

**Transactional Leadership for Safe Operations in Military Special Forces:
A Structural Equation Model.**

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ABSTRACT

Introduction: Despite safety performance constitutes an integral factor which assures the safety in operations of military Special Forces, hardly any literature has investigated its role in parachute divisions. **Method:** The current study analyses how transactional leadership affects safety performance in a sample of 161 parachutists of the Hellenic Armed Forces. A structural equation modelling revealed that transactional leadership has a significant positive effect on paratroopers' safety performance by means of safety climate. **Conclusions:** The practical applications, as well as the theoretical implications of these evidences for safety research, are outlined. **Impact on military field:** A transactional leadership style improves parachutists' safety performance, particularly safety participation behaviours in standardized environments.

Keywords: Safety Leadership, Transactional Leadership, Safety Climate, Safety Compliance, Safety Participation, Risky Behaviors

1. INTRODUCTION

Although previous literature has not focused much on safety of military operations, however this environment remains rather hazardous, especially in air forces where many fatal accidents have occurred in the last years. One of the most recent ones occurred during a NATO training program in Spain (January, 2015), where a Hellenic Air Force fighter crashed on the airport causing 11 fatalities, as well as 29 severely injured persons. Meanwhile, parachuting safety has also been questioned. According to a study published by the U.S. Army Public Health Command (Chanel, 2014), albeit the last decades injury rates in the parachuting field have improved, nevertheless there is still a high risk of entanglement and overall risk of accidents which incur severe damages and/or deadly falls. Worldwide, parachuting injuries (i.e. concussions, ankle sprains and lower back sprains fractured or broken bones) are the sixth leading cause of hospitalisation among active-duty soldiers (Chanel, 2014). Aviation mishap report released in 2011 by Knapik, Graham, Steelman, Colliver and Jones, demonstrated that most of those injuries (about 88%) were associated with ground impact due to safety performance shortcomings (i.e. failure in proper inspection of equipment, jumping during unfavourable weather conditions or high workload conditions). These accidents ended up with tragic losses of lives, severe injuries and expensive wastage of equipment.

In spite of being deficient safety performance the main cause of these accidents in military aviation, empirical research is scarce from answers about how to enhance members' safety performance in those environments. The general aim of this paper is to explore the impact of leadership on paratrooper's safety performance behaviours. In order to investigate this association, we hypothesised the following model, in which a transactional leadership style will predict three types of safety performance behaviours, namely, safety compliance, safety participation, and risky behaviours by means of safety climate (see Figure 1). Despite

the fact that most of the literature findings support that transformational leadership is the most effective style to guide subordinates in almost all industries, nevertheless, in this study we are going to test the beneficial impact of transactional leadership when it comes to improve subordinates' safety performance within the military domain.

