

# The Relationship between Self-Concept, Self-Efficacy, and Military Skills and Abilities

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**Abstract.** This study investigated the relationship between academic self-concept, academic self-efficacy and the self-reported acquirement of certain specific military skills and abilities. Our sample consisted of 141 military cadets from the Norwegian Military Academy (Army), the Royal Norwegian Naval Academy, and the Royal Norwegian Air Force Academy. Supporting our hypotheses, it was found that perceived academic self-concept related positively to self-efficacy, after controlling for initial levels of self-efficacy, and that self-efficacy relates positively to self-reported Individual Coping Capacity (ICC), Cooperation in Difficult Situations (CDS), and Motivation to Achievement (MA), this after controlling for the initial levels of these Military Skills and Abilities (MSA). We discuss the implications of these findings.

**Keywords:** self-concept; self-efficacy; military skills and abilities.

## 1. Introduction

“The rigors in combat can be extreme. In our profession, the will to succeed and to strive towards results that exceed the expected, is the difference between success and failure” (Forsvarsstaben, 2007. p. 160, our translation). This quotation found in the Norwegian Armed Forces Joint Operational Doctrine reveals some reasons why officers and soldiers may need a well-developed self-

efficacy as they conduct their professional practice. Both officers and soldiers from the Norwegian Armed Forces (NAF) have been taking part in a multitude of operations across the world in an operational environment that has become increasingly difficult (Boe, Kjørstad, & Werner-Hagen, 2012; Forsvaret, 2018; Forsvarsdepartementet, 2009). After a conventional "cold war" scenario where the Norwegian soldiers only guarded its own borders, recent international conflicts are of a much higher complexity. The conflicts that the NAF have participated in the recent decades has changed its character from more regular combat operations through operations meant to stabilize and then to peace operations that are more complex in nature (Forsvarsstaben, 2014). New challenges will also arise as the operational environment becomes less transparent and at the same time more complicated (Boe, Bergh, & Johansen, 2017).

It has been stated that a large element of friction will be found in the wars that we will witness in the future. As a consequence of this friction, this will be very demanding for the single officer or soldier (Watts, 2004). The modern operational military environment is a mix of different factors, such as changes, uncertainty, complexity, and ambiguity. Stiehm (2002) refers to these types of situations as VUCA situations. VUCA is an acronym that is commonly used to describe the volatility, uncertainty, complexity and ambiguity of different situations and conditions. As a consequence of these types of situations, military leaders are forced to constantly ponder upon their values, norms, and roles that should be a part of their profession (Snider & Matthews, 2012; Sookermany, 2013).

Officers first has to be educated and trained to handle these operational environments (Boe, 2018). The document that governs the Norwegian Military Academy (Army), the Royal Norwegian Naval Academy, and the Royal Norwegian Air Force Academy and the education given at these military academies is the Norwegian Armed Forces Joint Operational Doctrine (FFOD) (Forsvarsstaben, 2014). FFOD states that stress in combat can be extreme, and that the will to succeed and to strive towards results that exceed what is expected may account for the difference between achieving success or failure (Forsvarsstaben, 2007). This statement highlights the importance for officers to believe in their ability to conduct their profession. The United States Army describe the need for leadership development in its Army Doctrine Publication ADP 6-22 (US Army, 2012). ADP 6-22 states that in decentralized operations, it is required from army leaders that they are able to adapt their thinking, their formations, and the employment of techniques in order to face the specific situation at hand. An adaptable and innovative mind and an ability to make adjustments based on continuous assessment are required in order to accomplish this (p. 0). In order to accomplish this, it is believed that one has to have a stable self-concept (Rosenberg, 1979) and a high degree of self-efficacy (Bandura, 1997).

Brown (2000) has shown that going through a military education in a military academy is psychologically, physically, and socially demanding. The purpose of

these demands is to prepare the cadets to lead in extreme environments after graduating. Brown reviewed research on military cadets, and concluded that military academic life was a significant contributor to the psychological development of the cadets at the military academies. According to social cognitive theories (SCT) (Bandura, 1997) such subjective convictions as academic self-concept and self-efficacy about oneself will play a very important role in a person's further growth and development (Markus & Nurius, 1986). An important factor thus becomes an individual's ability to create a high degree of self-efficacy (Eid, 2006) as to facilitate the acquirement of specific military skills and abilities (Johansen, Laberg, & Martinussen, 2013; Solberg, 2007). This ability is required in order for the soldier or officer to function well and to be able to lead in different missions, in particular because individuals with a high degree of self-efficacy persist in failure and deal with difficulties in a more efficient way (Jex *et al.*, 2001). Self-efficacy is thought to increase performance through different mechanisms. For instance, individuals that reveal high levels of self-efficacy tend to set more difficult goals for themselves. They also use more effort and they persist for a longer time when faced with challenges. When faced with challenges and adversity, such individuals also reveal more resilience (Klassen & Usher, 2010).

Additional research that takes a closer look at academic self-efficacy and academic self-concept simultaneously is thus needed, as this type of studies seems to be quite rare (e.g., Bandalos *et al.*, 1995; Choi, 2005; Lent, Brown, & Gore, 1997; Pajares & Miller, 1994). This research may then shed some light on the explanatory and mediating dimensions of both academic self-efficacy and academic self-concept. The present study investigating whether academic self-concept is positively related to self-efficacy and if self-efficacy could explain how military skills and abilities are acquired is an attempt in line with the previously defined need for this type of research.

