SITUATIONAL LEADERSHIP IN AIR TRAFFIC CONTROL

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ABSTRACT

In high-risk environments such as air traffic control, leadership on different levels plays a certain role in establishing, promoting, and maintaining a good safety culture. The current study aimed to investigate how leadership styles, leadership style adaptability, and over and under task leadership behavior differed across situations, operative conditions, leadership structures, and working tasks in an air traffic control setting. Study locations were two air traffic control centers in Sweden with different operational conditions and leadership structures, and an administrative air traffic management unit. Leadership was measured with a questionnaire based on Leader Effectiveness and Adaptability Description (LEAD; Blanchard, Zigarmi & Zigarmi, 2003; Hersey & Blanchard, 1988). The results showed that the situation had strong impact on the leadership in which the leadership behavior was more relationship oriented in Success and Group situations than in Hardship and Individual situations. The leadership adaptability was further superior in Success and Individual situations compared with Hardship and Group situations. Operational conditions, leadership structures and working tasks were, on the other hand, not associated with leadership behavior.

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INTRODUCTION

Leadership on different levels is believed to be a key factor in almost any organizational success (Moy, 2004; Silverthorne, 2001; Weil, Bogue & Morton, 2001). Bennis and Nanus (1985) suggested that one of the most important predictors of organizational achievement is effective leadership and that ineffective leadership often is a predictor of an organizational failure. In a high-risk environment, leadership on different levels seems to play a certain role in establishing, promoting, and maintaining a good safety culture, which is repeatedly stressed in the literature (Flin, 2003; Guldenmund, 2000). According to Bently and Haslam (2001), the management impact on safety arises both from their attitudes and their actions. The UK Health and Safety Regulator (HSE, 1999) points at management commitment, management style, and visible management as organizational factors that are associated with a safety culture. Several studies have also shown that safety is related to first-line supervisors' leadership style and team management skills (Flin, 2003). Further, the managers' commitment to safety and their attitudes concerning safety-related matters is of critical importance for a successful safety management system (Bailey, 1997; Clarke, 1999; Kirwan, 1998; O'Toole, 2002) and supervisors, site managers, and senior managers, all have significant positions in a safety management system (Flin, 2003).

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There is additional support in the literature which demonstrates that leadership can influence work-related stress in the psychosocial work environment. A supportive leadership style maintained by the leaders can act as a buffer for reducing work-related stress among employees in a demanding work environment (Bakker, Killmer, Siegriest & Schaufeli, 2000). According to Rowney and Cahoon (1988), leadership practices make a difference in the prevention or occurrence of stress and can help employees cope with stress factors. Leaders who allow employees a greater participation in decision-making and encourage a two-way communication process tend to generate a favorable climate among staff, characterized by less interpersonal conflict and hostility, and fewer non cooperative relationships (Oaklander & Fleishman, 1964). Assigning tasks, specifying procedures, and clarifying expectations have also been shown to result in reduced role ambiguity and increased job satisfaction among high occupational level employees (Gray-Toft & Anderson, 1985). On the other hand, the leadership can increase stress if it is too much control-oriented and structuring. A leader who constantly gives subordinates demanding instructions generates detectable physiological symptoms of stress among the staff (McCormick & Powell, 1988).
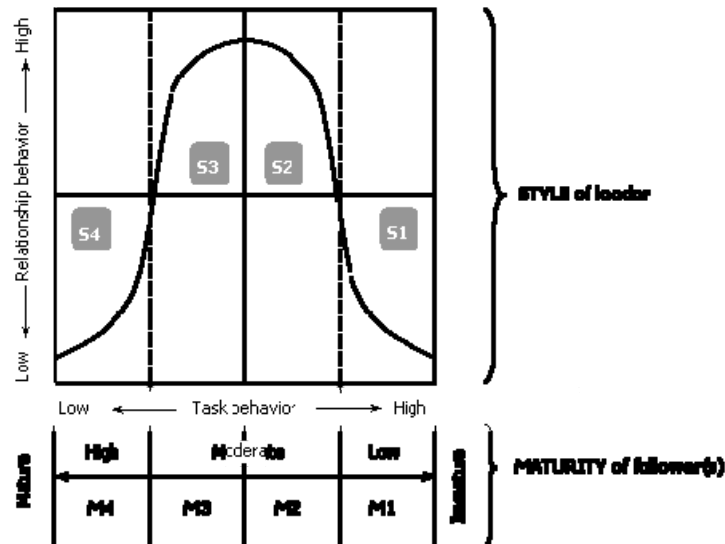
It is thus important for all organizations to understand the role of leadership and that they identify the styles of leadership most effective to their business. The role of leadership and of leadership style may be even more significant in high-technology companies because of their unique business environments (Silverthorne, 2001). In a high-risk environment, such as air traffic control, the role of leadership and leadership style should be no less important, since the operational work is conducted in a high-technology environment with great risk involved.