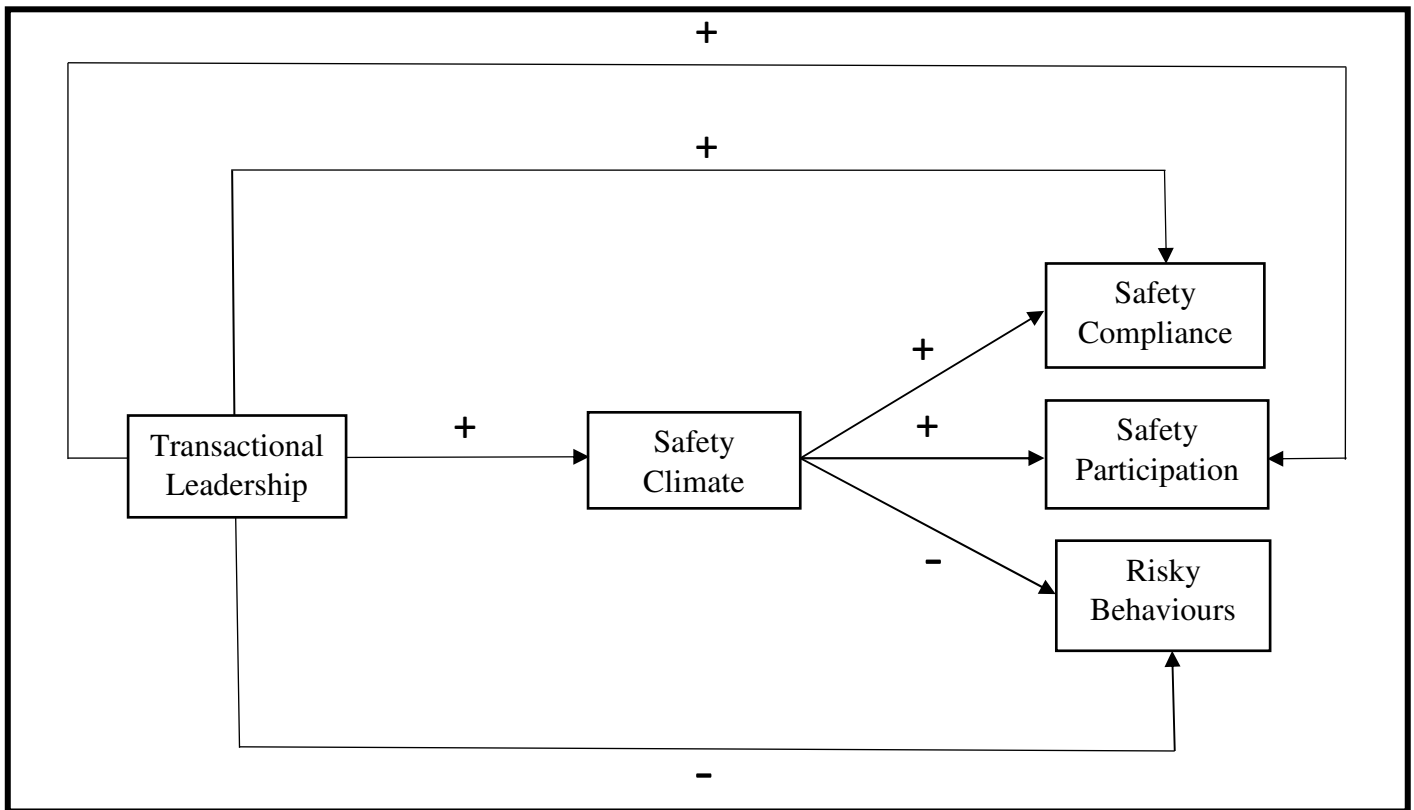


Figure 1. Hypothesised integrated structural model

1.1 Safety performance

Traditionally, safety outcomes have been measured from two different approaches. One of them considered accidents, small accidents, severe accidents and/or injuries as indicators for safety outcomes (e.g. Carvalho, Santos, & Vidal, 2005; Mearns, Whitaker, & Flin, 2003; Niskanen, 1994; Vredenburg, 2002; Zohar, 2000, 2002). The other took behaviours related with safety (safety performance) as an indicator (e.g. Cooper & Phillips, 2004; O'Dea & Flin, 2001). Previous studies have supported that safety performance and

accidents/incidents/injuries compose complementary safety indicators, with the former being a direct antecedent of the latter. For example, Neal and Griffin (2004, 2006) found out that team spirit predicted negative accidents, although this relationship was mediated by safety behaviour. When shared, safety perception is more favourable (indicating positive safety climate), workers tend to behave in a safely manner and avoid unsafe acts, thus providing for lower rates on accidents and injuries (Neal & Griffin, 2006; Reason, 1990).

As far as the accidents/incidents measurement approach is concerned, Cooper and Phillips (1994) expressed their objections against this method. Those authors alleged that utilising objective accident facts to estimate safety performance is problematic, since this kind of information is inadequate, sensitive of doubtful precision and retrospective. In addition to this, they disregard risk exposure (Fernández-Muñiz, Montes, & Vázquez Ordás, 2005; Glendon & Litherland, 2001) and have the tendency to be very erratic (Dejoy, Schaffer, Wilson, Vanenberg, & Butts, 2004; Fernández-Muñiz, et al., 2005; Havold, 2005). Apart from this, we need to take into consideration that safety performance behaviours demonstrate tangible evidence of crew's values, beliefs and attitudes concerning safety matters, which are visible and can easily be documented (Martínez-Córcoles, Gracia, Tomás, & Peiró, 2011). These arguments were the leverage for us in studying safety performance rather than accidents, incidents, or injuries.

The most-studied so far model of safety performance was created by Neal and Griffin (2006). These authors differentiated between two types of safety performance behaviours. On the one side safety compliance, also referred to as compliance with -safety- rules (Marchand, Simard, Carpentier-Roy, & Ouellet, 1998), concerns the core activities that each person needs to carry out in order to preserve a safe workplace. These behaviours refer to situations where employees engage in established job practices and carry along the necessary protective equipment. Safety compliance is also connected to the adherence to rules and procedures

developed by the organisation and regulatory bodies (Martínez-Córcoles, Gracia, Tomás, & Peiró, 2014). In addition to this, it encompasses intra-role behaviours (Katz & Kahn, 1966) related to safety, defined as behaviours that are required or expected as part of the obligations and responsibilities of the assigned role. On the other side safety participation, which refers to behaviours that do not directly contribute to an individual's personal safety, but they help to develop an environment that supports safety. It concerns discretionary, extra-role, and self-directed behaviours that go beyond prescribed safety precautions and make the workplace safe (Parker, Turner, & Griffin, 2003). Safety participation describes voluntary activities that contribute to safety strengthening in the organisation, such as participating in voluntary safety tasks, helping co-workers with safety-related issues or attending safety meetings (Neal & Griffin, 2006). This bi-dimensional model of safety performance was shaped at the basis of the traditional theory of job performance, which makes a distinction between task performance and contextual performance (Borman & Motowidlo, 1993; Motowidlo & Van Scotter, 1994). Griffin and Neal, (2006) supported the view that safety compliance is analogous to task performance which is defined as work activities that contribute to an organisation's primary task and are prescribed by formal job descriptions, whereas safety participation is analogous to contextual performance, which is defined as an activity that contributes to the social and psychological core of the organisation; it is voluntary in nature and considered as an informal activity (Borman & Motowidlo, 1993).

