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Relationship between Leadership and Characteristics of Learning Organizations in Deployed Military Units: An Exploratory Study

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Received: 12 July 2013; in revised form: 3 September 2013 / Accepted: 4 September 2013 /

Published: 13 September 2013

Abstract: Previous research has shown that military units operating in the context of risky missions display the characteristics of a Learning Organization. The present work provides preliminary exploratory evidence about the association between Learning Organization characteristics and leadership styles used by military leaders in the field. Based on the literature, we hypothesized that higher Learning Organization characteristics would be associated with a more transformational style of leadership that inspires followers. With this purpose, the five characteristics of a Learning Organization as defined by Peter Senge (Systems Thinking, Team Learning, Shared Vision, Mental Models, and Personal Mastery) and leadership styles as defined by the multifactor leadership model of Bass and Avolio (Transformational, Transactional, and Passive-Avoidant), were measured among commanding officers who had recently served in a mission abroad. Associations with organizational outcomes (Extra-Effort, Effectiveness, and Satisfaction) were also investigated for both Learning Organization characteristics and leadership styles. The correlations showed that Learning Organization characteristics were highly related to Transformational leadership dimensions, and also with Transactional leadership based on Contingent Rewards; meanwhile no association was found with a Passive-Avoidant leadership. Organizational outcomes were also related to Transformational leadership, Contingent Rewards and to various

characteristics of a Learning Organization. Implications of these results, as well as avenues for future research, are also discussed.

Keywords: leadership; military; learning organization

1. Introduction

In this paper, we seek to gain a better understanding of the characteristics of a Learning Organization in the context of military organizations, with a particular focus on the role of different leadership styles in the development of those characteristics. The call for defense organizations to develop characteristics of a Learning Organization has often been repeated by respected military leaders [1]. Even as early as 1994, the U.S. Army (TRADOC) released a pamphlet describing the enabling capabilities of Force XXI, stating that the “Army had become a Learning Organization through a process started in 1989, with the end of the Cold War and the transformation into a volunteer-based institution. In the same year, similar considerations were stated by Wheatley [2] in a seminal paper “Can the U.S. Army Become a Learning Organization?” Since then, the question has been raised by both scholars and practitioners, who seem to agree that the exploration of the path leading to a Learning Organization is still in its early stages and much work needs to be done [3,4]. As only little attention has been dedicated to the application of Learning Organization ideas and practices within military institutions, Stothard, Talbot, Drobniak and Fischer [5] found it valuable to compare the learning cultures of headquarters and brigades within the Australian Army. While their results suggest that headquarter and brigade elements within the Australian Army express similar learning behaviors to those found in Learning Organizations, their work also acknowledged the impact of diversity within large organizations on various dimensions of a Learning Organization.

This aligns with the preliminary findings of the authors of the present paper. In working with the Belgian Armed Forces, we found that the development of Learning Organization characteristics is influenced by the environment [6,7]. Indeed, findings have shown that in highly complex and uncertain hostile environments, such as missions abroad in areas of conflict or disaster, military units develop characteristics of a Learning Organization to a significantly higher extent than military units working in territorial activities. Whereas territorial units can afford to (and perhaps are even encouraged to) align with the overall characteristics of a large organization that reveals clear patterns of a bureaucratic organization, this does not seem to be an option for units deployed in a critical context. In order to adapt to their fast-changing environment, these units seem to develop faster and more flexible cycles of information and knowledge transfer that fosters collaboration and participation based on trust and mutual respect across hierarchical boundaries.

As the work of Stothard, Talbot, Drobniak and Fischer already identified leadership as an important mediating factor in learning within headquarters and brigades [5], the present paper seeks to provide a preliminary exploratory investigation about the role of leadership within deployed military units. We hypothesize that a more inspirational type of leadership, based on the transmission of values and beliefs, would foster the development of Learning Organization characteristics more than a transactional type of leadership, based on the logic of reward, or leadership simply based on passive avoidant

behaviors [8]. Moreover, we also hypothesize that certain leadership characteristics, as well as Learning Organization characteristics, would increase the effectiveness of the organization, the willingness of followers to undertake extra effort, and their satisfaction with the leader.

In the following sections, we first present the theoretical models that serve as a reference for our conception of a Learning Organization and of leadership. Next, a set of hypotheses are drawn about the relationship between Learning Organization dimensions, leadership styles, and outcomes. The hypotheses are tested in an exploratory study based on the self-assessment of a group of commanding officers of the Belgian Armed Forces (BAF) who had served in various missions abroad. Finally, the exploratory results describing the associations between LO dimensions, leadership styles, and outcomes are presented, and theoretical as well as empirical implications for future research are discussed.

2. Theoretical Background and Hypotheses

2.1. Learning Organizations

Several multi-dimensional models have been proposed to describe the characteristics of a Learning Organization. One of the leading models used within the academic literature, which actually originates from the practitioner literature, is the model proposed by Peter Senge [9] in his seminal book “The Fifth Discipline.” Senge’s model includes five characteristics (or “dimensions”) that are briefly described in Table 1: Systems Thinking, Personal Mastery, Mental Models, Shared Vision, and Team Learning.

Table 1. Senge’s dimensions of a learning organization.

Shared Vision	The discipline of creating a shared picture of the future that fosters genuine commitment and engagement. In an organization, a shared vision binds people together around a common identity and a sense of destiny, giving a sense of purpose and coherence to all activities undertaken.
Team Learning	The discipline of raising the collective IQ of a group and capitalizing on the greater knowledge and insights of the collectivity. This implies dialogue and overcoming patterns of defensiveness that undermine group learning.
Personal Mastery	The discipline of continually clarifying and deepening employees’ personal visions, and focusing their energies. This includes awareness of personal weaknesses and growth areas as well as humility, objectivity and the persistent willingness to pursue self-development.
Mental Models	The discipline of clarifying deeply ingrained assumptions, pictures/images that influence employees’ understanding of the world and the actions they take. Change in organizations rarely takes place in the absence of systematic attempts at unearthing these internal pictures, bringing them to surface and holding them rigorously to scrutiny.
Systems Thinking	A framework for identifying patterns and inter-relationships, seeing the big picture, avoiding over-simplification, overcoming linear thinking and dealing with issues holistically and comprehensively.

Note: This table synthesizes the work from Senge [9], as cited in Jamali, Khoury and Sahyoun ([10], p. 343).

