive Strain Injury

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The aim of this prospective study was to identify key predictors of attrition from Canadian Forces (CF) basic training. Baseline health data from 5169 CF recruits collected using the Recruit Health Questionnaire (RHQ) were linked with administrative data kept by the CF Leadership and Recruit School (CFLRS) on basic training releases. The sample mostly consisted of Non-Commissioned (NCM) versus Officer candidates (88%), male versus female candidates (85.4%), and individuals under the age of 25 years (63.9%). Overall, the proportion of recruits from this sample who were released from basic training was 8%. They were primarily released on a voluntary basis (80.5%). A wide range of factors falling within each of the following categories were examined as potential predictors of attrition: demographic characteristics, social environment, health status, lifestyle, and personality. Logistic regression analyses pointed to increased odds of attrition among NCM candidates, recruits with one or more dependents, as well as those with an annual household income of less than \$20,000, poor/fair self-rated health, medium/high severity of somatic symptoms, higher neuroticism, lower mastery, and higher agreeableness. All things considered, results underscored the importance of good overall health and resilient personality to basic training success. Incorporating resilience training into the existing basic training curriculum may thus prove to be an effective strategy to reduce attrition from basic training.

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Recruits; Basic Training; Attrition; Health; Mental Health; Personality



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