Previous research on military skills and abilities in a military context are limited. The need for more research by using for instance sport psychology has been requested lately (Flore & Salas, 2008). Janelle and Hillmann (2003) state that by knowing the underlying mechanisms for performance in high level athletes, one may also gain insight in underlying factors that leads to to instruction and effective practice, and also to support networks. These factors may facilitate the processes of performance and learning in military contexts. Two underlying mechanisms that probably play a key role in this respect are self-concept and self-efficacy. Self-efficacy has been found to be a significant contributor as to whether soldiers succeeded in completing a very hard selection into the US Special Forces or not (Gruber, Kilcullen, & Iso-Ahola, 2009). Similarly, a meta-analysis on math self-concept revealed that there existed strong relations between self-concept and achievement (Ma & Kishor, 1997). However, the relationship between self-concept and self-efficacy has been shown to be somewhat unclear in the present research literature. For instance, while Bong and Skaalvik (2003) argued that academic self-efficacy should promote academic self-concept, Ferla, Valcke and Cai (2009) argued that students' academic self-concept should promote students' self-efficacy beliefs.

Accordingly, in answering calls for longitudinal research on academic self-concept and academic self-efficacy (e.g., Ferla, *et al.*, 2009), our main purpose in the present study was to investigate the relationships between academic self-concept, academic self-efficacy, and military skills and abilities over time. Specifically, we propose that academic self-concept relates positively to an increase in self-efficacy, and that self-efficacy then is related positively to an increase in three specific military skills and abilities. These specific military skills and abilities were individual coping capacity, cooperation in difficult situations, and motivation to achievement. A third purpose was to investigate further the relationship between self-concept and self-efficacy as this has been shown to be somewhat unclear in the present research literature. By doing so, we intend to make a contribution to the understanding of the psychological mechanisms that can be found underneath these three specific military skills and abilities. As research seems to be lacking within this field, our study may be an important contribution to the research field.

## 2. Theoretical Background

The next sections will discuss the concepts of self-concept and self-efficacy, as well as the relationships between the two concepts. We then deduct our first hypothesis from this theoretical background. Then we shed some light on how self-efficacy is related to military skills and abilities. We then deduct our second hypothesis from this additional theoretical background.

### *Self-Concept*

Rosenberg (1979) has defined self-concept as "...the totality of the individual's thoughts and feelings having reference to himself as an object" (p. 7). A similar definition of self-concept has been given by Shavelson, Hubner and Stanton (1976, p. 411): "...self-concept is a person's perception of himself"... One's perceptions of himself are thought to influence the ways in which he acts, and his acts in turn influence the ways in which he perceives himself..." Shavelson *et al.* (1976) postulated that through one's experiences with one's environment, one's self-concept is formed. Morreale (2011) investigated the academic motivation and academic self-concept of military veterans, and found that being exposed to combat did not relate neither to academic motivation nor to academic self-concept. According to Marsh and O'Mara (2008), one's self-concept is further influenced by reinforcements that stems from one's environment and from other persons that are significant to you. Investigating Portuguese Navy trainees, Frade and Veiga (2016) found that trainees with more self-concept and living offbase reached a higher level of engagement compared to trainees that presented a lower level of self-concept. Furthermore, those trainees living onbase with a low self-concept revealed a higher level of engagement when they were compared to those trainees that were not living at the base. Different aspects of self-concept may be seen to form a self-schema (Hughes, Galbraith, & White, 2011). This self-schema seems to include beliefs about one's, roles, abilities, experiences, and skills, but also beliefs about one's personal characteristics (Jerslid, 1965; Marsh & Shavelson, 1985; West & Fish, 1973).

For the purposes of the present study, and following Ferla *et al.* (2009), we focus on academic self-concept. Academic self-concept dwells around individuals' perception of their competence within different academic domains (Harter, 1982). Academic self-concept is further connected to the perceptions and knowledge that individuals have about themselves in academic situations where achievement is expected (Byrne, 1984; Shavelson & Bolus, 1982; Wigfield & Karpathian, 1991). The concept of academic self-efficacy revolves around the assumption that the belief you have in your academic skills and in your abilities will predetermine your following motivation and feelings. This is accomplished through a mechanism that is self-regulating, and academic self-efficacy is simply the degree to which you believe that you will complete the education you are going through (Bandura, 1986; Pajares & Miller, 1994; Schunk & Zimmermann, 1997; Zimmermann, 2000). For instance, in a study on medical students conducted by Yu, Chae, and Chang (2016), academic self-efficacy was found to be a partial mediator regarding the relationship between on one hand, socially-prescribed perfectionism, and on the other hand, academic burnout.

#### *Self-Efficacy*

For military professionals, high standards are both expected and required. It should therefore not come as a surprise that a soldier or officer will need a strong self-efficacy to deal with VUCA situations they may encounter. Bandura (1986, 1997) postulated that self-efficacy emerges from four major sources, respectively enactive mastery experiences, vicarious experiences, verbal persuasion and physiological reactions. Bandura (1997, p. 3) later defined self-efficacy as "...[the] beliefs in one's capabilities to organize and execute the courses of action required to produce given attainments". This is about what one considers attainable with the skills one possesses and not about the abilities and skills one possesses (Bandura, 1986). There exists several meta-analyses that suggest that there is a positive relationship between self-efficacy and performance (Gully *et al.*, 2002; Moritz *et al.*, 2000; Multon, Brown & Lent, 1991; Sadri & Robertson, 1993; Stajkovic & Luthans, 1998). It has also been shown that believing in one's own capacities, skills and abilities is important for Norwegian military officers within a variety of different tasks. Examples of such tasks are how professional soldiers learn aggression as well as aggression control (Boe & Ingdahl, 2017), how to increase professional soldiers willingness to kill (Boe & Johannessen, 2015), how to prepare officers for their first parachute jump (Boe & Hagen, 2015), and how to enhance leadership communication skills of officer cadets (Boe & Holth, 2017; Holth & Boe, 2017). Self-efficacy has also been found to emerge as a partial moderating factor regarding the relationship between the conscientiousness domain in the Big Five and how one perform in a sample of Norwegian military cadets (Fosse *et al.*, 2015).