The Swedish Air Navigation Service Provider, which operates in a high-risk environment, has succeeded in creating an overall positive safety culture (Ek, Arvidsson, Akselsson, & Johansson, 2002) and psychosocial work environment (Arvidsson, Johansson, Ek, Akselsson, & Josefsson, 2004). The general purpose of this study is to investigate and describe situational leadership characteristics and leadership styles in this distinctive environment.

The theory is based on task and relationship leadership behavior and subordinate maturity (Blanchard & Johnson, 2000; Hersey & Blanchard, 1996; Hersey, Blanchard & Johnson, 2006). *Task behavior* is described as the extent to which leaders are likely to organize and define the roles of the members of their group, to explain what activities each has to do and when, where, and how tasks are to be accomplished. *Relationship behavior* is referring to the extent to which leaders are likely to maintain a personal relationship between themselves and members of their group by opening up channels of communications, providing socio-emotional support, and

facilitating behavior. *Maturity* refers to the followers' experience, willingness and ability to take responsibility. The level of maturity determines the appropriate combination of task and relationship behavior for the leader (see Figure 1). The *leadership style profile* is thus a description of how task and relationship behavior are used separately and in combination.

Figure 1. The Situational Leadership Model (Hersey & Blanchard, 1996; Hersey, Blanchard & Johnson, 2006)

The theory attempts to provide leaders with some understanding of the relationship between an effective leadership style and the level of maturity of their co-workers. Because abilities and motives among co-workers vary the leader must have sensitivity and diagnostic ability to perceive and appreciate these differences. Yet, even with good diagnostic skills, leaders may still be not effective unless they can adapt their leadership style to meet the demands of their environment (Hersey & Blanchard, 1996; Hersey, Blanchard & Johnson, 2006). This implies that if the needs and motives among co-workers are different they must be treated differently. The *leadership style adaptability* is the measure of the leader's ability to use an appropriate leadership style in a given situation. *Over and under task behavior* indicates how a possible lack of leadership style adaptability is constituted and should be interpreted. Over task behavior occurs when the current leadership style is more task oriented than appropriate in a given situation, and under task

behavior occurs when the current leadership style is less task oriented than appropriate.

STUDY LOCATIONS

To study situational leadership abilities, a group of team managers (TMs) were assessed by their team members at two Air Traffic Control Centers (ATCC) in Sweden, referred to as the *en route ATCC* and the *arrival-and-departure ATCC*. A group of department managers were further assessed by their department members at the Air Navigation Services (ANS) organizational unit, which is part of the Swedish LFV Group of Airports and ANS (Luftfartsverket) central head office. At the en route ATCC, the air traffic control work mainly consists of surveillance of en route air traffic, passing by on high altitude. At the arrival-and-departure ATCC the air traffic control work is more active since most of the work is connected to air traffic arriving and departing from different airports in the area. Each team is managed by a TM. The teams have only a tactical function to coordinate individuals with different working tasks and positions. Accordingly, they do not primarily serve as operative air traffic control units. The aim is to shorten information paths and make each employee enjoy greater participation and influence concerning the ATCC's overall operations and long term development. The TM's primary task involves human resource management, employee training and employee development, work scheduling, etc.

At the arrival-and-departure ATCC, each TM also holds the position as watch supervisor (WS). WS can be described as an operative management position. For each shift a WS has responsibility for the operative work and care for such things as air traffic distribution in different sectors and that the work is conducted in a safe manner within the existing regulatory framework.

At the en route ATCC, the TM position does not imply the position as WS. Instead, the TMs are regular air traffic controllers or air traffic control assistants with no operative management tasks.

The study further involves the ANS unit, dealing with general air traffic management issues such as air traffic flow and airspace management. The work is exclusively administrative; no operative air traffic control is conducted. The two ATCCs and the ANS unit differ mainly from each other with respect to working tasks and methods. The organizational structure can be described as consisting of different small departments managed by a department leader with ordinary supervising tasks.

