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The influence of autonomy support on self-regulatory processes and attrition in the Royal Dutch Navy

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ABSTRACT

The purpose of this study was to investigate the underlying mechanisms that explain the influence of instructor support on attrition levels within Navy basic military training. Based on self-determination theory, we hypothesized that higher autonomy support leads to lower intent to quit, mediated by self-efficacy and training value. Results from a group of trainees (N = 208) confirmed that autonomy support negatively predicted intent to quit and that this relationship was mediated by self-efficacy. Training value did not mediate between autonomy support and intent to quit. In addition, logistic regression showed intent to quit predicted attrition. In conclusion, the application of self-determination theory provided new insights into the mechanisms underlying attrition in the military domain.

1. Introduction

To ensure that military ranks are filled at all times, a constant effort is made to draft and train new service members. However, a substantial proportion of military recruits does not finish basic military training. This can lead to a shortage in ready to deploy service members. This can be especially problematic in times of high operational tempo because it puts additional strain on operational units. In addition, it carries high costs associated with lost investments and reduced morale (e.g. Booth-Kewley, Larson, & Ryan, 2002).

Several researchers have studied factors influencing attrition in the military. First of all, demographic factors (age, gender, and ethnicity) and aptitude (cognitive and physical) were found to be relevant. For example, a self-reported history of physical problems (e.g., shortness of breath, or back problems) is positively related to higher attrition levels. Age and aptitude have been shown to reduce attrition (Booth-Kewley et al., 2002; Larsson, Broman, & Harms-Ringdahl, 2009; Talcott, Haddock, Klesges, Lando, & Fiedler, 1999). Second, the importance of psychological characteristics of recruits such as personality and behavioral styles has been studied (e.g., Bartone, Roland, Picano, & Williams, 2008; Davis, 2006). For example, Bartone et al. (2008) found that higher levels of psychological hardiness are negatively associated with attrition. However, such factors are difficult to influence by organizations. By contrast, the behavior of military leaders and instructors can be influenced more directly.

The importance of leadership and instructor behavior for attrition in the military has been shown in a range of studies using different theoretical approaches. Transformational leadership has been studied by several researchers (Bass, Avolio, Jung, & Berson, 2003; Shamir, Zakay, Breinin, & Popper, 1998). For example, Hardy et al. (2010) showed that instructors who show more transformational leadership (e.g. fostering acceptance of team goals, appropriate role model behavior, inspirational motivation and individual consideration) positively affect self-confidence, resilience and satisfaction in recruits and have lower levels of turnover in their groups. Another line of research is concerned with the effects of social support on attrition. For example, Lucas et al. (2010) showed that perceptions of social support provided by drill instructors were positively related to completion rates of Navy training.

The aforementioned studies have established the importance of instructor behavior in basic military training. Instructors work very intensively with recruits and therefore can have a large impact on recruit well-being, motivation and attrition. A theoretical approach that has to our knowledge not yet been applied to attrition in the military is self-determination theory (SDT; Deci & Ryan, 2000). In the educational domain, SDT has proven to be a valuable theory in describing the relationship between personal needs, environmental factors and self-regulatory processes that explain students' motivation and engagement in education. Especially the importance of autonomy support for intrinsic motivation might be relevant for the military domain, because the military is not an autonomy supportive environment in itself. According to SDT, students benefit from autonomy supportive environments because such an environment stimulates self-regulatory processes that enhance performance and reduce attrition (Vansteenkiste, Simons, Lens, Sheldon, & Deci, 2004). The aim of

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the present study is to test the relevance of SDT for the military domain by investigating whether autonomy support affects self-regulation and subsequently attrition during basic military training.