Although the Borman and Motowidlo's model of job performance has been highly influential the last decades, new upgraded models have emerged which approach performance more holistically. For instance, Rotundo and Sackett (2002), provided a modified model of Borman and Motowidlo (1993), adding a new dimension called "counterproductive behaviours" to the existing two dimensions. Therefore, this job performance model encompassed task, citizenship and counterproductive performance

behaviours. According to Robinson and Bennett's (1995) definition, counterproductive behaviours are those voluntary behaviours that impair the well-being of the organisation. Recent studies in safety field have used this three-dimensional model to measure the overall safety performance construct. For example, Martínez-Córcoles, Gracia, Tomás, Peiró, and Schöbel (2013), demonstrated by means of comparing several CFA's, that safety performance construct is configured by three dimensions, equivalent to the dimensions in Rotundo and Sackett's model. These are safety compliance (equals to task performance); safety participation (equals to citizenship/ contextual performance); and risky behaviours (equals to counterproductive behaviours). In this paper we adopt the three-dimensional safety performance model (Martínez-Córcoles et al., 2013).

1.2 Safety Leadership

Empirical findings in safety research strongly support the connection that exists between leadership and safety performance. Most of these studies mainly examine two popular leadership approaches, namely transformational leadership (Bass, 1985, 1990) and transactional leadership (Bass, 1981; Weber, 1947). Transformational leadership aims at supporting persons to trust themselves and achieve higher goals. It was indicated that this type of instructions-giving is described by value based and personalised approach, generating a higher exchange quality and provision for wellbeing. Numerous scholars have focused their interest on the exploration of transformational leadership, because in many environments it is expected to be more effective than transactional leadership. The outcome of those studies revealed that transformational leaders exert a strong influence on subordinates' performance by enhancing personal identification with the leader and reinforcing the self-worth of the subordinate in putting an extra effort for the sake of the organisation (Bass, Avolio & Goldheim, 1987; Kark & Shamir, 2002). Transactional leadership is defined as the exchange relationship between superior and subordinate, whose purpose is to meet the expectations and

gratify each side's interest (Burns, 1978). In general, transactional leaders display behaviours related to constructive and corrective transactions. Bass (1998) asserted that "contingent reward" is the key aspect of constructive interchange. An example of contingent reward is when the instructor guides the team and assigns tasks to each person or makes a deal with them about the assignments which need to be fulfilled. Therefore, in exchange of their desirable performance, the leader offers a material or an emotional reward. There are several kinds of psychological rewards, such as a compliment, a positive feedback or praise. The material rewards may include a higher wage, a prize or other benefits. At the same time, Bass (1998) characterised "management by exception" as a corrective arrangement, which was further subdivided into active and passive. In its active form, the leader carefully monitors the work, detects any errors or deviance of the workers in the work process and instantly makes corrective improvements and rectifications. In its passive form, the leader does not take the initiative to take any corrective action before an unwelcome situation arises save only after he ascertains that the employee's performance is inadequate. In this case, the corrective action can have the form of negative criticism, repercussion or other kind of punishment.

In spite of the fact that safety literature demonstrates a clear positive link between transformational leadership and safety outcomes (e.g. Kelloway, Mullen, & Francis 2006; Zohar, 2002), active transactional leadership behaviour (which includes aspects of surveillance, proactive behaviour towards potential deviances, and feedback on mistakes) is also a critical dimension which deserves to be studied (Clarke, 2013). Indeed, it seems that transformational and transactional supervision exert supplementary effect on safety behaviour and one of them can be more powerful under certain circumstances than the other (Komaki, 1998). Zohar (2003) declared that transactional as opposed to transformational leadership can be examined through the prism of routinisation. In this way, although transformational leaders may outweigh in using innovative techniques, inspiring the workers to exceed their

limits and go this “extra mile”, transactional supervision remains a necessity when standard and credible activity needs to be preserved (Komaki, 1998). Indeed, House, Spangler and Woycke (1991) declared that in those situations that necessitate routine and at the same time trustworthy performance in order to achieve pragmatic targets, charismatic or transformational leadership could even be ineffective and lead to impairment.

This inquiry was carried out in the military sector, where parachuting operations are mostly standardised regarding safety issues and the outcome of each effort can be easily estimated. In this domain, there are clear instructions for following several kind of procedures such as checks of the gear before jumping, constant implementation of simulation exercises concerning the process of jumping/landing fall techniques and rules, as well as the steps which need to be followed in case the canopy does not deploy effectively or lines are tangled, if there is a reserve (back up parachute) malfunction, how the skydiver should react when a collision with another skydiver under canopy occurs, etc. Hence, there is a need to measure the potential effectiveness of transactional leadership towards safety, particularly in this standardised setting, and observe whether this type of supervision can exert beneficial influence on the crew’s safety behaviour.

1.3 Leadership, Safety Climate, Safety Performance

In 1980, Dov Zohar presented the term of safety climate and defined it as the employees’ shared perceptions about their work environments concerning safety. Since then, a large portion of empirical papers have demonstrated the positive relationship between safety climate and safety behaviours (e.g., Brown & Homes, 1986; Gilen, Baltz, Gassel, Kirsch, & Vaccaro, 2002; Hofmann & Stetzer, 1996; Lee, MacDonald, & Coote, 1993; Neal & Griffin, 2006; Neal, Griffin, & Hart, 2000; Smith, Huang, Ho, & Chen, 2006; Zohar, 2000, 2002; Zohar & Luria, 2005). Thereby, there is a strong support of the idea that positive safety