HYPOTHESES

Apart from the followers' maturity, other factors in the environment can have an impact on the leadership style adaptability and the leadership style profile. The working situation itself can be characterized by Success or Hardship and leadership actions can occur in Group or Individual situations.

Hypothesis Ia therefore states that the *leadership style adaptability, over and under task behaviors and leadership style profiles are dependent on the working situation and thus differ in Group or Individual situations.*

Hypothesis Ib states that the *leadership style adaptability, over and under task behaviors and leadership style profiles are dependent on the working situation and thus differ in situations characterized by Success or Hardship.*

It is further assumed that the different leadership conditions at the two ATCCs will affect leadership performance.

Hypothesis II therefore states that the *leadership style profiles differ according to operational leadership conditions.*

Further it is assumed that the different working tasks and organizational structure at the ANS unit compared with the two ATCCs will affect the leadership.

Hypothesis III thus states that the *leadership style profiles will differ due to working tasks and organizational structures.*

The TMs at the arrival-and-departure ATCC who also holds the WS position practice leadership actions more frequently than the TM at the en route ATCC. Thus this group has more leadership experience with respect to both task requirements and relationship requirements and might therefore be more sensitive to followers' maturity also when they act as TM than TMs at the en route ATCC. The department managers at the ANS unit are, in addition, full time leaders with constant responsibility for the daily work and the department's performance which provide them with regular leadership experience.

Hypothesis IV therefore states that the *leadership style adaptability is assessed as more effective by organizational member's with more experienced leaders.*

Hypothesis V states further that *more experienced TMs and department managers will practice less over and under task behaviors than the less experienced TMs,* since these leadership aspects are related to the leadership style adaptability.

METHOD

Participants

The questionnaire used in the study was distributed to all 635 employees at the three units; 309 completed questionnaires were returned. Of these, 108 were filled out by employees at the en route ATCC, 102 by employees at the arrival-and-departure ATCC, and 99 by employees at the ANS unit. Altogether 39 respondents dropped out for reasons such as maternity/paternity leave, on leave for sickness, training, vacation, etc. This resulted in a final response rate of 53% for the en route ATCC, 49% for the arrival-and-departure ATCC, and 54% for the ANS unit. At the en route ATCC, 52 respondents (48%) were men and 56 women (52%); at the arrival-and-departure ATCC 53 were men (52%) and 49 women (48%); and at the ANS unit, 76 were men (76%) and 23 women (24%). Age, length of service, and position of the staff at the three units are presented in Table 1. The number of teams at the en route ATCC was 16, at the arrival-and-departure ATCC was 8 and at the ANS unit was 13.

Table 1. Age, Length of Service of the Staff at the Three Air Traffic Management Units: The en route Air Traffic Control Center, the Arrival-and-Departure Air Traffic Control Center, and the Air Navigation Services Unit

Age	21-30 years	31-40 years	41-50 years	>50 years
En route ATCC	23 (20%)	45 (42%)	20 (19%)	20 (19%)
Arr./dep. ATCC	34 (33%)	37 (36%)	18 (18%)	13 (13%)
ANS unit	10 (10%)	22 (22%)	25 (26%)	42 (42 %)
Length of service	0-24 months	2-5 years	6-10 years	>10 years
En route ATCC	2 (2%)	24 (22%)	13 (12%)	69 (64%)
Arr./dep. ATCC	2 (2%)	25 (24 %)	19 (19%)	56 (55%)
ANS unit.	10 (10%)	16 (17%)	7 (7%)	66 (66%)

Instrument

Situational leadership was measured with the questionnaire LEAD (Blanchard, Zigarmi & Zigarmi, 2003; Hersey & Blanchard, 1988) in a modified version (Holmkvist, 2000). The questionnaire consists of 32 items, reflecting different situations, which are described to the respondent. Each item is answered by one of four alternatives. The respondent is asked to choose the alternative that best describes the respondent's expected behavior of their leader in each situation (see Appendix). Each item concerns leadership in Group or Individual situations or in terms of Success or Hardship. The method is therefore managing four types of situations: Group or Individual situations and situations characterized by Success or Hardship.

Leadership measures and statistical analysis

For each study location and for each type of situation, the leadership style profiles were calculated as mean scores of the occurrence of each of four possible leadership styles S1-S4. S1 indicated high task/low relationship behavior, S2 high task/high relationship behavior, S3 low task behavior/high relationship and S4 low task/low relationship behavior (Hersey, Blanchard & Johnson, 2006). T-test for dependent samples was used to test for statistically significant differences between Success situations versus Hardship situations and between Individual situations and Group situations for each leadership style (Hypothesis Ia and Hypothesis Ib, respectively). T-test for independent samples was used to calculate statistically significant differences in the occurrence of each leadership style between the three study locations (Hypotheses II and III).