Senge's characteristics seem highly relevant to military units serving in missions abroad, where the environment is uncertain and unforeseen, and risky events are likely to happen. Clearly, all members should agree on the mission of their organization (*i.e.*, Shared Vision), create occasions to exchange findings from after-action reviews to support each other (*i.e.*, Team Learning), and be offered training and education opportunities related to weapon systems and military tactics to pursue personal development (*i.e.*, Personal Mastery). This implies a culture that stimulates members to discuss and revise already-established assumptions, drills, and procedures (*i.e.*, Mental Models) and to develop a clear understanding of the whole picture of the organization, e.g., how activities of each unit are intertwined with those of other units of the BAF or their partners on the field (*i.e.*, Systems Thinking).

The importance of developing Learning Organization characteristics in critical environments with high uncertainty has been demonstrated in the literature: organizations open to continuous learning will be much more able to control and prevent crises and to adapt to change [11] taking action when needed through adaptive responses [12]. However, although these statements are intuitive and seem to be generally accepted within the literature, they may be in conflict with the prevailing organizational culture within the military, which is notoriously hierarchical and in many situations bureaucratic. Soldiers are trained to execute well-established standard operating procedures in situations that present extreme dangers and threats to life. They learn to honor obedience to rules and above all, to respect the authority of their line of command under conditions of intense stress. As a result, one might argue that in the heat of the fight, deployed units should strictly adhere to existing procedures, following orders from their leaders without any questioning. At first, these values seem to be at odds with the five disciplines of Senge [9]. However, empirical findings revealed that military units deployed in a crisis context rated the characteristics of a Learning Organization to be highly present, whereas territorial units operating in their own nation did not possess any of these characteristics [6]. Analysis of interviews of deployed units' commanding officers provided further insight regarding this pattern. According to officers in deployed mission unites: "*The overall organization in a mission is very hierarchical in theory, but in reality the superior commanders are not always there where or when the action occurs. So the soldiers could be called to make their own decisions and to take initiative at the lower levels*"; "*We planned, executed, checked, adapted to the environment at that moment, and changed the standard operating procedure if necessary. We had briefings for every particular local mission, followed by an after action review after the mission. The colonel always asked questions to the section and as a result of this, the necessary changes were implemented (...). In territorial activities, on the contrary, everything is much more formally structured, requiring more approvals*" [6].

This statement is in line with Senge's assumption about the nature of Learning Organizations [9]: the characteristics of a Learning Organization should not just be considered as qualities that are present or absent in an organization, but rather as disciplines which are never fully mastered and that need to be progressively developed and promoted. As a result, in this paper, we investigate to what extent the leadership style of the commanding officers in deployed missions can contribute to this development process.

2.2. Leadership

One of the leadership models that has particularly captured the attention of scholars over the last twenty years, and that therefore will serve as the reference model for this work, is the Full Range of Leadership (FRL) model developed by Bass and Avolio [8]. This model argues that three major styles of leadership can be identified: Transformational, Transactional, and Passive-Avoidant. According to Bass and Avolio, Transformational leadership can be defined as “a process of influencing in which leaders change their associates’ awareness of what is important, and move them to see themselves and the opportunities and challenges of their environment in a new way” ([8], p. 94). Transactional leaders on the other hand, “display behaviors associated with constructive and corrective transactions. The constructive style is labeled Contingent Reward and the corrective style is labeled Management-by-Exception. Transactional leadership defines expectations and promotes performance to achieve these levels” [*ibidem*]. Finally, Passive-Avoidant leaders “avoid specifying agreements, clarifying expectations, and providing goals and standards to be achieved by followers” [*ibidem*]. In the conceptualization, Bass and Avolio propose that these three broad categories are better defined by their respective dimensions, described in more detail in Table 2.

Table 2. Multifactor Leadership Questionnaire (MLQ) dimensions.

Transformational	<p>The leader tries to increase followers’ awareness of what is right and important and to motivate them to perform “beyond expectation.”</p> <p><i>Idealized Influence (behavior and attributed)</i> is described when a leader is being a role model for his/her followers and encouraging the followers to share common visions and goals by providing a clear vision and a strong sense of purpose.</p> <p><i>Inspirational Motivation</i> represents behaviors when a leader tries to express the importance of desired goals in simple ways, communicates a high level of expectations and provides followers with work that is meaningful and challenging.</p> <p><i>Intellectual Stimulation</i> refers to leaders who challenge their followers’ ideas and values for solving problems.</p> <p><i>Individualized Consideration</i> refers to leaders who spend more time teaching and coaching followers by treating followers on an individual basis.</p>
Transactional	<p>A process that is mainly based on contingent reinforcement.</p> <p><i>Contingent Reward</i> refers to an exchange of rewards between leaders and followers in which effort is rewarded by providing rewards for good performance or threats and disciplines for poor performance.</p> <p><i>Management by-Exception (Active)</i> leaders are characterized as monitors who detect mistakes.</p>
Passive-Avoidant	<p>Absent, unavailable leader</p> <p><i>Management-by-Exception (Passive)</i> leader intervenes with his or her group only when procedures and standards for accomplishing tasks are not met.</p> <p><i>Laissez-faire</i> or non-leadership exhibits when leaders avoid clarifying expectations, addressing conflicts, and making decisions.</p>

Note: Definitions are from N. Muenjohn, and A. Armstrong ([13], pp. 3–14).

Most of the leadership dimensions mentioned in this model are behavioral. However, in the particular case of Idealized Influence, Bass and Avolio, in response to some critics to the previous

version of their model [1], found it important to disentangle the behavioral aspects of the charisma of leaders, from its impact on followers, assuming that these two facets are strictly intertwined but not overlapping. As a result, in the latest version of the FRL model, the factor of Idealized Influence was split into a “behavioral” component and an “attributed” component, referring to the concrete behaviors assumed by the leader and to the trait of power or charisma attributed by the followers, respectively.

The importance of developing traits associated to charisma and moral leadership has been repeatedly emphasized in the context of the military. Transformational leadership is at the core of what constitutes adaptive leadership. According to U.S. Army doctrine Field Manual 22–100, commanding officers are required to gain the confidence of their followers so that the followers will be willing to make proper sacrifice for the cause. Moreover, according to the Canadian Forces leadership doctrine, transformational leadership is essential at all levels of the organization [15]. Further, several authors have demonstrated that Transformational leadership predicts followers commitment within the military [16,17], and that, although to a lesser extent, the same is true for Transactional leadership, especially related to Contingent Rewarding [18,19]. Most of these studies, however, have been investigating these associations in a stable context of military soldiers employed in territorial activities. In an earlier paper [20], however, Bass argued that “Transformational leadership is more likely to reflect social values and to emerge in times of distress and change while Transactional leadership is more likely to be observed in a well-ordered society” ([20], p. 154). As a result, the present paper investigates the role of Transformational leadership in developing Learning Organization characteristics, hypothesizing this could be an important condition for adaptation in the uncertain and dangerous context such as military missions abroad.