Research has revealed that the strongest predictor of self-efficacy is enactive mastery experience (Boe & Bergstøl, 2017; Britner & Pajares, 2006; Lent, Lopez, & Bieschke, 1991; Usher & Pajares, 2008). Bandura also states that a very important factor for individuals when it comes to performing is self-efficacy (Bandura, 1997). Throughout all the educational processes, the perceived competence you think you have has been found to be an important contributor to success.

Looking at research conducted on military personell, Adler, Thomas, and Castro (2005) found that the military competence that individuals reported they had correlated well with the demonstrated effort and expertise the same individuals showed. Investigating soldiers in an American Stryker brigade, Hammermeister *et al.* (2010) revealed that those that had revealed psychological skills that were well-developed showed a better performance on physical tests as compared to those that had revealed psychological skills that were less-developed. Similarly, the completion of a physically hard selection process was found to be significantly impacted by individual levels of self- efficacy (Gruber, Kilcullen, & Iso-Ahola, 2009). Based upon these studies, it is therefore fair to say that psychological skills are important for both soldiers and officers. Contradicting this, Buch, Säfvenbom, and Boe (2015) found that for military cadets with a high level of intrinsic motivation, self-efficacy was of less importance as a mediator to increase their perception of their military competence. A preliminary conclusion one might draw from the above mentioned studies is that the role of self-efficacy in a military environment is still somewhat ambiguous and not well-defined clear-cut.

*The Concepts of Self-Concept and Self-Efficacy and their Relationship*

Some researchers have argued that self-concept and self-efficacy as constructs tend to be somewhat loosely defined at a conceptual level. As such, it then becomes difficult to construct a clear and operational definition of the constructs (e.g., Harter, 1982). Other researchers have argued that the constructs academic-self-concept and academic self-efficacy clearly can be distinguished from each other, and that they have a different impact upon both motivation and subsequent behavior (e.g., Marsh, Walker & Dubus, 1991). In an extension of prior research, we argue below that higher levels of academic self-concept should relate positively to higher levels of self-efficacy.

Social cognitive theory (Bandura, 1986) suggest that mastery experience is a core element of self-efficacy beliefs, and cadets with greater academic self-concept probably experience greater levels of mastery experience. This should promote the cadets' self-efficacy beliefs. To complicate the picture a bit more, it has been suggested that the construct of self-concept seems to include a component of the construct self-efficacy (Bong & Clark, 1999; Pajares, 1996; Schunk, 1991). The two constructs, that is, self-concept and self-efficacy, can be seen to have several common elements. These are social comparison, experiences that you have from the past, and the reinforcements that comes from other people that are significant to you. Previous research has revealed that the two constructs can be linked to different outcomes that are deemed as desirable by students. Examples of such outcomes are academic achievement (Pintrich & Schunk, 1996; Marsh & Yeung, 1997), being persistent (Lent, Brown, & Larkin, 1986; Skinner, Wellborn, & Connell, 1990), and the internalization of task goals and achievement (Bong, 2001; Skaalvik & Skaalvik, 2005). Also, the two constructs share many of the perceived results that are related to functioning both cognitively, affectively and behaviorally. Furthermore, linking the concept of self-concept to self-efficacy, Hughes, Galbraith, and White (2011) suggested that there exist an overlap between the different elements of the constructs of self-concept and self-efficacy.

Other researchers claim that self-concept could include self-efficacy (Lent *et al.*, 1997). Within the literature there is thus an ongoing discussion whether self-concept and self-efficacy can be perceived as two distinctive and separated constructs or not. A common theme is that both self-concept and self-efficacy seem to reflect a greater perception of control that is personal (Pekrun, 2006). According to Pajares and Schunk (2001), both self-efficacy and self-concept beliefs have been especially dominant in motivation research.

However, Bong and Skaalvik (2003) suggest that self-efficacy leads to self-concept but in another later study by Ferla *et al.* (2009) it was revealed that the participants' academic self-concept clearly correlated to a high degree with beliefs about academic self-efficacy. Ferla *et al.* (2009) showed that math self-concept and math self-efficacy represented two conceptually and also empirically separated concepts. They also showed that students' academic self-concept strongly influenced academic self-efficacy beliefs. In a similar vein, Bong *et al.* (2012) have found that self-beliefs, that is, self-concept and self-efficacy can be good for predicting the value a task has.

Further looking at the subjects of mathematics and modules of engineering education that were related to mathematics, Loo and Choy (2013) found that most important predictor for academic achievements within these subjects was mastery experience. Ferla *et al.* (2009) concluded that their findings underpinned both the conceptual and empirical differences found in the literature, specifically referring here to Bong and Skaalvik (2003).