Leadership data were also calculated as mean scores with respect to leadership style adaptability for each situation and study location. The leadership style adaptability scale ranges from -32 (no adaptability) to +32 (full adaptability) for each situation. The weighting is based on the Situational Leadership Theory (Hersey, Blanchard & Johnson, 2006) and the leader with the highest probability of success of the alternatives offered in the given situation is always weighted +2. The leadership behavior with the lowest probability of success is always weighted -2. The second best alternative is weighted +1 and the third is weighted -1. T-test for independent samples was used to test for statistically significant differences in leadership style adaptability between the three study locations for each situation (Hypotheses I and IV).
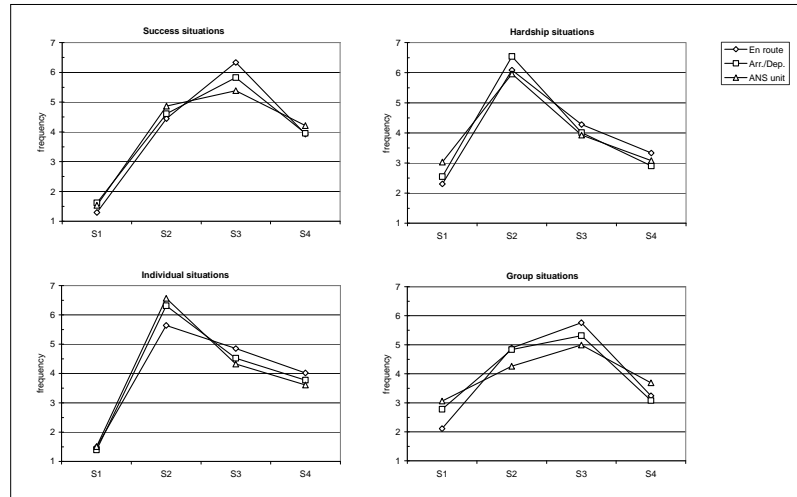
For each study location and for each type of situation, the LEAD data were further calculated as mean scores concerning over and under task behaviors. The over and under task behavior scales range respectively, from 0 (no over or under task behavior) to 24 (maximum over or under task behavior) for each situation and are based on the leadership style adaptability. When the leadership style adaptability in a given situation is weighted +2 the over and under task behavior is 0. When the leadership style adaptability is weighted +1 the over or under task behavior is weighted +1, when -1 then +2 and when -2 then +3. T-test for independent samples was used to test for statistically significant differences in over and under task behavior between the three units and for each situation (Hypotheses I and V).

RESULTS

Leadership style profiles – Hypotheses I, II and III

For all situations and study locations, the two most seldom-used leadership styles were S1—high task/low relationship behavior, and S4—

low relationship/low task behavior, according to Figure 2. For Success and Group situations, the overall most frequently-used leadership style was S3—high relationship/low task behavior, and the second most frequently-used was S2—high task/high relationship behavior. In Hardship and Individual situations the most frequent leadership style used was S2—high task/high relationship behavior, and the second most frequent used was S3—high relationship/low task behavior.

Figure 2. Leadership Style Profiles in Success, Hardship, Individual and Group Situations for each Study Location.

When the three study locations were compared according to leadership styles in different situations, only leadership style S1—high task/low relationship behavior for Group situations, became statistically significant different in the comparison between the two ATCCs according to Table 2. This result indicates that the TMs at the arrival-and-departure ATCC more often used leadership style S1—high task/low relationship behavior in Group situations, compared with the TMs at the en route ATCC. In the comparison between the en route ATCC and the ANS unit, four differences became statistically significant. In Success situations, the leadership style S3—high relationship/low task behavior was more often used by the TMs at the en route ATCC than by the department managers at the ANS unit. On the other hand, the department managers at the ANS unit more often used leadership style S1—high task/low relationship behavior in Hardship situations, S2—high task/high relationship behavior in Individual situations and S1—high task/low relationship behavior in Group situations, compared with the TMs

at the en route ATCC. In the comparison between the arrival-and-departure ATCC and the ANS unit no differences were statistically significant.