2.3. Leadership and Learning Organization

With regard to the effect of leadership on the creation of a Learning Organization, the first associations have already been made by Senge himself [21], in his pivotal article “The Leader’s New Work: Building Learning Organizations,” published in the same period as his influential book “The Fifth Discipline” [9]. In his article, Senge clearly emphasized the role of the leader in the creation of a Learning Organization and proposed different leaders’ functions in this process, such as building a Shared Vision, surfacing and testing Mental Models, and developing and promoting Systems Thinking. However, Senge’s work does not address the role that leaders might have with regard to Team Learning and Personal Mastery and does not provide a deeper analysis of leadership styles in relationship with Learning Organization. Since then, only a few studies have tried to address this research gap.

First, Chang and Lee [22] found that Transactional and Transformational leadership styles had both significant and positive effects on Learning Organization characteristics, as well as on job satisfaction of employees in a large sample of top companies in Taiwan. In this study, the FRL was used as a reference model for the investigation of leadership and the five disciplines of Senge were considered for the definition and measurement of Learning Organization characteristics. The authors assessed those aspects with aggregate measures adapted for the purpose of their study, hence, associations between specific Learning Organization characteristics and Leadership dimensions were not considered within their work.

Salman, Shabbir, Shabbir and Hafeez [23] investigated similar associations, measuring variables with the survey instrument provided by Garvin, Edmondson and Gino [24], which assesses the following dimensions: supportive learning environment, concrete learning processes and practice, and leadership that reinforces learning. Their findings showed that the third factor (leadership) had strong associations with the other two, thus, suggesting the importance of leadership in a Learning Organization.

Similar evidence was collected by Martinette in a case study about operating departments of the City of Lynchburg, Virginia [25]. Martinette used aggregate measures of Transformational and Transactional leadership, whose impact was assessed on a multi-dimensional model of Learning Organization based on ten indicators [26]. The results indicated that the best leaders at creating a Learning Organization were balanced in transactional and transformational attitudes. Similarly Rijal [27] investigated this topic in the pharmaceutical industries of India and Nepal, showing that Transformational leadership and Learning Organization characteristics were strongly associated in these industries, as well. Again, only aggregate measures were used, and further, Transactional leadership was not included in the analysis.

Finally, Nont [28] provided evidence related to the firms of The Stock Exchange in Thailand. Nont tested the role of a Learning Organization as a mediator of the relationship between Leadership styles (Transactional and Transformational) and the financial performance of the market agencies. In this study, all specific dimensions of both Transformational and Transactional leadership were included in the analysis, and the characteristics of a Learning Organization were measured based on the seven-dimension model of Watkins and Marsick [29]. All characteristics of Learning Organizations were highly related to all Transformational and Transactional leadership dimensions. However, when considering the impact on financial performance, results demonstrated that the specific aspects of Individualized Consideration and Contingent Reward had the most significant roles.

2.4. Leadership Outcomes and Learning Organization

Research on leadership has often been associated with the investigation of leadership outcomes [8,30–32]. As a result, the most widely adopted measure of Bass and Avolio's FRL (*i.e.*, the multifactor leadership questionnaire or MLQ) includes a number of items related to three specific leadership outcomes. To be more precise, these three factors have been defined as follows: “Extra Effort” measures the effect of getting others to do more than expected, to heighten their desire to succeed, and to increase their willingness to try harder; “Effectiveness” of the leader consists of the capacity to represent the interests of the group to higher authority, to succeed in meeting organizational requirements, and to lead a group that is effective; “Satisfaction” indicates that leaders’ methods, and the work itself that is led, are considered satisfying by followers.

The first meta-analysis of the literature [33] showed that among the three leadership styles defined by the FRL model, Transformational leadership had the strongest and most positive impact regardless of whether outcomes were measured subjectively or objectively. Further, there was a consistent hierarchical pattern of results: Transformational leadership had a more positive impact on Effectiveness and Satisfaction than Transactional leadership, which, in turn, had a more positive impact than Passive-Avoidant leadership. Further, Passive-Avoidant leadership was negatively related to measures of performance and satisfaction, regardless of the target leader’s level in the organization. A more

recent meta-analysis conducted by Dum Dum, Lowe and Avolio [34] confirmed these initial research findings, but also showed that the type of organization is an important moderator of this association. Finally, another interesting meta-analysis was conducted by Judge and Piccolo [35]; besides the classical widely-replicated effect of Transformational leadership on leadership outcomes, they also found a systematic positive effect of the dimension of Transactional leadership related to Contingent Rewarding.

While the literature concerning leadership and its outcomes is fairly large (facilitated by the presence of outcome indicators in the available leadership questionnaires), the link between Learning Organization characteristics and leadership outcomes remains largely unstudied. Many studies showed a positive impact of Learning Organization characteristics on organizational performance in general [36,37], which can lead to the hypothesis that Learning Organization characteristics should be positively correlated with leadership outcomes such as Extra-Effort, Effectiveness and Satisfaction. However, to our knowledge, no findings are available that clarify the link between leadership outcomes and Learning Organization characteristics. Further, no previous studies appear to have addressed the association between the three leadership outcomes and leadership dimensions and Learning Organization characteristics of military organizations operating in crisis environments.

3. Hypotheses

Based on the findings from previous studies on leadership dimensions and outcomes and Learning Organization characteristics, it seems reasonable to investigate the relationship between these three aspects. Because the type of organization has also been found to be an important variable [38] in studying these relationships, the investigation of the associations in the context of military units abroad can be important to evaluate the generalizability of findings from the literature that were briefly described earlier, as well as to investigate new associations not previously studied (*i.e.*, those between Learning Organization characteristics and leadership outcomes).

The hypotheses regarding the relationship between Learning Organization characteristics and leadership styles are the following (see Figure 1):

- H1. First, we expect Learning Organization characteristics to be positively related to the dimensions of Transformational leadership.
- H2. We also expect Learning Organization characteristics to be positively related to Transactional leadership dimensions.
- H3. On the contrary, we hypothesize a negative association between Passive-Avoidant leadership and Learning Organization characteristics.