1.1. Autonomy support and the military

According to self-determination theory, students can be motivated for different reasons (Deci & Ryan, 2000, 2002). On the one hand, students can be motivated because they acknowledge the inherent value of education as it provides a possibility to acquire new knowledge and develop competencies (i.e., intrinsic or autonomous motivation). On the other hand, students can be motivated by external factors, such as punishment and reward, which drive them to participate in education (i.e., extrinsic or controlled motivation). Although the initial focus of SDT research was on the educational domain, recently the relevance of SDT has been shown for employees (Hardré & Reeve, 2009). Research has shown that in general, students or employees with a stronger intrinsic motivation will persevere more even under difficult and stressful circumstances and develop more self-confidence or self-efficacy in their abilities (Ames & Archer, 1988; Richer, Blanchard, & Vallerand, 2002; Vallerand, Fortier, & Guay, 1997). Teachers or instructors can influence students' intrinsic motivation by shaping the motivational climate that satisfies the basic need for autonomy (Ames, 1992; Vansteenkiste et al., 2004).

There are two kinds of motivational environments: performance environments versus autonomy-supportive environments. The first one is a controlling environment that focuses on performance and competition. The second one endorses the intrinsic interests of students and avoids external incentives and threat. The latter will engage students more and subsequently motivate students to persist and learn in the face of difficulties (Goudas & Biddle, 1994; Reeve, Bolt, & Cai, 1999; Theodosiou & Papaioannou, 2006; Vallerand, Deci, & Ryan, 1987). Hardré and Reeve (2003) showed that among high school students an autonomy-supportive learning environment, providing opportunities for individual competency development and emphasizing the value of learning and education, results in less attrition. They showed that the students reported higher levels of perceived competence to do well at school and valued the education they received more and therefore had less intention to quit.

The military organization can be considered a distinct culture from civilian organizations. Traditionally, the military is more controlling than most civilian organizations. In military organizations hierarchy and discipline is considered more important than individual autonomy and competency development (Soeters, Winslow, & Weibull, 2003). As such the military is a performance focused motivational environment that seems to impede the support for the basic need for autonomy as established by SDT. However, recent studies have shown that the basic need for autonomy is relevant for individuals in different cultures, even when this need seems less important due to cultural norms (e.g., Hardré et al., 2006; Zhou, Ma, & Deci, 2009). As militaries are struggling to keep their ranks filled, the support of the need for autonomy may be a key factor in reducing attrition. Therefore, in this study, the role of instructor autonomy-support behavior on intent to quit and subsequently attrition during basic military training was investigated. In line with Vallerand et al. (1997) and Hardré and Reeve (2003), a motivational mediation model (see Fig. 1) was tested that argues that autonomy support by the instructor enhances self-efficacy beliefs and strengthens perceived value of training, resulting in lower intent to quit and subsequently less attrition. These proposed mediating pathways find support in literature. Firstly, instructor autonomy support positively affects self-efficacy as it enables recruits to regulate their mastery experiences that build self-efficacy (Bandura, 1997; Deci, Vallerand, Pelletier, & Ryan, 1991). This is also in line with a study by Hardré and Reeve (2003) that showed that autonomy support positively affected students' perceived competence. In turn, self-efficacy negatively affects intent to quit, because people who are highly self-efficacious have a strong belief in their ability to manage life's challenges and consequently show more perseverance in achieving their goals (Bandura, 1997). The negative relationship between self-efficacy and intentions to quit in training or education has been shown in both the civilian and military domain (Gruber, Kilcullen, & Iso-Ahola, 2009; Hardré, Sullivan, & Crowson, 2009; Hardy et al., 2010; Robbins, Oh, Le, & Button, 2009; Sitzman, 2012). Secondly, an autonomy supportive environment will enhance students' inner endorsement of the teaching goals because they are internalized (Ames, 1992). In line with this, Hardy et al. (2010) showed that supporting behaviors by instructors increase recruits' satisfaction with military training. In turn, the perceived intrinsic value of education or training is an important motivational resource for students because it facilitates engagement (Hulleman, Durik, Schweigert, & Harackiewicz, 2008). To our knowledge, these mediating pathways have not been studied in the military yet.