Table 2. Mean and Standard Deviation for the Occurrence of each Leadership Style in Success and Hardship Situations and in Individual and Group Situations at the Tree Study Locations and T-values for Differences between the Three Study Locations

Situation	Style	M			SD			t-value		
		E.r.	A.d.	ANS	E.r.	A.d.	ANS	E.r. / A.d.	E.r. / ANS	A.d./ ANS
								df=208	df=205	df=199
Success	S1	1.30	1.62	1.54	1.40	1.77	1.62	-1.46	-1.14	0.34
	S2	4.44	4.61	4.87	2.33	2.41	2.49	-0.50	-1.27	-0.76
	S3	6.33	5.82	5.38	2.92	2.59	2.87	1.34	2.36*	1.14
	S4	3.93	3.95	4.21	3.26	3.23	2.65	-0.06	-0.69	-0.63
Hardship	S1	2.31	2.55	3.03	2.34	2.19	2.78	-0.78	-2.03*	-1.36
	S2	6.08	6.54	5.96	2.81	2.38	2.49	-1.26	0.33	1.69
	S3	4.28	4.01	3.93	2.25	2.20	2.28	0.87	1.11	0.25
	S4	3.33	2.90	3.08	2.47	2.08	2.25	1.37	0.77	-0.59
Individual	S1	1.49	1.39	1.51	1.72	1.61	1.91	0.43	-0.06	-0.45
	S2	5.64	6.31	6.57	2.54	2.81	2.76	-1.83	-2.52*	-0.64
	S3	4.85	4.52	4.32	2.30	2.14	2.28	1.08	1.66	0.63
	S4	4.02	3.77	3.61	2.67	2.70	2.27	0.66	1.19	0.48
Group	S1	2.11	2.77	3.06	1.97	2.32	2.67	-2.24*	-2.93**	-0.81
	S2	4.89	4.83	4.26	2.49	2.22	2.12	0.17	1.94	1.86
	S3	5.76	5.31	4.99	2.90	2.57	2.92	1.18	1.90	0.84
	S4	3.24	3.08	3.69	2.71	2.42	2.25	0.46	-1.28	-1.85

For each leadership style S1-S4, there was a statistically significant difference in the mean occurrence of each leadership style between Success and Hardship situations according to Table 3. Also in the comparison between Individual situations and Group situations the mean occurrence of each leadership style was statistically significant.
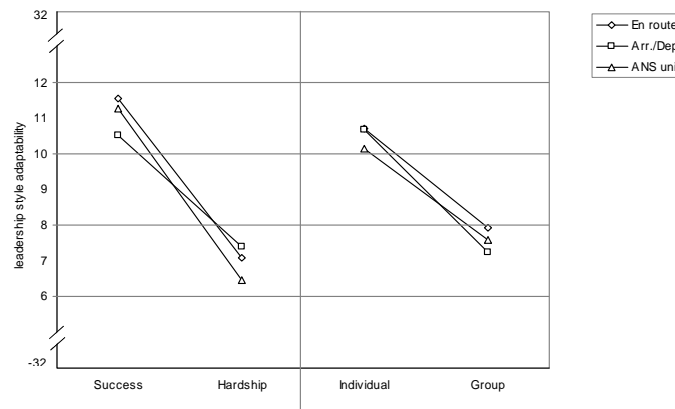
Table 3. Mean and Standard Deviation for the Occurrence of each Leadership Style in Success and Hardship Situations and in Individual and Group Situations and T-values for Differences between Success Situations versus Hardship Situations and between Individual Situations and Group Situations

Style	M				SD				t-value	
	Suc.	Hard.	Ind.	Grp.	Suc.	Hard.	Ind.	Grp.	Suc. / Hard.	Ind. / Grp.
									df=308	df=308
S1	1.48	2.62	1.46	2.63	1.60	2.46	1.75	2.35	-9.26***	-9.53***
S2	4.63	6.19	6.16	4.67	2.40	2.58	2.72	2.30	-9.81***	9.05***
S3	5.86	4.08	4.57	5.37	2.82	2.24	2.24	2.81	10.55***	-4.71***
S4	4.03	3.11	3.81	3.33	3.06	2.28	2.55	2.48	5.02***	3.27**

Leadership style adaptability – Hypotheses I and IV

The results indicated that the leadership style adaptability was superior in Success and Individual situations compared with Hardship and Group situations, as Figure 3 illustrates. The differences between Success and Hardship situations were statistically significant [$t(308) = 10.14, p \leq 0.001$)], as well as the differences between Individual and Group situations [$t(308) = 7.18, p \leq 0.001$].