climate is a substantial factor for employees to implement their task in a safer manner (Mearns et al., 2003). Meanwhile, several publications have demonstrated the important role of leadership as a triggering factor for safety climate. Particularly, the positive impact of participative leadership styles such as transformational (e.g. Antonakis, Avolio, & Sivasubramaniam, 2003; Lowe, Kroeck, & Sivasubramaniam, 1996; Zohar, 2002, 2003), LMX (e.g. Deluga, 1998; Hofmann & Morgeson, 1999; Hofmann, Morgeson & Gerras, 2003; Liden, Sparrowe & Wayne, 1997), and empowering leadership (e.g. Martínez-Córcoles et al., 2011, 2012, 2013, 2014; Tong, Rasia, Tong, & Lai, 2015) on the creation of a safety climate. Based on the preceding literature cited, safety climate is, perhaps, the cornerstone by means of which those type of leaders influence on their employees' safety performance. However, despite those leadership styles have been widely studied in the safety sector, a recent review by Clarke noted that only a small variety of empirical studies exist that have measured aspects of active transactional leadership in association with safety performance (Clarke, 2013). And this is precisely what this paper aims at: Shedding empirical light upon the impact that transactional leadership has on safety performance. Does transactional leadership influence the three different sets of performance behaviours proposed here? Is that relationship unmediated (direct effects) or mediated by safety climate? It is the purpose of this study to provide the answers to these questions.

It is evinced that not only participative leadership styles are able to create safety climate. For instance, Lekka and Healy (2012) carried out an extensive review of forty papers (thirty-five quantitative and five qualitative studies) published between 2002 and 2012, and they concluded that transactional (contingent reward) leadership (i.e. when expectations about anticipated outcomes are clearly stated, when work tasks are consistently monitored by superiors, and when performance is rewarded) is related with notions of a better safety climate, assertive safety behaviours and lower accident rates. Zohar (2002a) found out that an

enhancement of the interaction upon safety issues between the controller and the employee generates amelioration of safety climate. Also Clarke (2013) revealed in her review that active transactional leadership had a positive impact on safety climate.

Transactional practices such as close supervision, higher visibility, proactive behaviours towards potential deviances and constant feedback, encourage shared perceptions among the team towards safety priority and therefore contribute to the creation of safety climate. In the meantime, safety climate will positively influence members' compliance with safety rules and procedures. Thus, the more transactional leadership will be exhibited, the more safety climate will be formed, and the more safety compliance will exist. Following these arguments, our first hypothesis is the following:

Hypothesis 1: Transactional leadership will positively influence safety compliance by means of safety climate.

Clarke (2013) also highlighted that active transactional leaders emphasise on individual learning (by providing feedback) and proactive error management, and this fact gives an impulse to employees to get further involved in issues that are associated with safety. By means of the creation of a safety climate, transactional leadership not only enhances safety compliance, but also strengthens paratroopers' engagement to exhibit voluntarily activities for the protection of themselves and their colleagues, as well as for the promotion of safety actions. Consequently, it is hypothesised that this type of guidance will have the potential to improve safety participation through the creation of a positive safety climate as well.

Hypothesis 2: Transactional leadership will positively influence safety participation by means of safety climate

Active transactional leaders exhibit behaviours, like active monitoring and interference, when divergences take place. Such types of behaviours clearly show to the members of the organisation in a transparent manner, the interconnection that exists between their activities and safety (Clarke, 2013). Additionally, the daily reinforcement of safety as part of the members' work responsibility can establish a positive climate of safety, which can affect the members' tendency to abstain from unsafe acts. Thereby, we assume that transactional leadership will have a potential effect on risky behaviour through safety climate. Following this rationale, we formulate our third and last hypothesis accordingly:

Hypothesis 3: Transactional leadership will negatively influence risky behaviour by means of safety climate

2. METHOD

2.1. Participants and Procedure

Our sample comprised 161 paratroopers from the parachute division of the Hellenic Armed Forces. Within our sample, 55% of the participants were less than 28 years of age, 35% were between 29 and 39 years of age, and 10% older than 40 years of age. Moreover, 25% of the participants were university graduates.

The questionnaire was distributed electronically through the online survey software Survey Monkey, as part of a broader battery of questionnaires designed to assess organisational safety. Data was collected during the period from December 2014 to January 2015. Firstly, the respondents were encouraged by the headquarters of their division to participate in an external evaluation about safety matters that would take place. Next, each participant received an electronic e-mail on behalf of the research team, which informed him about the voluntary participation and anonymity and confidentiality of data that would exclusively be collected and used for scientific purposes. An email address was also

specified, to which each participant could refer and pose confidential questions to the researchers. This message also contained a link which was redirecting the users to a designated website, where they could fill in the relevant form and submit their answers. The time required in order to complete the questionnaire was approximately 25 minutes.

2.2. Measurement method

Transactional leadership was measured by means of the multifactor leadership questionnaire (MLQ-5X) (Bass & Avolio, 1997). This tool measures a broad range of leadership styles, such as passive leaders, transformational leaders or leaders who give contingent rewards to their subordinates. In our study we took into account only those items which identified transactional leadership as a whole. Hence, the 8-item transactional leadership scale of MLQ-5X (Bass & Avolio, 1997) was used to record transactional leadership behaviours, which encompass two subscales, contingent reward and management by exception active. The respondents had to indicate how frequently their direct superior acts in accordance with the statements in a 5-point Likert response scale from 1 (Not at all) to 5 (Always). Sample items which assessed transactional leadership included: “My superior... focuses attention on irregularities, mistakes, exceptions and divergence from standards... makes clear what one can expect to receive when performance goals are achieved” or “expresses satisfaction when others meet his expectations”. Internal consistency reliability for the scale was .96.