To summarize, the model in this study hypothesized that the effect of instructor support on intent to quit is mediated by self-efficacy and perceived training value. In addition, we hypothesized that intent to quit predicts attrition above instructor support, self-efficacy and perceived training value.

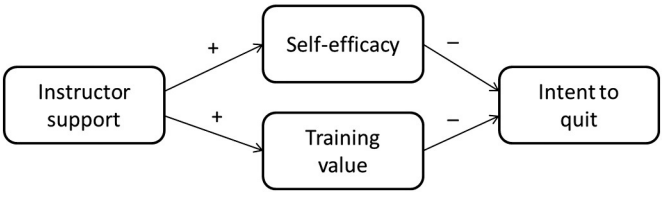

Fig. 1. Multiple mediation model with hypothesized relationships between instructor autonomy support, self-efficacy, training value, and intent to quit.

2. Method

2.1. Study context

To test our hypotheses we were able to study a group of recruits in basic military training in the Dutch Royal Navy. This training lasts 12 weeks and aims to facilitate the transfer to military life, teach basic military skills, and build stress tolerance. The training is ended by a physically demanding final exercise in which recruits are tested on perseverance and military skills. The training environment can be characterized as controlling because recruits have to follow strict routines and schedules. Recruits are placed into classes which are led by a group instructor.

2.2. Participants & procedure

In total 208 recruits (189 male, 19 female) (mean age 19.77, SD 2.4) in the basic military training of the Dutch Navy participated in this study. Educational level ranged from high school (50%), lower professional school (49%) to higher professional school or university (1%). These recruits were part of four subsequent cohorts in basic military training. Recruits were informed about the goals and methods of the study at the beginning of basic training. It was explained that anonymity would be maintained, that participation was voluntary and that consent was implied by returning the questionnaire. Questionnaires were filled out in a classroom setting in the third week of training (before our data collection 13 recruits dropped out of training and were not involved in this study). This period was chosen because the first two weeks are aimed to get the recruits acquainted with military life and instructors and after these weeks training is intensified. The goal of the study was to investigate the influence of an autonomy supportive environment

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as a predictor of attrition at onset of more intense training. Of the 208 recruits, 17 did not finish basic training.

2.3. Measures

2.3.1. Instructor autonomy support

In this study, instructor autonomy support was defined as the extent to which instructor behavior endorses the intrinsic interests of students and avoids external incentives and threat during basic military training. This construct was measured using a modified version of the Learning Climate Questionnaire (LCQ: Williams & Deci, 1996). The LCQ was modified for a military population, to make sure it was suitable for military culture, practices and vocabulary. The modified version of the LCQ was reviewed by 3 military experts. The adjusted scale consisted of 7 items using a 7-point Likert scale ranging from 1 (not at all true) to 7 (extremely true) and asked recruits to think about their group-instructors. Example items are 'My instructor provides me with choices and options' and 'My instructors convey confidence in my ability to finish basic military training'. The scale's internal consistency was good and had a Cronbach's α of .88. In general, a Cronbach's $\alpha \geq 0.70$ is regarded as satisfactory for comparing different groups (Bland & Altman, 1997).

2.3.2. Self-efficacy

Self-efficacy was defined as recruits' belief that they would be able to deal with demands of basic training and be able to finish basic military training. Specifically for this study, a scale was constructed to measure this conceptualization of self-efficacy based on Bandura (1997). The scale consisted of 13 items with a Likert scale ranging from 1 (not at all true) to 7 (extremely true). Example items are 'I expect I will be physically strong enough to finish basic military training', 'I expect I will be able to finish the training even if other people doubt it', 'I think I have the abilities to become a sailor'. The scale's internal consistency was very good (Cronbach's $\alpha = .96$).