Bong and Skaalvik (2003) asserted that academic self-concept is more oriented towards the past. They also asserted that one's perceived academic abilities was supported by judgments that were relatively stable. This relatively stable past-oriented judgment should increase future academic self-efficacy, which represents a more oriented towards the future assessment regarding the confidence an individual has when it comes to performance in academic tasks that are subject-specific (Ferla *et al.*, 2009). Whereas self-efficacy beliefs develop over time and rest upon actual experiences (Caprara *et al.*, 2011), cadets' academic self-concept may also represent a proxy for actual experiences that shapes their self-efficacy beliefs over time. Accordingly, cadets who have a favorable academic self-concept should exhibit a greater increase in future academic self-efficacy beliefs. In support of such arguments, Ferla *et al.* (2009) found that participating students' academic self-concept had a strong influence upon the beliefs the students had about their academic self-efficacy. Accordingly, we hypothesize:

*Hypothesis 1: Academic self-concept relates positively to self-efficacy, after controlling for initial levels of self-efficacy.*

#### *Self-efficacy and Military Skills and Abilities*

It has been stated that specific military skills are valid indicators of performance (Johansen, Laberg, & Martinussen, 2013). In the present study, self-reports were used measuring perceived specific military skills and abilities and not actual specific military skills and abilities. One may ask whether self-reports are

reliable indicators of performance. However, a comparison of self-reports and unit records among US soldiers revealed a satisfactory correlation, indicating that self-reports are valid reports of performance (Adler, Thomas & Castro, 2005). The present study investigated three specific military skills and abilities, that is, individual coping capacity, cooperation in difficult situations, and motivation to achievement. These specific military skills were measured by the self-report instrument Military Skills and Ability (MSA) (Johansen, Laberg, & Martinussen, 2013; Myrseth *et al.*, 2018; Solberg, 2007). Specific military skills are comprised of certain skills and abilities that are necessary for soldiers when they are participating in operations and in combat. Military training aims at creating confidence in and achieving high standards performance in the military. This in order to make sure that soldiers has the ability to cope with combat contexts and complete their assigned missions (Driskell, Salas, & Johnston, 2006; Krueger, 2008).

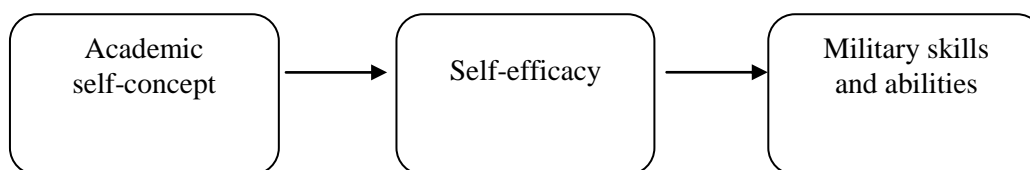
The MSA instrument is constructed of twenty statements and uses a Likert-type scale. The scale ranges from 1 (very bad) to 5 (very good). The self-report instrument is comprised of three subscales. The first subscale Individual Coping Capacity (ICC) (e.g., “Keeping a cool head in stressful situations” or “My ability to handle stress and difficult situations”). The second subscale Cooperation in Difficult Situations (CDS) (e.g., “Willingness to act on command in emergency situations” or “My ability to motivate and inspire others in difficult situations”). The third subscale Motivation to Achievement (MA) (e.g., “My motivation to participate in peacekeeping operations abroad”). Studies that have used the MSA instrument have yielded a Cronbach’s alpha  $>0.70$ , indicating a high enough internal consistency (Laberg *et al.* 2002; Moldjord *et al.* 2015; Solberg 2007).

The research literature leaves no doubt that there exists a clear and also significant path between self-efficacy, motivation, and performance (Bandura, 1995). Empirically, self-efficacy has revealed itself to be negatively correlated to psychological distress and the perception of stress (Chan, 2002; Markstrom, 2001; Markstrom *et al.*, 1997). Self-efficacy has further been found to be positively correlated to how one scores one’s own health (Kristenson, Olsson & Kucinskiene, 2005 (Bjorner *et al.*, 1996; Idler & Benyamini, 1997). It has been found that having high degree of self-efficacy increase the probability that one will set difficult personal goals for oneself (Bandura & Locke, 2003). Furthermore, it has also been shown that setting challenging goals for oneself will lead to a better performance on the task one is engaged in (Brown, Jones, & Leigh, 2005). For example, individuals that reveals a high degree of self-efficacy are more successful in their school work when they are compared to those with lower degree of self-efficacy (Multon, Brown, & Lent, 1991). The same has been revealed in sports (Moritz *et al.*, 2000) and at work (Stajkovic & Luthans, 1998). Jex *et al.* (2001) found that high self-efficacy individuals were more likely to believe that they would be able to comply with job demands when they are facing stressors. Research on Norwegian military cadets about to participate in a parachute course, revealed that the parachute course was a significant contributor to a higher level of self-efficacy before jumping out of the airplane



(Boe, 2006; Boe & Hagen, 2015). It then seems quite sensible that individuals displaying high self-efficacy will show a higher degree of individual coping capacity despite the presence of stressors. It has also shown that individuals that manage to maintain complexity under stress function better in groups. It is well-known and documented fact that soldier's in a group will perform significantly better than they would have by themselves (Kellett, 1984). According to Watson (1978, p. 113) "The good squad is more than the sum of its parts". Moreover, it turns out that groups where individuals know each other well and have a well-developed sense of coherence perform significantly better in the war than groups that have just been created and where individuals to a lesser degree know each other (Dinter, 1985).

In addition, it has been found that business students that reveal a high degree of self-efficacy have a higher probability of becoming entrepreneurs (Zhao, Seibert, & Hills, 2005). Also, those who believe that they have an ability to complete a task will show more interest in starting a task and then in implementing different strategies. This is also a solid predictor that these individuals will show a higher level of performance (Gerhardt, Rode, & Peterson, 2007). An explanation could be that individuals are more achievement motivated simply because they already have acquired a high degree of self-efficacy. Stated a bit differently, these individuals just believe that achieving their goals are possible. Following this line of reasoning, we propose that self-efficacy increases military skills and abilities (see figure 1 below).