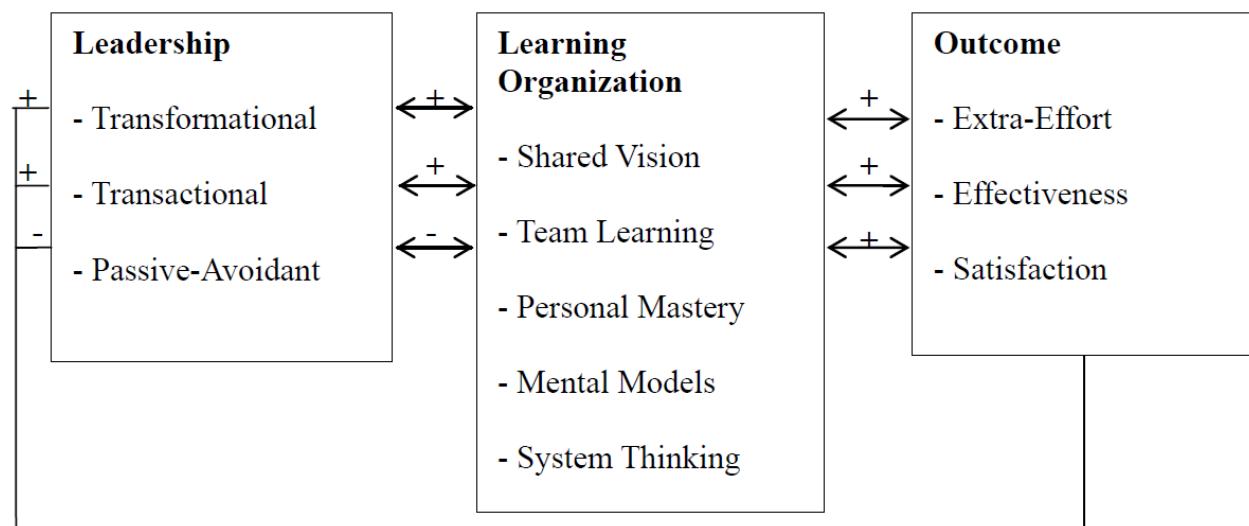
Based on the extensive previous literature on leadership styles and outcomes (Extra Effort, Effectiveness, and Satisfaction), we expected to replicate the hierarchical pattern observed in the meta-analyses [33,34].

- H4. A positive association is expected between Transformational leadership dimensions and leadership outcomes.
- H5. Transactional leadership dimensions are expected to have a positive association with leadership outcomes, although to a lesser extent than Transformational leadership.

H6. A negative association is expected between Passive-Avoidant leadership dimensions and outcomes.

H7. Finally, we also expect Learning Organization characteristics to be positively related to leadership outcomes, based on the evidence that showed their positive impact on organizational performance and satisfaction in general [22,36,37].

Figure 1. Synoptic scheme of hypotheses.



4. Research Method

A questionnaire-based study was conducted, measuring the variables of interest in a group of commanding officers who served as the leaders of detachment units for one of the 50 crisis missions abroad conducted by the Belgian Armed Forces over the last five years (e.g., Afghanistan, Lebanon, and Libya). Of these 50 officers, 17 returned the survey, for a response rate of 34%. This group was composed of a majority of males (2 females), and had a mean age of 44.6 years ($SD = 4.91$). Participants completed the questionnaires that measured Learning Organization characteristics of their detachment during the crisis mission, as well as their leadership style and outcomes during the mission.

Learning Organization Questionnaire (LOQ). For this study, the 54-item Learning Organization Questionnaire developed by Di Schiena, Letens, Farris and Van Aken [6] was used to measure the Learning Organization characteristics defined by Senge. The characteristic Shared Vision was measured by 12 items, Team Learning by 14 items, Personal Mastery by 6 items, Systems Thinking by 10 items, and Mental Models by 11 items. Each item was a statement for which participants had to rate their level of agreement on a six-point Likert-type scale (1 = strongly disagree; 6 = strongly agree). The 6-point scale was chosen because it does not include the ambivalent middle rating and the coefficient alpha reliability has been shown to improve up to the use of 5-point Likert-type scales and then level off with more scale points [39]. Because the present sample size does not allow for a reliable estimation of psychometric properties, we refer to earlier work, which revealed that the scale's internal consistency was sufficient, as all Cronbach's alpha values were well above the recommended threshold of 0.70 [40]: Shared Vision = 0.90; Systems Thinking = 0.90; Personal Mastery = 0.75; Team Learning = 0.85; and Mental Models = 0.89.

Multi-Factor Leadership Questionnaire (MLQ). The MLQ (5X-Short) by Bass and Avolio [8] was used to assess the leadership style and the leadership outcomes of the detachment commanders. It consists of 45 five-point Likert-type scales that rate the frequency of relevant behaviors, ranging from 0 (Not at all) to 4 (Frequently, if not always); four items measure each of the nine leadership dimensions identified by the FRL model, and nine additional items using the same response categories measure the outcomes. In particular, three items measure Extra Effort, two measure Satisfaction with leadership, and four items measure the perceived Effectiveness of leadership. Two versions of this instrument are available—one for the self-evaluation of leaders and another for the evaluation of leadership by followers. In the present study, the self-evaluation version was used. For both versions, the internal consistency, as well as the construct and predictive validity, of the scales have been confirmed in a series of studies [8,41–43] so that the MLQ is now often considered one of the most reliable instruments to measure the factors of the FRL model.

In the following sections, we analyze and discuss the results of the survey responses. We emphasize, however, that, due to the small sample size, our findings need to be considered exploratory. We will further comment on this in discussing limitations and avenues for future research.

5. Analysis and Results

5.1. Descriptive Statistics

Medians and ranges for Learning Organization characteristics, leadership dimensions, and outcome indicators are displayed in Table 3. Given the potential instability of other descriptive statistics such as means and standard deviations in such a small sample, these non-parametric indexes were preferred. They show that the commanding officers reported ratings for all Learning Organization characteristics in the positive range of the 1 to 6 Likert-type scale. As the median values for the Learning Organization characteristics range from 4.21 (Team Learning) to 4.67 (Personal Mastery), respondents “tend to agree” (4) that their detachment showed characteristics of a Learning Organization. We refer to previous research [6] for a more comprehensive discussion of these results in comparison with territorial units operating in the home country, which suggests that under the pressures of the crisis environment, military units seem to develop more characteristics of Learning Organization.

In order to interpret the self-reported median scores of leadership styles and outcomes, percentiles reported in the MLQ manual based on a normative sample [8] are included in Table 3. These data show that for Transformational leadership, the commanding officers rated three of five dimensions near the mean of the normative sample. However, the score of Idealized Influence (Behavioral) falls at the 80th percentile, while Intellectual Stimulation falls at the 70th percentile. This indicates that leaders from our sample were particularly confident in their capacity of “being a role model for his/her followers and encouraging the followers to share common visions and goals by providing a clear vision and a strong sense of purpose” at the behavioral level [14], while also challenging their followers intellectually. Values for the Passive-Avoidant leadership style were found to be quite low, as the median of the Laissez-faire dimension fell at the 30th percentile and the median of the Management-by-Exception (Passive) dimension corresponded to the median score of the normative sample. This indicates that the commanding officers considered themselves in general to be proactive

leaders of their unit. With regard to a Transactional leadership style, they reported to be very prone to using Contingent Reward strategies and clearly indicate the use of approaches based on active Management-by-Exception. With both scores of the dimensions of Transactional leadership corresponding to a percentile of the normative sample of 70, the results seem to demonstrate a strong presence of this type of leadership among the leaders in our sample.