2.3.3. Training value

Training value was defined as the extent to which recruits find basic military training useful and important. Training value was measured using a modified version of a three-item scale developed by Hardré and Reeve (2003). Items used a Likert scale ranging from 1 (not at all true) to 7 (extremely true) and were 'What I learn during basic military training is valuable', 'What I learn during basic military training is important for my future work', and 'I value the activities during basic military training'. The scale's internal consistency was good (Cronbach's $\alpha = .76$).

2.3.4. Intent to quit

Intent to quit was defined as the extent to which recruits consider leaving basic military training. This concept was measured by a three-item scale based on a scale developed by Vallerand et al. (1997). The scale consisted of 3 items with a Likert scale ranging from 1 (not at all true) to 7 (extremely true). Items were 'I intend to quit basic military training', 'I sometimes consider dropping out of basic military training', and 'I am not sure whether I will finish basic military training'. The items were translated in Dutch using back translation (Harkness, 2007). The scale's internal consistency was good (Cronbach's $\alpha = .79$).

2.3.5. Analysis plan

Several methods can be used to test the hypothesized multiple mediation model as depicted in Fig. 1. The most commonly used way of testing mediation was developed by Baron and Kenny (1986). According to Baron and Kenny, mediation is established when the paths between the independent variable and mediator and mediator and dependent variable are significant. In addition, the total effect of the independent variable on the dependent variable needs to significantly reduce when controlling for the mediator effect. However, this method does not include formal testing of the indirect effect. MacKinnon, Lockwood, Hoffman, West, and Sheets (2002) showed that in small samples a formal testing of the indirect effect is to be preferred, as it has higher power and a lower Type I error rate. Moreover, because the indirect effect is often skewed in small samples, an approach that acknowledges this skewness is recommended, such as bootstrapping (MacKinnon et al., 2002). Bootstrapping Q4 is a nonparametric resampling method that does not assume a normal distribution of the indirect effect (for details see Preacher & Hayes, 2004). Preacher and Hayes (2008) developed a method to test multiple mediator models using bootstrapping. They propose that a multiple mediation method should first assess the significance of the total indirect effect (aggregate of indirect effects of all mediators), and subsequently test the significance of the indirect effects of individual mediators. This approach allows for testing of indirect effects within the context of the full model and uses bootstrapping. Therefore, it was preferred in this study over methods that use single mediator analysis or methods that assume normality of the indirect effect. As recommended by Preacher and Hayes (2006), bootstrapping resampling was Q5 done with 5000 samples and a 95% bias-corrected confidence interval. The indirect effect is significant when the interval does not contain zero.

In addition, the relationship between instructor autonomy support, self-efficacy, training value, intent to quit and actual attrition was assessed using logistic regression (used reference categories: attrition yes = 1, no = 0). Because attrition is a dichotomous variable it was not possible to include it in the multiple mediation model analysis.

3. Results

Descriptive statistics are presented in Table 1. Instructor autonomy support, self-efficacy, and training value are positively intercorrelated and are all negatively correlated with intent to quit.

The result of the multiple mediator analysis are summarized in Table 2 and Fig. 2. First, the total indirect effect was tested using bootstrapping to assess the significance over the aggregated indirect effect. The total indirect effect was significant, which indicates mediation (see Table 2). Next we assessed the specific indirect effects of the mediators self-efficacy and training value. The indirect effect of self-efficacy was significant, whereas the indirect effect of training value was not. As expected, self-efficacy mediates between instructor autonomy support and intent to quit. Results show a negative indirect effect between instructor autonomy support and intent to quit; instructor support positively predicted self-efficacy, and self-efficacy negatively predicted intent to quit (see Fig. 2). Contrary to our expectation, no significant indirect effect was found for training value over and above the indirect effect of self-efficacy. Fig. 2 shows that instructor support did positively predict training value, but that training value did not predict intent to quit.