**Figure 1. Conceptual model used in the study**

Therefore, we hypothesize:

*Hypothesis 2: Self-efficacy relates positively to a) individual coping capacity, b) cooperation in difficult situations, c) and motivation to achievement, after controlling for initial levels of these constructs.*

### **3. Method**

In this section we will reveal the method we used in the present study. An overview of our participants and the measures we used in the study will first be given, and thereafter we will reveal which control variables we used and how we analyzed our data.

#### *Participants and Procedure*

The data used in the present study was collected from cadets at the Norwegian Military Academy (Army), the Royal Norwegian Naval Academy, and the Royal Norwegian Air Force Academy at three consecutive points in time between 2007 and 2010 (referred to here as T1, T2, and T3). T1 data was collected when the cadets stated their first year at one of the academies. T2 data was collected when

the participants finished their first year at one of the academies, and T3 data was collected when the participants finished their second year at one of the academies. The participants were given the information that the survey was approved by the Norwegian Social Science Data Services (NSD) and strict confidentiality was assured. In accordance with the NSD rules regarding voluntary participation, our participants were subsequently also informed that it was completely voluntary to take part in the study. They were further informed that if they would like to withdraw from the study, they could do whenever they wanted. Participation on each time of measurement varied from 295 (T1) to 165 (T3). The total number of individuals who participated with data at all three measurement times consisted of 141 cadets. Our initial sample at T1 was 90.2% men and 9.8% women, and the mean age was 23.2 years ( $SD = 2.72$ ). Age, rank, and military experience in Norwegian military cadets are comparable to other countries in NATO (Johansen, Laberg, & Martinussen, 2013).

#### *Measures*

*Academic self-concept.* Regarding the measurement of academic self-concept at T1, we decided to use the Self Perception Profile for Adolescents (SPPA) (Harter, 1988). Specifically, we used the dimension typically referred to as scholastic competence. Sample items include “*I manage to complete my school work without any difficulties*” and “*I do well at school*” (translated to Norwegian and back to English by the authors). The respondents were asked to indicate their responses on a 4-point scale ranging from 1 (totally disagree) to 4 (totally agree). We found the internal consistency to be high for this scale in our study, as Cronbach's alpha reached  $\alpha = .80$ .

*Academic self-efficacy.* As we wanted to measure self-efficacy at T1 and T2, we developed a seven-item scale that was specifically designed to capture the self-efficacy beliefs that participants would have regarding their ability to be successful in completing their military training and education (Buch, Säfvenbom, & Boe, 2015). The Self-Efficacy Scale was developed because individuals have different self-efficacy beliefs in different activities and across domains, and as a consequence of this “there is no single all-purpose measure of self-efficacy with a single validity coefficient” (Bandura, 2012, p. 15).

Bandura (2012) has argued that general measures of self-efficacy that are not related to the context are less predictive and that they “usually bear weak relation both to domain-related self-efficacy beliefs and to behavior” (p. 16). On a general basis self-efficacy theorists thus not encourage using an all-purpose or more general instruments to measure self-efficacy (e.g., Pajares & Urdan, 2006). For cadets to attain self-efficacy beliefs, they need to have acquired a knowledge regarding the environment and context that the military education at the academy takes place in. Answering this in the present study, we tailored the instrument so that it would fit to the academic domain that exist in a military academy. The items were thus designed so that they would measure the cadets perceived capability to manage process activities. These process activities, such as coping with difficult and hard times and getting through the education and still perform well, is of importance for academic performance. The stem used for each item was “With reasonable certainty, I can say that I...” The respondents

were asked to indicate their responses on a 7-point scale ranging from 1 (totally disagree) to 7 (totally agree). Table 1 below shows the 7 questions that were used in the Self-Efficacy Scale (Buch, Säfvenbom, & Boe, 2015).

**Table 1: The Self-Efficacy Scale**

With reasonable certainty, I can say that I...
...am a person who can handle being a military-academy student
... am able to mobilize the energy needed to work hard with my studies
... am able to handle dark moments in the life of studying
...will manage to complete the military academy
...will achieve a result I can be proud of
...after completing the military academy will achieve results above average among my peers
...after completing the military academy will receive a service report above average

*Note.* Respondents indicated their responses on a 7-point scale (1 = totally disagree, 7 = totally agree).

The scale was measured with an internal consistency of  $\alpha = .88$ . (Nunnally, 1978, states that for exploratory measures the internal consistency should be above .70) providing an “indication of strong item covariance and suggests that the sampling domain has been captured adequately” (Hinkin, 1988, p. 113). Previous studies using The Self-Efficacy Scale have previously reported reliability estimates (Cronbach alpha’s) ranging from 0.83 to 0.89, thus revealing a high internal consistency (Buch, Säfvenbom, & Boe, 2015; Fosse, Buch, Säfvenbom, & Martinussen, 2015).

#### *Military skills and abilities*

For the measurement of initial military skills and abilities at T1 and at the follow-up survey at T3, we used the self-report instrument Military Skills and Abilities (MSA) developed by Solberg (2007) and previously used by Johansen, Laberg, and Martinussen (2013) and by Myrseth, Hystad, Säfvenbom, and Olsen (2018). The scale consists of twenty items that comprises three sub-dimensions: ICC ( $\alpha = .83$ ), CDS ( $\alpha = .70$ ), and MA ( $\alpha = .78$ ). The overall  $\alpha$  of the instrument is .78. The respondents recorded their responses on a five-point scale that ranged from 1 (very bad) to 5 (very good). Sample items include “*My ability to make decisions in difficult situations is*” (individual coping capacity), “*My ability to give support to others in demanding situations is*” (cooperation in difficult situations), and “*My motivation to participate in peacekeeping operations abroad is*” (motivation to achievement). Three items from the sub-dimension motivation to achievement was later removed from the analyses. Items 4 and 7 were removed due to low factor loading and item 1 was removed due to cross loading.