Table 3. Descriptive statistics.

Aspects investigated	Dimension	Median (Range)	Percentile *	Scale range
LO Characteristics	Shared Vision	4.42 (2.3)		1 to 6
	System Thinking	4.30 (1.9)		1 to 6
	Personal Mastery	4.67 (1.8)		1 to 6
	Team Learning	4.21 (2.3)		1 to 6
	Mental Models	4.64 (1.8)		1 to 6
Transformational Leadership	Ideal. Infl. (B.)	3.50 (1.8)	(80)	0 to 4
	Ideal. Infl. (A.)	2.75 (1.5)	(40)	0 to 4
	Inspir. Motivat.	3.00 (1.5)	(50)	0 to 4
	Intell. Stim.	3.25 (1.3)	(70)	0 to 4
	Individ. Consider.	3.00 (1.5)	(40)	0 to 4
Passive-Avoidant Leadership	Laissez-faire	0.25 (1.0)	(30)	0 to 4
	Management-by-Exception (Passive)	1.00 (2.3)	(50)	0 to 4
Transactional Leadership	Management-by-Exception (Active)	2.00 (2.8)	(70)	0 to 4
	Contingent Reward	3.25 (2.5)	(70)	0 to 4
Leadership Outcomes	Extra Effort	3.00 (2.0)	(60)	0 to 4
	Effectiveness	3.25 (2.3)	(50)	0 to 4
	Satisfaction	3.00 (2.0)	(50)	0 to 4

* Note: norms are taken from [8].

Finally, looking at the leadership outcomes in Table 3, the perceptions of commanding officers of the impact of their leadership in terms of Extra Effort, Effectiveness and Satisfaction are located around the median of the normative sample.

5.2. Correlation Analyses

To investigate the hypothesized associations, correlation analyses were executed. Given the limited size of the sample and the potentially non-normal distribution of scores, we adopted a non-parametric test of association. The two most commonly used non-parametric measures of association for two random variables are Spearman's rho and Kendall's tau [44]. Rho and tau are not identical in magnitude because their underlying logic and computational formulae are quite different. Whereas Spearman's rho is a measure of average quadrant dependence, Kendall's tau is a measure of average likelihood ratio dependence [45]. The choice between both measures is not trivial because Kendall [46] has noted that values of tau and rho are similar at some magnitudes, but differ appreciably at others; several authors have noted that for most associations, tau is typically smaller in absolute value than

Spearman's rho [44,47,48]. In general, tau seems to offer some advantages over rho. For example, Kendall initially noted that the distribution of tau is normal not only for large values of N (as is rho) but also for very small values, which is clearly an important argument for this study. Further, Hays [49] argues that rho is in most instances a biased estimator, whereas tau provides an unbiased estimate of the true population correlation. Finally, Arndt and Turvey [50] found that, relative to rho, tau provided adequate control of type I errors and tighter confidence intervals. Based on these arguments, the initial historical and computational advantage of rho over tau seems to vanish, particularly as computations were to be performed using software. As a result, while we did perform all tests of association with both measures as a form of sensitivity analysis, the results of the analyses presented and discussed next are based on Kendall's tau [46]. In our discussion later of limitations and avenues for future research, we summarize the differences between the tests performed with both measures.

5.3. Associations between Learning Organization Characteristics and the Dimensions of Transformational Leadership

Table 4 displays the association between Learning Organization characteristics and dimensions of Transformational leadership. The first finding of note is that all correlations were at least nominally positive, which is consistent with H1, although not all correlations were significant.

Table 4. Correlations between learning organization characteristics and transformational leadership dimensions.

	Transformational Leadership				
	Ideal. Infl. (B.)	Ideal. Infl. (A.)	Inspir. Motivat.	Intell. Stim.	Individ. Consider.
Shared Vision	0.032	0.475 *	0.048	0.025	0.287
Systems Thinking	0.147	0.146	0.187	0.382 *	0.412 *
Personal Mastery	0.196	0.244	0.114	0.358	0.387 *
Team Learning	0.335	0.382 *	0.262	0.228	0.489 **
Mental Models	0.229	0.480 *	0.391 *	0.150	0.412 *

Note: Significant correlations for $p \leq 0.05$ ($p \leq 0.01$) are noted with *(**). $N = 17$.

First, Table 4 shows that Shared Vision is only significantly correlated with the Transformational leadership dimension of Idealized Influence (Attributed). According to its definition (cf. Table 2), Idealized Influence means that leadership is able to make followers share the leader's vision of the organization, as well as its mission. Therefore, this association might suggest that Idealized Influence (Attributed) measures the process of building shared vision, while Shared Vision would seem to measure the outcome of this process.

The next associations worth mentioning are those between Systems Thinking, Intellectual Stimulation, and Individualized Consideration. As Systems Thinking is the capacity to think about the whole process, to identify all components of the organization and understand their role and function, it appears reasonable that it has no significant association with Idealized Influence and Inspirational Motivation, as they might foster an abstract and ideal representation of the mission of the organization.

Conceptually, Systems Thinking has rather to do with the concrete perception of organizational dynamics. As a result, individual contact between leaders and followers (Individualized Consideration), and the sharing of knowledge (Intellectual Stimulation) seem to be more important for building such a complex, mental representation of the organization.

Personal Mastery only showed a significant correlation with Individualized Consideration. To understand this pattern, we should consider that Personal Mastery is the characteristic of Learning Organization that better specifies the personal implication of the learning process. As shown in Table 1, it includes “awareness of personal weaknesses and growth areas as well as humility, objectivity and the persistent willingness to pursue self-development;” therefore, the feeling of getting attention from the leader appears to become important for the development of Personal Mastery.

Meanwhile, Team Learning was significantly correlated with the Idealized Influenced (Attributed) and Individualized Consideration dimensions of Transformational leadership. This suggests that leaders who are attentive to their followers and influential also foster the willingness to exchange information in the group in order to share and increase acquired knowledge. It is noteworthy that the specific association between Individualized Consideration and Team Learning was particularly strong, thus, suggesting the importance of this aspect of leadership in the creation of a learning dynamic where the leader acts as a coach and a teacher. This behavior of leaders in deployed units is often noted during the daily after action reviews. It is considered to be essential for the success of a mission, as it warrants the identification of lessons learned and knowledge capturing with the team members from a completed intervention (such as a terrain reconnaissance or a city patrol) in order to assure knowledge sharing with the team members that are assigned for the next intervention.