The result of the logistic regression analysis to predict attrition by instructor autonomy support, self-efficacy, training value and intent to quit, showed significant model fit (Chi-Square in omnibus test was 10.44, $df = 4$, $p < .05$). As expected, only intent to quit was significantly related to attrition. As can be seen in Table 3, intent to quit was positively related to attrition ($B = .53$, $SE = .19$, Wald = 7.95, $df = 1$, $p < .01$,

Table 1
Means, standard deviations and correlations of variables in the study.

		Mean	SD	1	2	3	4
1	Instructor support	5.73	0.76	*.87*	.69	.59	−.36
2	Self-efficacy	6.06	0.78	.69	*.96*	.62	−.55
3	Training value	5.81	0.88	.59	.62	*.76*	−.35
4	Intent to quit	1.95	1.23	−.36	−.55	−.35	*.79*

Note. All correlations are significant on $p < .01$. Reliabilities (*Cronbach's alfa*) are on the diagonal. Scale scores range from 1 to 7.

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Table 2
Indirect effects of instructor support on intent to quit through self-efficacy and training value.

Mediator	Parameter estimate	SE	95% BC CI Lower	95% BC CI Upper
Total	−.67	.13	−.94	−.43*
Self-efficacy	−.55	.11	−.82	−.35*
Training Value	−.12	.10	−.34	.04

Note. BC CI = bias-corrected confidence intervals.
* $p < .05$ (significant indirect effect).

Table 3
Results of logistic regression analysis with attrition as dependent variable.

	IV	B	SE	Wald	df	sig	Exp(B)
1	Instructor support	−.09	.45	.04	1	.85	.92
2	Self-efficacy	.14	.46	.10	1	.76	1.15
3	Training value	−.11	.37	.10	1	.76	.89
4	Intent to quit	.53	.19	8.0	1	.005	1.7

Note. Attrition was the dependent variable; Reference Categories: attrition yes = 1, no = 0, IV = independent variable.

$Exp(B) = 1.70$). Instructor autonomy support, self-efficacy, training value did not predict attrition over and above intent to quit.

4. Discussion

The aim of the present study was to investigate whether autonomy support affects self-regulation and subsequently attrition during basic military training. The findings confirm the importance of instructor behavior for recruit attrition found in recent studies (Hardy et al., 2010; Lucas et al., 2010). The results showed that instructor autonomy support affected intent to quit through self-efficacy beliefs of recruits. Recruits who perceived the instructor as providing a learning environment that endorses recruits' intrinsic interest to develop individual competencies, were more confident in their abilities to finish basic military training (i.e. self-efficacy) and subsequently showed lower intentions to quit. In addition, intent to quit was found to predict actual levels of attrition. This is in line with the findings in the educational domain by Hardré and Reeve (2003) in a population of high school students. Contrary to our expectation, perceived training value did not show an indirect effect between instructor autonomy support and intent to quit over and above the indirect effect of self-efficacy. A positive relationship was found between instructor autonomy support and training value. Recruits who perceived the instructor as providing a learning environment that endorses students' intrinsic interest to develop individual competencies, valued the training more. However, training value did not have a unique relationship with intent to quit next to self-efficacy. This implies that in basic military training, self-efficacy is a more important resource than training value for recruits to motivate them to finish the training. A potential explanation lies in the context of basic military training that places high demands on recruits' capabilities to cope with stressful and difficult circumstances. In this environment, beliefs about one's ability to get through the training are more important than the perceived value of the training itself. Self-efficacy enables people to persist in activities and tasks in the face of difficulties (Bandura, 1997) and therefore may be an especially important factor during basic military training.

4.1. Theoretical and practical implications

This study extends the relevance of self-determination theory from the educational domain to the military domain. SDT has been widely used in educational psychological research, but has not received that much attention within the military domain. The current findings show that SDT provides new insights in the study of attrition in the military. The results of this study confirm that autonomy supportive instructor behavior is important for reducing recruits' intentions to quit basic military training. Although the military can be characterized as low in autonomy support as it is a hierarchical, performance-oriented and controlling environment, these results show that on the level of instructors it is important to endorse autonomy as much as possible to reduce attrition. This supports the assumption of SDT that it is important for people to fulfill their basic need for autonomy, even in environments and (organizational) cultures characterized by norms and values that do not foster autonomy (i.e., Zhou et al., 2009).