#### *Control variables.*

Self-perceptions with respect to athletic competence (AC), physical appearance (PA), and global self-worth (GSW), could influence self-efficacy beliefs and military skills and ability. We therefore controlled for AC ( $\alpha = .80$ ), PA ( $\alpha = .79$ ), and GSW ( $\alpha = .68$ ) using the Self Perception Profile for Adolescents (Harter, 1988). Furthermore, we also controlled for any level of civilian education (CE) our participants had, as prior CE may influence the belief that the cadets had

about their academic self-efficacy beliefs. Finally, we also controlled for the participants age and their gender (men = 1; women = 2) in order to remove them as alternative explanations for our observed findings.

#### *Data Analysis*

We analyzed the data in several steps. First, in order to test whether the items measured reflected the latent constructs they were intended to and designed to measure (Hair *et al.*, 2006), using the Mplus program we then performed a confirmatory factor analysis (CFA). To take into account the ordered categorical data (e.g., Flora & Curran, 2004), we followed Muthén, du Toit, and Spisic (1997) guidelines and used the weighted least squares (WLSMV) estimator. The WLSMV estimator uses polychoric correlations among items. According to Jöreskog (1994), this is an effective procedure when one want to estimate models that consists of variables that are ordinal and dichotomous.

Given the fact that our data were nested (our respondents were nested within the Norwegian Military Academy (Army), the Royal Norwegian Naval Academy, and the Royal Norwegian Air Force Academy), the CFA was conducted using cluster robust standard errors at the academy level. Finally, in order to test our hypotheses, we ran separate hierarchical multiple regressions for each dependent variable.

#### **4. Results**

The results of a seven-factor CFA model, representing academic self-concept (ASC), self-efficacy (SE), MSA (individual coping capacity, cooperation in difficult situations, motivation to achievement), and the latent control variables (athletic competence (AC), physical appearance (PA), and global self-worth (GSW), provided a good fit with the data ( $\chi^2 [1009] = 1602.66, p < 0.01; \chi^2/df = 1.59; RMSEA = 0.045; CFI = 0.98; TLI = 0.98$ ). With the exception of the latent control variable GSW which fell slightly below the “magic threshold” of .70 ( $\alpha = .68$ ), the scales also yielded high internal consistency, with reliability estimates (Cronbach alpha’s) ranging from .70 to .88. Hurley *et al.* (1997) recommend using the CFA when testing “*whether the newly written items conform to the hypothesized structure the scale architect had in mind*” (p. 672). Means, standard deviations and bivariate correlations are reported below in Table 2. As can be seen, the zero-order correlations were found to be in the predicted direction. Academic self-concept at T1 was revealed to be positively related to self-efficacy at T2 ( $r = .37, p < .01$ ), which in turn, was positively related to a) ICC at T3 ( $r = .38, p < .01$ ), b) CDS at T3 ( $r = .26, p < .01$ ), and c) MA at T3 ( $r = .14, n.s.$ ), although the latter relationship failed to reach statistical significance.

**Table 2: Means, standard deviations and bivariate correlations**

Variables	Mean	SD	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1. Gender	1.10	.30														
2. Age	23.17	2.92	-.07													
3. CE	2.50	.90	-.11	.47**												
4. PA T1	3.09	.52	-.07	-.03	.03											
5. AC T1	2.80	.52	-.03	-.02	-.04	.38**										
6. GSW T1	3.34	.39	-.17**	-.09	.02	.60**	.29**									
7. ASC T1	3.12	.43	-.09	-.13*	.05	.08	.07	.21**								
8. SE T1	5.43	.80	-.13*	-.06	-.06	.25**	.31**	.33**	.37**							
9. SE T2	5.34	.94	-.11	.03	.07	.25**	.13	.19**	.37**	.44**						
10. ICC T1	3.64	.46	-.11	.20**	.01	.15*	.16**	.21**	.21**	.37**	.22*					
11. ICC T3	3.90	.49	-.22**	.25**	.05	.05	.05	.06	.24**	.28**	.38**	.57**				
12. CDS T1	3.68	.42	.00	.08	-.15**	.16**	.18**	.22**	.12*	.31**	.17**	.44**	.20*			
13. CDS T3	3.87	.43	-.10	-.16*	.03	.07	.13	.13	.13	.32**	.26**	.37**	.52**	.54**		
14. MA T1	4.34	.69	.08	-.04	-.22**	.02	.04	.06	-.07	.10	.02	.30**	.07	.25**	.21**	
15. MA T1	4.35	.73	-.20*	-.07	-.08	-.01	-.13	.08	-.05	-.02	.14	.14	.14	.20*	.24**	.54**

Note:  $n = 295$  (T1);  $n = 248$  (T2);  $n = 165$  (T3), CE= Civilian education, PA= Physical appearance, AC= Athletic competence, GSW= Global self-worth, ASC= Academic self-concept, SE= Self-efficacy, ICC= individual Coping Capacity, CDS= Cooperation in difficult situations, MA= Motivation to Achievement.

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

Our first hypothesis was that ASC relates positively to SE, after controlling for initial levels of SE. Our second hypothesis was that SE relates positively to MSA, after controlling for initial levels of MSA. The results of the hierarchical multiple regressions can be found in Table 3 and 4 below.