Safety climate was recorded with a 16-item questionnaire from Zohar and Luria (2005). Items were accompanied by a 5-point rating scale, extending from 1 (Completely disagree) to 5 (Completely agree). Although those items covered three content dimensions, which are active practices (monitoring, controlling), proactive practices (instructing, guiding) and declarative practices (declaring, informing), the questionnaire has been used as

unidimensional in several similar publications (e.g. Martínez-Córcoles et al., 2011). Example of these items are: “My organisation... provides members with a lot of information on safety issues... reacts quickly to solve a problem when told about safety hazards” or “regularly holds safety awareness events (e.g. presentations, ceremonies)”. Internal consistency reliability for the scale was .95.

The measurement of *safety compliance* was performed through the scale by Neal and Griffin (2006). This scale consists of three items, with a 5-point Likert response scale from 1 (Completely disagree) to 5 (Completely agree). The three items were: “I use all the necessary safety equipment to do my job”, “I use the correct safety procedures for carrying out my job” and “I ensure the highest levels of safety when I carry out my job”. Internal consistency reliability for the scale was .89.

Safety participation was recorded with the use of the Neal and Griffin’s scale (2006) as well. The scale consisted of three items, with a 5-point Likert form from 1 (Completely disagree) to 5 (Completely agree). The three following sentences were included: “I promote the safety program within the organisation”, “I put extra effort to improve safety in the workplace” and “I voluntarily carry out tasks or activities that help to improve workplace safety”. Internal consistency reliability for the scale was .72.

In order to measure *risky behaviours*, we adapted the scale of Mearns, Flin, Gordon, and Fleming (2001). The original scale was made up of 12 items, but two items were removed, since they were not suitable for the parachuting field. This adapted scale has already been used in previous studies (e.g. Martínez-Córcoles et al., 2013). Therefore, 10 items were included with a 5-point Likert response scale ranging from 1 (Never) to 5 (Usually), with higher scores indicating riskier behaviour. Among sample items were the following: “I ignore safety regulations in order to get the job done”, “I take shortcuts that

involve little or no risk”, or “Conditions at the workplace force me to deviate from the rules”. Internal consistency reliability for the scale was .91.

2.3 Analyses

2.3.1 Preliminary analyses

In order to demonstrate evidence of the construct validity of the five scales presented above, we tested their factorial structure in our sample by performing confirmatory factor analyses (CFAs) with observed variables using the program LISREL 8.8 (Jöreskog & Sörbom, 2006). In order to determine the fit of these models, we took into consideration RMSEA (root mean square error of approximation), CFI (comparative fit index), NNFI (non-formed fit index), and AGFI (adjusted goodness of fit index) goodness of fit statistics. The interpretation of these indexes has as follows: RMSEA $<.08$ = acceptable model (Browne & Cudeck, 1993; Browne & Du Toit, 1992); CFI $>.90$ = acceptable model, and $>.95$ = excellent model (Marsh, Hau & Grayson, 2005); NNFI $>.90$ = acceptable model, and $>.95$ = excellent model (Marsh et al., 2005); AGFI $>.90$ = acceptable model.

Initially, two confirmatory factor analyses were conducted, by using the transactional leadership scale (Bass & Avolio, 1997), in order to determine the most suitable factorial structure in our sample. Bass and Avolio (1997) supported a two-dimensional model in their transactional leadership scale (contingent reward and management by exception active). However, in their analyses those researchers discovered that both of these leadership factors were highly correlated each other, suggesting that a single factor of transactional leadership could emerge. Hence, we compared both factorial structures (two-dimensional and one-dimensional). In the first CFA, transactional leadership was treated as one-dimensional, whereas in the second it was treated as a two-dimensional construct, which was divided into contingent reward and management by exception active. Weighted Least Squares method

(WLS) were used, in order to assess the model parameters, and both polychoric correlations matrix and the asymptotic covariance matrix were introduced as input for the analyses. In order to interpret the differences in practical fit indexes and designate which model displayed a better fit, a modelling rationale was considered according to existing statistical literature. Consequently, differences smaller or equal to .01 in CFI values (Δ CFI) (Cheung & Rensvold, 2002), and 0.2 in NNFI values (Δ NNFI) (Vandenberg & Lance, 2000) are considered an indication of negligible practical differences; in this case, one can claim support for the more constrained (parsimonious) model.

Since the scales were included in the same battery of questionnaires (participants responded to the scales sequentially and immediately), and the method used was the same for all participants, we conducted a CFA using the five scales together. Therefore, all variables were firstly introduced as one-dimensional scales (transactional leadership was previously supported as one-dimensional as the reader can see in the *Results* section). The other four variables measured (safety climate, safety compliance, safety participation and risky behaviours) were also introduced as one-dimensional scales. We loaded the items to their respective scale (i.e. transactional leadership items were loaded in transactional leadership scale, safety compliance items were loaded in safety compliance scale, and so on). Thereafter, we investigated the likelihood that a single factor could emerge for all five constructs, considering that common variance could overstate the associations among the study variables (all of them were responded by means of self-reports). To examine this possibility, we conducted another CFA in which all the items from the five variables were loaded in a single factor. Thus, a Harman Single Factor test was conducted using the CFA method (Podsakoff, MacKenzie, Lee, & Podsakoff, 2003). Its basic assumption is that if a substantial amount of common method variance is present, either a single factor will emerge from the factor analysis or one general factor will account for the majority of the covariance

among the measures with all items loaded in this single factor (Podsakoff et al., 2003). We used robust maximum likelihood (ML), in order to assess the model parameters, due to the fact that the large number of items and the sample size deterred us from using weighted least square estimations. Both polychoric correlations matrix and the asymptotic covariance matrix were introduced as input for the analyses.