This study showed the relevance of SDT for basic military training: future research may show whether these results can be generalized to learning in military operational units. The context in which militaries operate is complex and dynamic and military personnel have to keep learning new skills. In peacetime, military units are in training full time (Salas, Milham, & Bowers, 2003) during which they might benefit from an autonomy supportive learning environment as well.

This study has some practical implications for the military. As attrition and turnover still pose a major problem for military organizations, the results of this study provide important implications on how to preserve recruits and service members for the organization. By enhancing instructors' motivation and capability to provide an autonomy supportive environment for recruits attrition may be reduced. This can conflict with traditional military practices that underline the importance of a controlling 'drill instructor'. To transform these traditional practices into more autonomy supportive practices, principles of interventions applied in the educational setting to strengthen teachers autonomy supportive behaviors (e.g., Hardré, Nanny, Refai, Ling, & Slater, 2010) may be modified for the military domain.

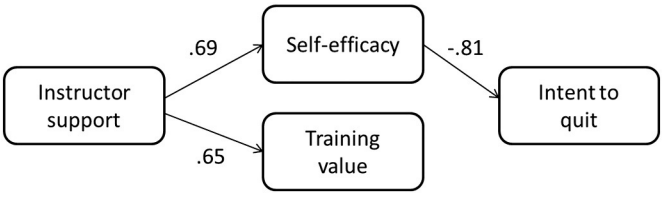

Fig. 2. Model with results of multiple mediation analysis between instructor autonomy support, self-efficacy, training value, and intent to quit. Note. Standardized regression coefficients from bootstrap procedure are reported with significance levels $p < .01$.

4.2. Limitations

The present study has some methodological limitations. The data-set is cross-sectional and therefore no causal conclusions can be drawn. Although the proposed model implies causality, only longitudinal or experimental data can establish the causal nature of the relationships within the model. In addition, all measurements except attrition were self-report, including instructor autonomy support. It is possible that recruits' beliefs about the value of the training or self-efficacy beliefs affected the perception of instructor autonomy support. In future studies, a comparison of the self-report of instructor support with an objective measure could disentangle these effects.

The measurement took place at week 3 of the training. Before this time, 13 recruits dropped out of training who could not be involved in the study. In addition, there are no data on the reasons why recruits dropped out of training.

Studies investigating SDT theory in non-western cultures showed that the basic premises hold, but the predictive relationship might differ between cultures (e.g., Hardré et al., 2006). The population studied was Dutch military. National militaries have a specific organizational culture (Soeters et al., 2003) that can differ from militaries in other cultures. For example, a cross-national study showed that militaries from Latin-based countries like Brazil, France, Italy and Spain have higher power-

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distance and discipline is valued more compared to Nordic countries (e.g. Norway) and Canada (Soeters, 1997). It is not unlikely that the differences between military cultures also affect the relationship found in this study. As such, these results should be generalized with caution to other militaries and to other domains.

5. Suggestions for future research

The results confirm the importance of instructor autonomy support for maintaining and building self-efficacy beliefs of recruits that in turn is an important motivational resource to persist in basic military training. Future studies can extend these results in different ways. First, the inclusion of reasons for attrition and the investigation of the development of the perception of training value over the course of basic military training could enhance our understanding of the importance of autonomy support in such an environment. Furthermore, interventions that enhance instructors' capabilities to provide an autonomy supportive environment could be developed and studied to investigate the possibilities for reducing attrition through instructor training programs. Finally, studying self-determination theory within the military context might be a promising addition to current research on service members' motivation and turnover. It can be concluded that the application of self-determination theory provided new insights into the mechanisms underlying attrition in the military domain.

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