**Table 3: Hierarchical regression analysis predicting SE (T2) from academic self-concept (T1) while controlling for SE at Time 1**

	Self-efficacy T2	
	Step 1	Step 2
<i>Control variables</i>		
Gender <sup>a</sup>	-.04	-.03
Age	.01	.06
Civilian education	.07	.01
Physical appearance T1	.16*	.16*
Athletic competence T1	-.03	-.01
Global self-worth T1	-.02	-.05
<i>Initial level of self-efficacy</i>		
Self-efficacy T1	.41***	.33***
<i>Predictor</i>		
Academic self-concept T1		.26***
F	9.52***	11.16***
R <sup>2</sup>	.22	.28
$\Delta R^2$		.06***

Note:  $n = 295$  (T1);  $n = 248$  (T2);  $n = 165$  (T3). <sup>a</sup>men = 1; women = 2.

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

As demonstrated by Table 3, there was a positive relationship between ASC at T1 and SE at T2 ( $\beta = .26, p < .01$ ), after controlling for the effect of initial level of SE at T1. Accordingly, we obtained support for Hypothesis 1.

**Table 4: Hierarchical regression analysis predicting MSA (T3) from SE (T2) while controlling for MSA at Time 1 (T1)**

	ICC T3		CDS T3		MA T3	
	Step 1	Step 2	Step 1	Step 2	Step 1	Step 2
<i>Control variables</i>						
Gender <sup>a</sup>	.15*	-.10	-.03	.00	-.24**	-.21**
Age	.07	.10	.11	.13	-.01	.01
CE	-.03	-.06	.04	.02	-.03	-.05
PA T1	-.02	-.08	-.04	-.08	.07	.04
AC T1	.03	.01	.07	.06	-.16	-.18*
GSW T1	-.08	-.06	-.01	.00	-.03	-.02
ASC T1	.19*	.06	.14	.06	.03	-.05
<i>Initial MSA</i>						
ICC T1	.50***	.50***				
CDS T1			.50***	.50***		
MA T1					.51***	.51***
<i>Predictor</i>						
SE T2		.31***		.22***		.19*
F	9.26***	11.05***	7.07***	7.39***	7.87***	7.41***
R <sup>2</sup>	.36	.43	.30	.34	.32	.35
$\Delta R^2$		.07***		.04***		.03*

Note:  $n = 295$  (T1);  $n = 248$  (T2);  $n = 165$  (T3). <sup>a</sup>men = 1; women = 2.

ICC = individual Coping Capacity, CDS = Cooperation in difficult situations, MA = Motivation to Achievement, CE = Civilian education, PA = Physical appearance, AC = Athletic competence, GSW = Global self-worth, ASC = Academic self-concept, SE = Self-efficacy, MSA = Military Skills and Abilities.

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

Regarding the relationships between SE and MSA, Table 4 revealed that there existed a positive relationship between SE at T2 and ICC at T3 ( $\beta = .31, p < .01$ ), after controlling for the effect of initial level of ICC at T1. Support for Hypothesis 2a was thus yielded. Furthermore, in support of Hypothesis 2b, we found a positive relationship between SE at T2 and CDS at T3 ( $\beta = .22, p < .01$ ), after controlling for the effect of initial level of CDS at T1. Finally, we obtained support for Hypothesis 2c, as we found a positive relationship between SE at T2 and MA at T3 ( $\beta = .19, p < .05$ ), after controlling for the effect of initial level of MA at T1.

## 5. Discussion

Our main purpose in the present longitudinal study was to assess whether there existed a relationship between the constructs self-concept, self-efficacy and military skills and abilities. The results from our study leads to several theoretical implications.

First, with respects to the hypothesized relationship between ASC and SE, we found that ASC relates positively to an increase in SE. This observation supports previous research suggesting that academic self-concept is an antecedent to self-efficacy (Ferla, *et al.* 2009). Furthermore, our study extends prior research relating academic self-concept and self-efficacy (e.g., Bong & Skaalvik, 2003; Ferla, *et al.* 2009) by indicating that individuals with greater ASC also exhibit a greater increase in SE than those with a lower ASC. Hence, having a greater ASC when enrolling into a military academy seems to be beneficial when it comes to the cadets' being able to develop SE beliefs over time. Accordingly, our study contributes to the self-concept and self-efficacy literatures by clarifying the nature of the relationship between academic self-concept and self-efficacy.

Second, with respect to the relationships between SE and MSA, an important result from our longitudinal study is that SE relates positively to an increase in ICC, CDS, and MA. This finding extends prior research investigating antecedents to military skills and abilities among military cadets (Johansen, Laberg & Martinussen, 2013; Myrseth *et al.*, 2018) by indicating that cadets with higher levels of self-efficacy are able to increase their military skills and abilities to a greater degree during their education than cadets with lower levels of self-efficacy. Supporting this, other studies have revealed that high self-efficacy has been found to promote helpfulness, to promote an orientation and cooperation towards others, and to promote an interest in the health and wellbeing of others (Bandura *et al.*, 1996; Bandura *et al.*, 1999).

Third, our results yielded a positive relationship between SE and later ICC, CDS and MA. This fits well with Wrzesniewski *et al.* (2014) study of 10,000 West Point cadets over the period of 10 years. The results from this study revealed that the cadets internal motivation for military service was itself a predictor for "*whether they would become commissioned officers, extend their officer service beyond the minimum required period, and be selected for early career promotions*" (p. 10990).

Interestingly, although we did not hypothesize this, we observed a negative relationship between gender and MA, suggesting that women's motivation to engage in peacekeeping operations abroad tend to decrease during their military training and education. Previous research has shown that military personnel developed more negative attitudes towards peace-keeping missions over time (Laberg *et al.*, 2005).