Finally, it appears that Mental Models is the Learning Organization characteristic most affected by the dimensions of Transformational leadership, as it was significantly correlated with Idealized-Influence (Attributed), Inspirational Motivation, and Individualized Consideration. In particular, it is worth noting that Mental Models is the sole Learning Organization characteristic affected by Inspirational Motivation. As Mental Models is “the discipline of clarifying deeply ingrained assumptions” and of “unearthing these internal pictures, bringing them to surface and holding them rigorously to scrutiny” to promote organizational change, it is interesting to note that the development of this aspect requires the contribution of many facets of leadership, in particular those related to the idealization of the leader, to inspiration and to the feeling that the leader is concerned about each follower as an individual.

With the exception of the behavioral component of Idealized Influence, each of the Transformational leadership dimensions was positively and significantly correlated with at least one Learning Organization characteristic and vice-versa. Thus, we can say that H1 was generally supported. The detailed pattern of associations, however, suggests that different aspects of Transformational leadership might diversely contribute to the development of Learning Organization characteristics.

5.4. Associations between Transactional and Passive-Avoidant Leadership and Learning Organization Dimensions

Table 5 shows the pattern of association between the Transactional and Passive-Avoidant leadership styles and Learning Organization characteristics.

Table 5. Correlations between learning organization characteristics and transactional and passive-avoidant leadership dimensions.

	Transactional Leadership		Passive Avoidant Leadership	
	Management-by-Exception (Active)	Contingent Reward	Laissez-faire	Management-by-Exception (Passive)
Shared Vision	0.070	0.342	-0.017	0.279
Systems Thinking	-0.087	0.329	-0.234	0.086
Personal Mastery	0.024	0.297	-0.147	0.071
Team Learning	-0.031	0.424 *	-0.296	0.130
Mental Models	-0.157	0.321	-0.217	-0.008

Note: Significant correlations for $p \leq 0.05$ are noted with *. $N = 17$.

For the Transactional leadership dimensions, no significant association, positive or negative, was found between Learning Organization characteristics and Management-by-Exception (Active), whereas one positive association was found for Contingent Rewards. More specifically, Contingent Reward was significantly and positively associated with Team Learning. As a result, H2 was generally not supported.

Table 5 also shows that Learning Organization characteristics had no significant association, positive or negative, with either of the Passive-Avoidant leadership dimensions. Thus, H3 was not supported.

5.5. Associations between Leadership Outcomes, Leadership Dimensions and Learning Organization

The outcome measures included in the MLQ, *i.e.*, Extra Effort, Effectiveness and Satisfaction, also revealed interesting patterns of association with the different leadership dimensions, as shown in Table 6. The correlations between the Transformational and Transactional leadership dimensions and learning outcomes were all at least nominally positive (*i.e.*, not all correlations were significant), which is consistent with H4 and H5. Meanwhile, none of the dimensions of Passive-Avoidant leadership displayed a significant (negative) correlation with outcomes. Further, the correlations between Management-by-Exception (Passive) and outcomes were all nominally positive, which is inconsistent with H6.

In particular, Extra Effort showed significant positive associations with three out of five Transformational leadership dimensions and Effectiveness showed significant positive associations with four out of five Transformational leadership dimensions. Interestingly, neither Extra Effort nor Effectiveness was significantly related to Intellectual Stimulation, whereas on the other hand, Intellectual Stimulation was the sole dimension of Transformational leadership that displayed significant association with Satisfaction towards leaders. Although results are potentially unstable because of the sample size, it is nonetheless interesting to demonstrate such a contrasting pattern. If this result is confirmed with a larger sample, it might imply that Intellectual Stimulation does not lead to good outcomes at all levels, as it does not imply that employees put extra effort in their work, or that the leadership is more effective, but rather just implies higher satisfaction with leadership. Overall,

however, it is possible to conclude that H4 was generally supported, as each of the Transformational leadership dimensions was positively and significantly correlated with at least one outcome and vice-versa.

Table 6. Correlations between leadership dimensions and outcomes.

		Extra Effort	Effectiveness	Satisfaction
Transformational Leadership	Ideal. Infl. (B.)	0.687 **	0.584 **	0.408
	Ideal. Infl. (A.)	0.37	0.614 **	0.271
	Inspir. Motivat.	0.496 *	0.407 *	0.250
	Intell. Stim.	0.376	0.305	0.458 *
	Individ. Consider.	0.458 *	0.453 *	0.207
Transactional Leadership	Management-by-Exception (Active)	0.215	0.104	0.212
	Contingent Reward	0.658 **	0.754 **	0.443 *
Passive-Avoidant Leadership	Laissez-faire	-0.282	-0.301	-0.100
	Management-by-Exception (Passive)	0.272	0.104	0.181

Note: Significant correlations for $p \leq 0.05$ ($p \leq 0.01$) are noted with *(**). $N = 17$.

Concerning H5, this hypothesis was supported only in part, as Contingent Reward was significantly and positively associated with all three outcomes, whereas Management-by-Exception had no significant association with outcomes. Again, a contrasting pattern emerges that appears to deserve further attention in future research. Finally, in terms of Passive-Avoidant leadership, no significant associations, either positive or negative, were observed. Thus, H6 was not supported.

Investigation of associations between Learning Organization characteristics and outcomes displayed in Table 7 reveals a significant positive association between Extra Effort and two Learning Organization characteristics, *i.e.*, Team Learning and Personal Mastery. No significant association was found between the five Learning Organization characteristics and the two other outcomes, Effectiveness and Satisfaction. As a result, there is only minimal support for H7.

Table 7. Correlations between learning organization characteristics and outcomes.

	Extra Effort	Effectiveness	Satisfaction
Shared Vision	0.324	0.260	0.040
Systems Thinking	0.328	0.255	0.080
Personal Mastery	0.419 *	0.279	0.220
Team Learning	0.513 **	0.327	-0.029
Mental Model	0.287	0.239	0.060

Note: Significant correlations for $p \leq 0.05$ ($p \leq 0.01$) are noted with *(**). $N = 17$.