Figure 3. Leadership Style Adaptability for the Three Study Locations in Success vs. Hardship Situations and Individual vs. Group Situations.

According to Table 4, no statistically significant differences concerning leadership style adaptability were found in any of the four studied situations in the comparisons among the three study locations.

Table 4. Mean and Standard Deviation for Leadership Style Adaptability for each Study Location and Situation and T-values for Differences in Leadership Style Adaptability between the Three Study Locations

Situation	M			SD			t-value		
	E.r.	A.d.	ANS	E.r.	A.d.	ANS	E.r. / A.d.	E.r. / ANS	A.d. / ANS
							df=208	df=205	df=199
Success	11.56	10.53	11.27	6.20	6.29	5.78	1.20	0.35	-0.87
Hardship	7.09	7.40	6.46	6.91	7.63	6.03	-0.31	0.69	0.96
Individual	10.71	10.69	10.14	6.68	7.61	6.45	0.03	0.63	0.55
Group	7.94	7.25	7.60	6.06	6.36	5.73	0.82	0.42	-0.41

Note. A.d. refers to Arrival-and-departure air traffic control center, E.r. refers to En route air traffic control center, ANS refers to air navigation services unit.

Over and under task behavior – Hypotheses I and IV

The results indicated that the frequency of over and under task behavior was dependent on the situation, according to Figure 4. Thus, the comparisons between Success and Hardship situations concerning over task behavior turned out to be statistically significantly different [$t(308) = 6.55$, $p \leq 0.001$] as well as concerning under task behavior [$t(308) = 2.10$, $p \leq 0.05$]. Further, comparison between Individual and Group situations concerning over task behavior was statistically significantly different [$t(308) = 4.63$, $p \leq 0.001$]. No statistically significant differences appeared in the comparison between Individual and Group situations concerning under task behavior.

The under task behavior was more dominant than the over task behavior according to Figure 4, and the difference between under and over task behavior was statistically significant for Success situations [$t(308) = 7.90$, $p \leq 0.001$], Hardship situations [$t(308) = 4.96$, $p \leq 0.001$], Individual situations [$t(308) = 7.82$, $p \leq 0.001$] and for Group situations [$t(308) = 5.51$, $p \leq 0.001$].

Figure 4. Over and Under Task Behavior for each Study Location in Success vs. Hardship Situations and in Individual vs. Group Situations.
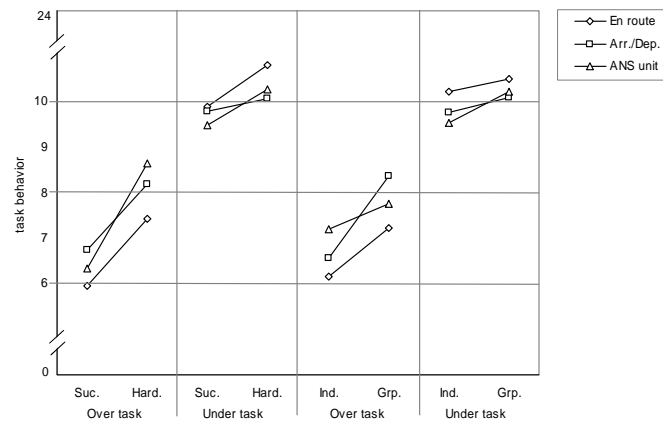

Table 5. Mean and standard deviation for over and under task behavior in Success and Hardship situations, and in Individual and Group situations at each study location and T-values for differences in over and under task behavior between the three study locations

Task behavior	Situation	M			SD			t-value		
		E.r.	A.d.	ANS	E. r.	A.d.	ANS	E.r. / A.d.	E.r. / ANS	A.d. / ANS
								df=208	df=205	df=199
Over	Suc.	5.94	6.74	6.34	3.69	3.97	3.97	-1.50	-0.75	0.70
	Hard.	7.44	8.20	8.64	3.82	4.21	4.78	-1.37	-2.01	-0.69
Under	Suc.	9.90	9.79	9.49	4.96	5.23	4.10	0.15	0.63	0.45
	Hard.	10.81	10.06	10.27	5.68	5.09	4.86	1.00	0.72	-0.30
Over	Ind.	6.17	6.56	7.21	3.34	3.90	3.72	-0.78	-2.13	-1.22
	Grp.	7.21	8.37	7.77	3.87	4.16	4.82	-2.09	-0.92	0.95
Under	Ind.	10.21	9.75	9.55	4.99	5.45	4.34	0.64	1.02	0.30
	Grp.	10.49	10.10	10.22	4.89	4.61	4.78	0.60	0.40	-0.19

Note. A.d. refers to Arrival-and-departure air traffic control center, E.r. refers to En route air traffic control center, ANS refers to Air Navigation Services unit.