2.3.2 Analyses for hypotheses testing

In the last phase of our analyses we proceeded to the implementation of a structural equation model (SEM) with the observed variables by means of LISREL 8.80 (Jöreskog & Sörbom, 2006). Maximum Likelihood (ML) method was used to estimate the model parameters, and polychoric correlation matrix was introduced as input for the analysis, since normal distribution for all variables was assumed. The goodness of fit indexes used were RMSEA, CFI, NNFI and AGFI and they were interpreted in the same manner, as previously illustrated in the CFAs. Furthermore, we applied Baron and Kenny's method (1986), in order to evaluate the type of given mediations (full or partial). This method indicates that when a prior significant direct connection from independent variable to dependent variable (direct effects) is confoundedly decreased while indirect effects (mediated effects) are controlled, the mediation is partial. When this association is no longer significant, then the mediation is full.

3. RESULTS

All measures for descriptive statistics and alpha coefficients (Cronbach, 1951) are presented in Table 1. Generally the participants achieved high scores for transactional leadership ($M = 3,77$, $SD = .73$), safety climate ($M = 4,00$, $SD = .78$), safety compliance ($M = 4,37$, $SD = .77$) and safety participation ($M = 3,87$, $SD = .87$), and low scores for risky behaviours ($M = 1,66$, $SD = .64$). Pearson correlations showed significant associations among all variables ($p < .01$)

Table 1

Descriptive statistics and inter-correlations between study variables

Variable	M	SD	1	2	3	4	5
1. Transactional Leadership	3,77	.73	-				
2. Safety climate	4,00	.78	,71**	-			
3. Safety compliance	4,37	.77	,59**	,71**	-		
4. Safety participation	3,87	.87	,46**	,46**	,53**	-	
5. Risky behavior	1,66	.64	-,44**	-,35**	-,61**	-,27**	-

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

Table 2

Goodness of fit statistics of four confirmatory factor analyses performed.

Model	χ^2	df	p	RMSEA	CFI	NNFI	AGFI
Leadership (1 factor)	31.68	20	< .01	.076	.963	.948	.951
Leadership (2 factor)	24.820	19	< .01	.055	.981	.973	.959
Study variables (1 factor)	324.63	740	< .01	.012	.631	.611	.798
Study variables (5 factor)	200.07	730	< .01	.057	.917	.911	.892

3.1 Confirmatory Factor Analyses

With regard to the transactional leadership model, we compared two different dimensional structures: the one-dimensional structure (transactional leadership as unique factor) and the two-dimensional structure (contingent reward and management by exception), in order to determine which of them fits better to our sample. Both structures, the one-dimensional structure ($\chi^2 = 24.820$, $df = 19$, $p < .01$; $RMSEA = .055$; $CFI = .981$; $NNFI = .973$, $AGFI = .959$), and the two-dimensional structure ($\chi^2 = 31.68$, $df = 20$, $p < .01$; $RMSEA$

= .076; CFI = .963; NNFI = .948, AGFI = .951) presented an excellent fit and all the estimated parameters were statistically significant ($p < .01$). Due to the fact that the incremental indices' discrepancies produced negligible practical differences between the two structures, we decided to use the more parsimonious model, namely, the one-dimensional structure. So, albeit transactional leadership is commonly divided into contingent reward and management by exception active (Bass & Avolio, 1997), however we treated this variable as one-dimensional, because the results supported that the one-dimensional structure is a better fit for this scale in our sample.

Once we determined the dimensional structure for transactional leadership, two confirmatory factor analyses (CFA) were conducted in order to test the dimensional structure of the other variables: A five-dimensional structure (where the items of each scale were loaded into their corresponding scale) and a one-dimensional structure (with all the items from the five scales loading into a single dimension). The five-dimensional structure produced a good fit ($\chi^2 = 200.07$, $df = 730$, $p < .01$; RMSEA = .057; CFI = .917; NNFI = .911, AGFI = .892) and all the estimated parameters were statistically significant ($p < .01$). However, the one dimensional structure single-factor model showed a poor fit to the data (cut-off values in CFI, NNFI, AGFI and RMSEA were far to be acceptable) ($\chi^2 = 324.63$, $df = 740$, $p < .01$; RMSEA = .012; CFI = .631; NNFI = .611, AGFI = .798). Consequently, the five-dimensional structure was considered as the best model.

3.2. Structural equation model

The hypotheses tests were carried out by means of a Structural Equation Model. The acquired results demonstrated an excellent fit of the model ($\chi^2 = 2,18$, $df = 2$, $p < .01$; RMSEA = .028; CFI = .999; NNFI = .996, AGFI = .937). All the assessed parameters were statistically significant ($p < .01$) and showed the expected sign, providing support to our

assumptions. In order to interpret more effectively the significant interactions, a graphic representation was created (Figure 2).