6. Discussion

6.1. Summary and Interpretation of Findings

The objective of the present study was to investigate associations between leadership dimensions and outcomes as theorized in the FRL Model [8] and Learning Organization characteristics as put

forward by Peter Senge [9] in the context of military missions abroad. First, the descriptive analysis has shown that in general, commanding officers attribute to themselves a proactive attitude, as their ratings on Passive-Avoidant leadership are very low. Meanwhile, they describe themselves as clearly prone to adopt a Transactional style of leadership based on Contingent Rewarding and Management-by-Exception (active). With regard to Transformational leadership, however, commanding officers appear to possess a high level of Idealized Influence (Behavior) and Intellectual Stimulation, compared to the norm, but provided ratings on Inspirational Motivation, Individualized Consideration and Idealized Influence (Attributed) near the median of, or even lower than the normative sample. This shows that commanding officers in general considered themselves to be effective leaders, although they display higher degrees of Transactional leadership and lower degrees of most Transformational leadership dimensions than expected. The present findings, then, satisfy only in part the general call for the development of Transformational leadership traits within the Army [1,2,15].

If we consider the associations relevant for our hypotheses, we found that in general, some dimensions of Transformational and Transactional leadership were significantly and positively related to some characteristics of Learning Organizations, thus in general confirming H1. These results not only support previous evidence about the impact of certain leadership styles on the development of Learning Organization characteristics [22,25,27,28], but also further expand upon previous evidence, in that more specific information is provided regarding which leadership dimensions impact which Learning Organization characteristics. More precisely, we found that among the five dimensions of Transformational leadership, Idealized Influence (Attribute) and Individualized Consideration appear to be the most important factors related to fostering a Learning Organization. This suggests that charisma and providing attention and consideration to each member of the team is essential to transform an organization into a more flexible, adaptive and willing to learn organization. The sole previous study that investigated the role of specific leadership dimensions within the broad Transactional and Transformational categories is the one of Nont [28]. Although a strict comparison is not suitable, given the different model of a Learning Organization and different outcomes employed by Nont, it is nonetheless interesting to observe some differences and similarities in findings. In contrast to this study, Nont [28] found that all dimensions of Transactional and Transformational leadership were associated with all Learning Organization characteristics. However, among all Transformational leadership dimensions, the only one that was related to financial performance via the Learning Organization characteristics was Individualized Consideration. In the present study, we did not include any measure of financial performance, and the small sample size did not allow testing any mediation pattern. It is interesting, however, to note that Individualized Consideration in our data was also strongly associated with four of the five Learning Organization characteristics, and with the leadership outcomes Extra Effort and Effectiveness. It would certainly be valuable to test the same mediation in future research and to eventually examine whether Idealized Influence (Attributed) is related to performance via Learning Organization characteristics as well.

It is also noteworthy that Idealized Influence and Individualized Consideration received the lowest ratings from the commanding officers in comparison with the normative sample. This suggests that training on those dimensions would be valuable within the military if the desire is to promote the development of a Learning Organization.

With respect to the associations of Learning Organization characteristics with dimensions of Transactional leadership (H2), the present study showed that just one association was significant, which is the one between Contingent Reward and Team Learning. Since commanding officers rated themselves fairly high on Contingent Reward and rather low on Idealized Influence and Individualized Consideration (the two Transformational leadership dimensions significantly associated with Team Learning), we might infer that Learning Organization characteristics within the military, with respect to the creation of collaborative learning in teams (Team Learning), are currently mainly fostered by this dimension of Transactional leadership rather than by these Transformational leadership dimensions. We might interpret the observed findings considering that the military context is not so accustomed to Transformational leadership because in this context there is not a long tradition of these leadership practices; on the contrary, officers are notoriously effective in clarifying each person's tasks by giving instructions, disciplining and allocating rewards.

Finally, no significant correlations, positive or negative, were observed between the Learning Organization characteristics and the Passive-Avoidant leadership dimensions (H3). Thus, H3, which posited negative correlations between these two types of characteristics, was not supported.

With regard to associations between FRL dimensions and outcomes (H4–H6), the present study supported only in part the hierarchical pattern observed in previous studies, as Transformational leadership dimensions had positive associations with leadership outcomes but not every pair-wise relationship was significant. Further, the associations between Contingent Reward and outcomes were even higher than those displayed by dimensions of Transformational leadership [33,34]. Nonetheless, this finding is consistent with some other meta-analytical studies, which found Contingent Reward to be highly linked to the three measured outcomes, more than Management-by-Exception (active) and sometimes to the same extent as the dimensions of Transformational leadership [33,35]. Moreover, this is not surprising if we consider that the extensive literature produced on this aspect already revealed in many occasions that different leadership dimensions may have very different relationships with outcomes, across different contexts [17]. Indeed, the particular nature of the present context might have played a strong role in determining this pattern of results. Commanding officers that need to self-assess their style of leadership in critical settings are presumably influenced by implicit theories about how the unit should be led. As during their basic training all soldiers are drilled to execute standard procedures and continuously are educated to respect the military hierarchy through systematically disciplining of inappropriate behaviors, this may explain why the transactional type of leadership, especially based on contingent rewarding, is conceived as the most appropriate in effectively leading a unit in a critical context. Therefore, the commanding officers presumably did not immediately attach a great deal of importance to charisma, inspired motivation, and individualized consideration in this particular environment. Consistently, correlations between Contingent Reward and outcomes were among the strongest of the correlations observed between any of the FRL dimensions and outcomes, and commanding officers possessed this dimension to a particularly high extent. To conclude, Contingent Reward appeared to be the most effective leadership style overall in inducing desired results, both in terms of Extra Effort, Effectiveness and Satisfaction, and in terms of Learning Organization characteristics, especially Team Learning.

Concerning H6, the Passive-Avoidant leadership dimensions had no significant associations with any outcome, which contradicts the hypothesis but is consistent with some of the findings previously observed in other studies [33,35].

Lastly, the support for H7 was very limited, as only two Learning Organization characteristics (Personal Mastery and Team Learning) had a significant and positive association to one sole outcome (Extra Effort).

In summary, the overall set of hypotheses was supported only in part, suggesting unexplored directions for future research, particularly on the role of implicit theories about leadership, and on the seemingly prominent role of Contingent Reward in this context.

6.2. Limitations and Avenues for Future Research

Several limitations need to be considered in order to facilitate future research on this topic. First of all and most importantly, the small sample size limits the reliability of the present findings, in terms of the limited power of statistical tests and potential instability of the descriptive and correlation statistics. Given that the goal of this investigation was essentially exploratory and that the aim was to provide preliminary evidence of the role of leadership styles in the development of Learning Organizations in military organizations, the present data were considered sufficient for this purpose. Also, as previously mentioned in Section 5.2 (Correlations Analysis), we conducted all tests using both Kendall's tau and Spearman's rho and found a confirmation of the literature that, in general, values of tau are more conservative: the correlation values are smaller and the significance levels more stringent. Only in one occasion (*i.e.*, for the association between Systems Thinking and Intellectual Stimulation), did we find that tau identified a significant correlation ($p = 0.049$) whereas rho did not ($p = 0.060$). From this perspective, the results discussed within the paper are as conservative as possible, given the small sample size. However, it clearly remains of high importance that the results be replicated using a larger sample in order to draw more definitive conclusions.