When the three study locations were compared concerning over and under task behavior in different situations, no statistically significant differences appeared, according to Table 5.

DISCUSSION

According to Hypotheses Ia and Ib, it was assumed that the leadership style adaptability, leadership style profiles, and over and under task behavior should differ in Group or Individual situations, and in situations characterized by Success or Hardship. The results gave strong support for these hypotheses. The results indicated that the frequency of leadership styles in use were statistically significantly different among all situations, and the leadership style adaptability was assessed as superior in Success and Individual situations compared with Hardship and Group situations. The same pattern holds true for over and under task behavior, which both were statistically less frequent in Success situations, compared with Hardship situations. In Individual situations over task behavior was also less frequent than in Group situations. Further support for Hypothesis I was found in the overall results, which showed that the two most seldom-used leadership styles were S1—high task/low relationship behavior, and S4—low relationship/low task behavior. For Success and Group situations, the overall most frequently used leadership style was S3—high relationship/low task behavior, and the second most frequently-used was S2—high task/high relationship behavior. In Hardship and Individual situations, the most frequent leadership style used was S2—high task/high relationship behavior, and the second most frequently-used was S3—high relationship/low task behavior. This indicates that the leadership was more relationship-oriented and supportive in Success situations and Group situations and more task oriented in Individual situations and in Hardship situations.

It was further assumed according to Hypothesis II, that the leadership style profiles should differ between the two ATCCs because of different leadership structures and operational conditions. This hypothesis was not supported, since only one significant difference was found between these two study locations. When the en route ATCC was compared with the ANS unit, according to Hypothesis III, four statistically significant differences appeared. At the ANS unit the leadership style S—high task/low relationship behavior, was assessed as more frequent in Hardship and Group situations, compared with the en route ATCC. The leadership style S2—high task/high relationship behavior, in Individual situations, was further assessed as more frequently used by the staff at the ANS unit. On the other hand, the en route ATCC assessed the leadership style S3—high relationship/low task behavior, as more used by the leaders than the ANS unit did. Even though some differences appeared, no obvious pattern emerged that clearly

distinguished these two units from each other. Since these analyses further included a large number of comparisons, there is a possibility that some statistically significant differences are due to chance. In the comparison between the arrival-and-departure ATCC, and the ANS unit, no differences were statistically significant. Thus, these results did not unequivocally support the assumption that the leadership behavior at the three units differed in a systematic way. Instead, the leadership style profiles were similar at the three units as Figure 2 shows. Therefore, we conclude that the air traffic control work and the air traffic management have a stronger effect on the leadership style than differences in the leadership conditions and work tasks, for the three organizations reviewed by this study.

The leadership style S3—high relationship/low task behavior, which was most frequently used in Success and Group situations, is referred to as a participative leadership style by Hersey, Blanchard & Johnson (2006). Participative leadership is known from other studies to generate a favorable climate among the staff, characterized by less interpersonal conflicts and better cooperative relationships (Oklander & Fleishman, 1964), which is positive for the psychosocial work environment. A supportive leadership style can further act as a buffer for reducing work-related stress according to Bakker et al. (2000). Since no strong support was found for Hypothesis II or Hypothesis III, a supportive leadership style seems to be promoted by the leaders at all units in Group and in Success situations. It is probably easier for a leader to release control and task-oriented behavior in a favorable situation, and give more responsibility to a group of followers than to a single individual. The results give further support for this view since the leadership was assessed as more task-oriented in Individual situations and in Hardship situations. Even though a supportive and participative leadership can be favorable for the psychosocial work environment, a task-oriented leadership is sometimes suitable and assigning tasks, specifying procedures, and clarifying expectations can, according to Gray-Toft & Anderson (1985), result in reduced role ambiguity and increased job satisfaction. The key is to adjust the leadership to fit the current situation and the maturity level among the followers.