According to the results, the three hypotheses tested were validated. Safety climate turned out to be a full mediator in the relationship between transactional leadership and paratroopers' safety compliance (Hypothesis 1). Thereupon, safety climate was shown to be a mediator between transactional leadership and safety participation. In this case, transactional leadership predicted safety participation both directly and through partial mediation (Hypothesis 2). Meanwhile, safety climate functions as a full mediator of the relation between transactional leadership and risky behaviours (Hypothesis 3). These results indicate that transactional leadership style enhances positively shared perceptions about safety issues and priorities (safety climate). That is the path through which leaders exert positive influence on safety compliance and safety participation behaviours, and negative influence on risky behaviours. At the same time, transactional leadership had a direct effect on safety participation (the mediation turned out to be partial).

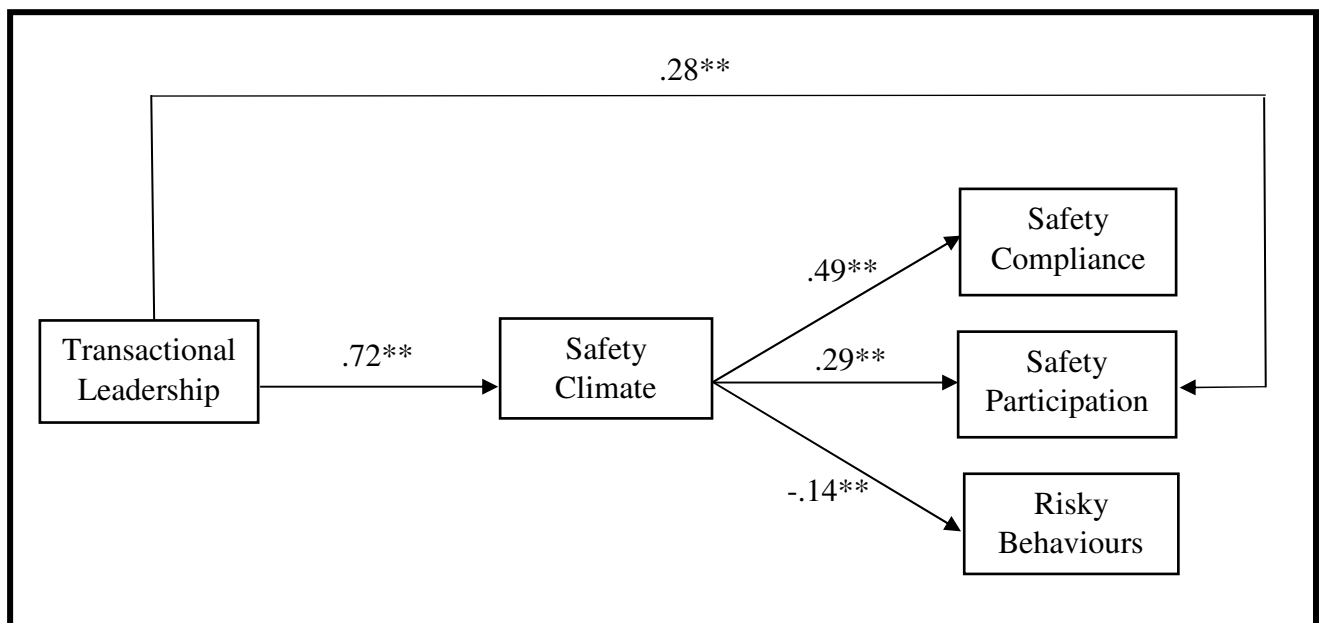


Figure 2. Direct and indirect (mediated) paths between variables and standardised parameters. **p < .01.

4. DISCUSSION AND CONCLUSIONS

Despite safety performance has been widely studied across different industries, very little is known about the predictors of safety performance in Military Special Forces such as paratroopers. Our main target in this paper was to develop a model that identifies the potential mechanisms and processes that improve safety performance behaviours in military parachute teams. To that end, this survey was designed to explore the effect of a potentially beneficial leadership on safety performance within this field. In light of the evidence, our results claim that transactional leadership is an antecedent of three kinds of behaviours, namely safety compliance, safety participation and risky behaviours, and this influence is exerted by means of safety climate. Particularly, when commanders act as transactional leaders, they establish a strong safety climate, which increases the number of subordinates' safety compliance behaviours (Hypothesis 1). Concerning our second hypothesis, safety climate was likewise shown to be a mediator of the relationship between leadership and safety participation. But at the same time, safety participation was directly influenced by the transactional guidance (Hypothesis 2). With respect to the third hypothesis, the existence of transactional supervision diminished the appearance of risky behaviours, by means of safety climate as well (Hypothesis 3). Full mediations in hypotheses 1 and 3 could be explained by the strong bond between active transactional leadership and safety climate, which leads us to the conclusion that transactional behaviour is a powerful leadership style when it comes to shape paratroopers' shared attitude and perception for safety matters. Regarding the partial mediation (Hypothesis 2), our study reveals that transactional leadership directly influences subordinates' safety participation behaviours (not only mediated by safety climate). This direct relationship could be explained because compliance with rules and procedures or avoidance of risky acts are considered mandatory behaviours and there are other rewarding

mechanisms for them (especially punitive, by regulation, policies, rules and procedures). Therefore, material or emotional positive rewards by leaders are not so necessary, in order to directly enhance safety compliance or reduce risky behaviours. On the contrary, safety participation does not entail formal rewards, ergo, that leaders who want to keep subordinates contributing voluntarily to safety will need to strongly reward them.