Although tentative, our observation could perhaps be explained by gender differences in that women seem to have a tendency to make less favourable social comparisons when judging their intellectual abilities (Goethals, Messick, & Allison, 1991). Another possible explanation for this finding is that women to a higher degree than men attribute their academic success to external factors, for instance luck (Leppin *et al.*, 1987). This is in line with other findings (Ferla *et al.*, 2009; Marsh & Yeung, 1998; Pajares & Miller, 1994) revealing that women have a lower degree of self-efficacy and that women also reveal a lower math self-concept and math self-efficacy than males.

## 6. Limitations and Research Directions

There are a few limitations that should be taken into account when we interpret our results. First, although we used a longitudinal design, our data were correlational and this hampers any possible assumptions about causality. Still, by investigating the variables at different points in time, such potential problems could be minimized (Podsakoff *et al.*, 2003). In addition, we took into consideration several procedural countermeasures.

We made sure that the respondents were anonymous, and we also separated psychologically the scale items for both the predictor and the mediating variable (Podsakoff *et al.*, 2003). We followed some of the procedural countermeasures that Podsakoff *et al.* (2003) suggests and in this way did our best to minimize the common method bias. As an example, when we emphasized confidentiality we expected a reduction in the potential common method variance (CMV). This emphasis was expected to reduce the probability that respondents would “*edit their responses to be more socially desirable, lenient, acquiescent, and consistent with how they think the researcher wants them to respond*” (Podsakoff *et al.* 2003, p. 888).

Second, our reliance on self-reported data when it comes to self-efficacy and MSA relationships may have affected the validity of our findings. In addition, according to Elstad (2010), if respondents are alone when filling out questionnaires, there is an increased risk that they will lose focus. On the other hand, although our study was based solely on self-report measures conducted at three points in time, we think that we avoided the tendency for CMV and inflated ratings (Podsakoff *et al.*, 2003). Furthermore, we separated psychologically the independent and the dependent variables in time when we collected the data. We estimate that this helped to reduce any possible influence of CMV, as this has been shown to be a good approach to this problem (Podsakoff *et al.*, 2003). There is also research that reveals that interactions that are statistically significant are not probable results of CMV (Harrison, McLaughlin & Coalter, 1996; Siemsen, Roth & Oliveira, 2010). Adler, Thomas, and Castro (2005) has found that there exist a sufficing similarity between soldiers self-reported data and their unit records when it comes to performance in different domains in a military context such as the one in the present study. Nonetheless, any research in the future should aim to collect data that come from different sources and variables. As an example of this, data could be collected from peers (Bang *et al.*, 2015; Matthews *et al.*, 2011; Zazanis, Zaccaro, & Kilcullen, 2001).

Thirdly, there are some limitations to the use of a 5 point Likert-scale. A well-known phenomenon is referred to as the social desirability bias (Garland, 1991). This means that the respondents tend to use the mid-point of the answering scale, as they do not want to give an answer that may be interpreted as a socially unacceptable one. The result of this is that the respondents tend to answer what they think is expected of them, instead of what they were thinking of. Silvera and Seger (2004) have also reported that specifically Norwegians have a tendency to avoid using the ends of the scales when rating their answers.



Fourthly, the measurements used in the present study were not complicated. However, our participants may have felt a sense of overload because the present study was a part of a much larger study on Norwegian military cadets. A study on situational awareness conducted on a previous combat fatigue course has proved this tendency (Matthews *et al.*, 2011). Another challenge in our study may be that the participants were not interested in the study and that this may have led to a less accurate scoring of themselves. In line with this, it has also been shown that a reduction in cognitive functioning may affect one's ability to focus (Vaitl *et al.*, 2005).

Fifthly, our possibility to generalize our results may be limited by the sample we used to test our hypotheses. Our sample was based on military cadets at the Norwegian Military Academy (Army), the Royal Norwegian Naval Academy, and the Royal Norwegian Air Force Academy in Norway. These cadets have previously been through different selection procedures and may have different characteristics than a normal population.

Sixth, the use of quantitative method may give different answers as compared to if we had used qualitative methods. On the other hand, according to Ringdal (2001), the use of quantitative methods will increase the distance to the underlying data, and this can contribute to a more objective approach to the problem being investigated.

Seven, the measures of military skills in the present study were based on self-report. This may be a weakness as self-reported skills may differ from "actual" military skills. However, a good enough similarity has been found in comparing self-reports from US soldiers with their unit records. This was found in domains where the soldiers were expected to perform and included that the soldiers were able to demonstrate effort and proficiency in soldiering (Adler, Thomas & Castro, 2005).

Finally, as our sample consisted mainly of male cadets coming from the Norwegian Military Academy (Army), the Royal Norwegian Naval Academy, and the Royal Norwegian Air Force Academy in Norway, there is a risk that we cannot generalize our results beyond our population. If we want an extension of generalizability of our results we suggest that other countries and cultures are tested with the same instruments we used. We also suggest that similar studies with experimental designs should be conducted within other countries and in other sports, in the hope that our findings may lead to new directions in the research to come.

## **7. Practical Implications**

Finally, we think that our study may yield a few implications that might be of importance in a practical sense. We think that military academies can use our findings in order to facilitate how to develop academic self-efficacy beliefs in their cadets. Following this line of thinking, van Dinther, Dochy, and Segers (2011) have suggested that higher education intervention programs can increase the cadets' beliefs about their self-efficacy. There is also research suggesting that

the role of teachers may be crucial. This as self-efficacy seems to be receptive to changes in the instructions that are given from the teachers (Pajares & Schunk, 2001; Robbins *et al.*, 2004).

## 8. Conclusion

To summarize, our study offers empirical support that academic self-concept leads to self-efficacy and that self-efficacy leads to an increased individual coping capacity, cooperation in a difficult situation, and a motivation to achievement in a military academic context.

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