The ability to do so seems to be dependent on the situation, according to the present results. As mentioned previously, the leadership style adaptability was statistically significantly more accurate in Success and Individual situations than in Hardship and Group situations. The leadership adaptation process seems, therefore, to be more complex when facing a group, and in situations where problems are present in the environment. According to Hypothesis IV, the leadership style adaptability was assumed to be more efficient among the department managers at the ANS unit and TMs at the arrival-and-departure ATCC compared with the TMs at the en route ATCC. This was because the department managers at the ANS unit

constantly practice leadership and the TMs at the arrival-and-departure ATCC have an air traffic control operative management function that the TMs at the en route ATCC do not have. The results did not indicate that this should be the case, however. No differences between the three units were statistically significant, which implies that the leadership style adaptability was not affected by the different leadership conditions or the amount of leadership conducted. This might be somewhat surprising, but the administrative character of air traffic control work could, as previously mentioned, have an impact on the leadership practice. Since most of the activities in air traffic control involve great risks, the work is performed within a strict regulatory framework with standardized routines. The leadership actions could therefore be affected by the extensively standardized work environment and administrative procedures since the leader have no impact on the regulatory framework. The space that will allow leadership adaptation is limited, at least in the operative work. In addition, the air traffic controllers are well-trained and confident in their profession. No one knows better than them how to control the air traffic within their current sector. The leader has not the same overview or situational awareness concerning the current traffic as the air traffic controller. In that sense, the air traffic controllers are extremely mature in relation to their work tasks and current air traffic situation, whereby leadership adaptation becomes almost irrelevant.

As mentioned previously, the most seldom practiced leadership style was S1—high task/low relationship behavior, which implies that the amount of task-oriented leadership was limited. The assessment of over and under task behavior gave further support for this view since the occurrence of under task behavior was statistically significant more often in all situations measured. Since for safety reasons, air traffic control work is conducted within a strict framework of rules and regulations, a more task-oriented behavior could be expected. Even if the evidence on exactly how leadership influences organizational safety is less clear, it is apparent that psychologists attempting to measure safety culture believe that managerial actions and their commitment to safety are core components in the safety culture (Flin, 2003). Past research by Zohar (2002) implies that a leadership behavior that closely monitors workers' safety-related behavior can significantly improve the organizational safety. Despite this, the positive safety culture assessed in the Swedish ANS does not seem to be affected by the lack of task oriented leadership style among the TMs. A close monitoring of the safety work does not, however, necessarily contradict a more relationship-oriented leadership style. As mentioned previously, the air traffic controllers are further well trained and thereby mature in relation to their work, whereby no task oriented leadership is needed.

It was further assumed, according to Hypothesis V, that the department managers at the ANS unit and the TMs at the arrival-and-departure ATCC should practice less over and under task behavior, compared with the TMs at the en route ATCC, since this behavior is related to the leadership adaptability. The results gave no support for this hypothesis, however. Since no differences were found in the leadership style adaptability this result might not be surprising.

The results from this study describe the situational leadership as rather homogenous over the three study locations despite differences in the leadership conditions. It is therefore assumed that the characteristics of air traffic control had a greater impact on the leadership performance than local differences in the organization. Large differences existed, on the other hand, between different types of leadership situations, with more accurate leadership adaptability in Success and Individual situations and a more supportive and relationship-oriented leadership in Success and Group situations.

Even if past research has shown that the safety culture and the psychosocial work environment in many aspects are dependent on the leadership performance, it is hard to know whether, and in what way, the leadership described in this study has contributed to the overall positive safety culture and psychosocial work environment that exists in the Swedish ANS (Ek et al., 2002; Arvidsson et al., 2003). Thus, more research is needed to study the linkage between specific leadership styles and safety-related organizational aspects and working environment in air traffic control.

The extent to which the results can be applied to other industries or settings is also an issue that needs to be considered. There are many characteristics in this environment that does not apply to other business environments, for example, the regulatory framework, standardized work procedures, etc. Air traffic control shares, in addition, certain conditions with other highly regulated environments that are automated and include significant risk factors. Therefore, some of the knowledge gained in these studies may be valuable also outside the area of air traffic control.

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APPENDIX

Example of LEAD question

Situation

The project group that your leader is supervising has come to a dead end. The group has misunderstood parts of the project definition and puts the blame on poor briefing. Meetings are used for pseudo-activities.

Alternative actions

A.   Your leader gathers the group and ensures that everybody who has any views is allowed to speak his mind. Your leader responds to misapprehensions, supports realistic proposals and shares her or his experience.

B.   At a meeting your leader makes a point of bringing out the group's own resources for solving the problems.

C.   Your leader collects the group as soon as possible and finds out what has gone wrong. He or she clarifies the project description until convinced that everyone has understood.

D.   Your leader helps the group to understand why the group has got into trouble and supports their own way of grappling with the problems.