We consider that the results of our survey could have implications for safety research. We deliberately chose to investigate transactional supervision style, which is rather underestimated in order to explore the potential advantages that can be offered in this particular environment governed by a strict hierarchy, high routinisation and measurement of adequate performance (task performance) in the case of paratroopers divisions. This study empirically supports that in this kind of surroundings (i.e. Special Forces), where persons execute highly standardised tasks, transactional authority assures that lower ranking staff will show reliable and accountable behaviour. It becomes evident that those instructors, who have adopted a transactional style to command their subordinates dealing with highly routinised tasks, are more probable to attain employees' safety performance, thanks to the persistent and constant supervision, as well as the provided constructive feedback. This type of guidance stems from the concept that the workforce will behave in accordance to the standard policies and report directly to the head of their team any hazardous or problematic condition that it encounters. Notwithstanding the fact that most evidence from the literature demonstrates a positive link between transformational leadership and safety, our findings showed that active transactional leadership is also a critical leadership style to be considered when it comes to foster safety performance. This study does not aspire neither to downplay the value of other leadership styles nor to deify transactional supervision, but to highlight that in certain conditions, a transactional leadership can be proven as effective and powerful as other leadership models. Based on the results of our analyses, we infer that there is not one type of

leadership that can be equally effective for safety performance under all circumstances, but each guidance style is integrally connected with the situational favourability.

The findings of this study could have practical implications to Military Special Forces and divisions in multiple ways. On one hand, by introducing a transactional leadership model among commanders or/and direct captains, for instance through training courses or coaching. On the other, by creating a powerful safety climate that the directors on the top of the chain of hierarchy are responsible for spreading. The essence of this guidance is based on the notion that the leader who has a team under his commands, assigns tasks to the lower ranking persons and makes arrangements with them in exchange of their desirable performance. In order to achieve the best possible performance the superior offers the subordinates either material (e.g. higher wage) or emotional rewards (e.g. praise) which function as a compliment and a positive feedback to their effort. So we can teach the commanders, that in case of the subordinates' member compliance with the rules, there will be an exchange for desired commodities such as emotional status or monetary recompense, whereas in response to non-compliance, hazardous acts and faults, punitive measures could be implemented. Following this rationale, based on the Skinnerian principles where the stimulus-response-reinforcement concepts are of paramount importance, the individual perceives that the team or the organisation values his participation within the team and the content of the actions has a direct impact in his life also. The role of the leader in parachute division is to observe carefully the work of his staff and detect any faults or deviance instantly, so that he can proceed with corrective improvements and rectifications. When a safety climate is established among the crew of the unit, its existence can work as a guide for paratroopers set of perceptions and evidence expectations, which will affect their safety performance. The appropriate safety climate represents members' socially shared interpretations of the organisational environment. Moreover, it informs them which behaviours are expected and

which are more possible to be appraised. This study aspires to contribute to an on-going training of instructors, which in Greek Military Special Forces is rather discounted, and supply them with essential skills associated to transactional style. This leadership training shall include factors related to communication, such as that statements and orders are clearly transmitted, timely, relevant, justified, complete and verified. This kind of transactional behaviours can maintain a team spirit and engage the team members towards a safety conduct.

This study is subject to several limitations. First of all, in our attempt to evaluate safety performance we utilised self-reports. This fact can produce distorted results due to the participants' tendencies to answer in a consistent and socially desirable manner. Nevertheless, we reassured the participants about the anonymity and confidentiality of the data, in order to acquire reliable responses. Furthermore, the object of our assessment concerns the perceived safety behaviours on behalf of the paratroopers; consequently we are not aware of the actual existence and outcomes of these conducts. Secondly, within this inquiry, we examined the leader's safety behaviours at all levels of the chain of hierarchy. This means, that we asked the participants to evaluate the behaviours that their direct leader exhibits. However we were unable to ask which behaviours are more suitable at each level of the organisational chart. Future surveys could inquire whether leadership behaviours vary according to the level of the person of authority (i.e. if the individual should behave in a different manner due to the position that he occupies as a member of the lower, middle or top chain of hierarchy) (Flin & Yule, 2004). Thirdly, the cross-sectional nature of the research reduces the content of the variable to a "snapshot", instead of being a longitudinal evaluation which examines dynamically processes over time. A characteristic example is that this type of investigation deters us to conclude how leadership influences each type of safety performance in longer time and obstructs us to establish causal relationships. Another

constrain could be the relative small sample (161) that we investigated, due to the fact that paratroopers' Special Forces have a limited number of crew. It would be more preferable to have a larger sample which would allow us to present more robust results and provide additional support to our evidence. Last, but not least the reader shall be cautious in respect of the generalizability of the outcomes of this study. Thereby, our data regarding the potentials of transactional leadership must be examined in the light of this impact. It could be modified, depending on the cultural background integrated within the national mentality. The limitations tracked in the present inquiry point out potential future directions of research. Future surveys which anticipate to assess either team-level or organisational-level factors must involve an adequately large sample which will enable the inclusion of team or organisation scores and the conduct of multi-level analysis. In addition to this, longitudinal surveys may captivate the dynamic quality of these structures, and the adoption of other methods which have to be used apart from self-reports tools. For instance, through participative observation and/or interviews a deeper understanding of the participants' responses could be achieved, avoiding tendencies to respond in a consistent and socially desirable manner. The authors hope that this study sheds new light upon leadership and safety performance in the military sector and provides new orientations for practitioners.

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