Similarly, the nature of the study also precludes definitive conclusions regarding the causality of the observed relationships. Based on the literature, we have hypothesized that leadership styles relate to the development of Learning Organization characteristics, and that both leadership styles and Learning Organization characteristics cause outcomes. However, as the study was observational, rather than experimental, and all variables were measured at the same point in time using the same respondents, the direction of causality for observed relationships cannot be proven empirically. Instead, it is possible that the true direction of causality is the reverse of that hypothesized, causality is cyclical, or that additional, unmeasured variables (*e.g.*, implicit theories on leadership) are the true causes of the observed relationships.

Further, it should be noted that the model proposed by Senge has received criticism in the last decade. In particular, Örtenblad [51] completed a systematic screening of the empirical and theoretical literature inspired by Senge's theory, concluding that Senge's concept was too vague, as many different interpretations can be identified across the literature (for a deeper analysis of the limitations and strengths of Senge's model, see also Di Schiena *et al.*, 2012 [6]; Letens *et al.*, 2012 [7]). As a result, future research should consider additional dimensions of Learning Organizations as well as organizational learning dimensions that have been identified over recent years. This also implies

considering the use of other measurement instruments, such as the Dimensions of Learning Organization Questionnaire developed by Marsick and Watkins [52], which was recently found to be a reliable and robust instrument across languages, cultures and types of organizations (including the military) [53].

Finally, although the major motivation for this study was exploring the relationship between Learning Organization characteristics and leadership dimensions and outcomes in the military, it is acknowledged that this specific focus limits the reliability of generalizing study results to other contexts. For example, it is possible that Learning Organization characteristics are differently affected by the leadership dimensions in domains such as for-profit organizations or in other public organizations, where missions and final objectives are different than those of the military. It is also possible that the results for the Belgian Armed Forces may not translate to other military organizations worldwide.

6.3. Practical Implications

Notwithstanding the above limitations, assuming that developing the characteristics of a Learning Organization in the context of a mission is a valuable objective for modern military organizations (cf. [1,3,4]), the present findings provide some insights that can be used to improve training (cf. [54]) for leadership staff within the military, as well as leadership staff selection procedures.

With this purpose in mind, it is necessary to disentangle the leadership dimensions that pertain to behaviors and attitudes and those that refer to personality traits. Variables that are worded and easily interpreted in behavioral terms can indeed be translated into practices and taught to commanding officers within their specific training for missions abroad; conversely, variables that refer to stable tendencies belonging to the background personality, and that are difficult to develop through training, should then become criteria for leader recruitment and selection. For instance, Idealized Influence (Attributed) and Individualized Consideration, appear to be important transformational qualities for leaders who want to lead their mission unit to become a Learning Organization. However, if we look at the items used, the first trait does not seem to be easily translated into practical training, as it primarily refers to the individual's personal charisma (*i.e.*, "I act in ways that build others' respect for me"; "I display a sense of power and confidence"). Consequently, this aspect should probably be used as a selection criterion for the assessment of candidates. The necessity to include this aspect in the selection of officers is also justified by the systematic association between Idealized Influence (Attributed) and outcomes of Extra Effort, Effectiveness, and Satisfaction.

On the other hand, Individualized Consideration can be more easily translated into practical behaviors of "spending time teaching and coaching" and "helping others to develop their strengths" [8]; therefore, it could be the objective of particular training sessions. Furthermore, Individual Consideration appears to be important in generating positive outcomes, in particular Extra Effort and Effectiveness.

Similarly, Contingent Reward could be incorporated in training, given the tangible and behavioral nature of this dimension, and given its importance for the stimulation of a Learning Organization and positive outcomes. However, if we consider that the present sample already seemed to possess this dimension at a high level, the improvement of this aspect does not seem to be as much of a priority. As mentioned earlier, the role of implicit theories about which dimensions are suitable in a given environment cannot be neglected. Available training materials, such as the "Full Range of Leadership Development" put forward by Avolio [54], provide tools for the evaluation of implicit theories of ideal

leadership that trainees carry around in their heads. Based on the present findings, the use of such tools, and the adaptation of subsequent training modules to implicit theories, as well as to the objective of creating a Learning Organization in deployed unit, appears to be a valuable approach for the modern military.

7. Conclusions

In the context of a crisis or disaster, life-threatening situations can easily lead to indecisiveness and inaction. To overcome some of these challenges, soldiers are trained to follow standard operating procedures and to obey their leaders under difficult conditions without any questioning. In territorial settings, these core values of the military sometimes seem to stimulate the creation of followers instead of leaders, which eventually may result in the development of static bureaucratic organizations. In the context of complex, unique and fast-changing crisis environments, however, quick learning cycles are equally important for survival. As such, deployed units that operate under extreme conditions should evolve to become Learning Organizations [6].

The objective of the present paper was to provide a better understanding of the relationship between leadership styles (and their dimensions) and characteristics of a Learning Organization in the context of deployed military units. We found that, in order to develop a Learning Organization, leaders of these units should possess characteristics of both Transformational (in particular Idealized Influence and Individualized Consideration) and Transactional leadership (*i.e.*, Contingent Reward).

The significant association between Contingent Reward and Team Learning emphasizes the role of basic military training that initially seeks to reward discipline and individual excellence but gradually emphasizes the importance of team performance. Under extreme conditions, team members have to develop mechanisms that stimulate mutual trust and support which typically are characterized by a spirit of ‘no one will be left behind.’ As such, the creation of such a team spirit seems to be a precondition for the development of Team Learning.

Whereas the results underline the importance of a Transactional leadership style based on Contingent Rewarding to stimulate Team Learning, they also indicate that the development of Transformational dimensions such as Idealized Influence and Individualized Consideration may offer further potential for growth. This seems particularly important as results revealed that commanding officers already rated themselves quite high on Contingent Reward but low on Idealized Influence and Individualized Consideration. For this reason, we suggest examining and developing appropriate training programs that focus on these characteristics of Transformational leadership and adapting selection procedures in order to recruit officers with the suitable traits.

While discipline, standard operating procedures, and respect for the military hierarchy remain essential, in a crisis context, these traditional values of the military need to be complemented with leadership dimensions that lead to the development of Learning Organization characteristics that assure fast learning cycles, provide direction, and stimulate team learning through mutual trust. Results indicated that the development of both Transactional and Transformational leadership dimensions additionally relate to beneficial leadership outcomes such as Extra Effort and Leadership Effectiveness.

Conflicts of Interest

The authors declare no conflict of interest

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