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Group Cohesion and Soldiers' Behavior in a Simulated Combat Situation Empirical Results from two Infantry Platoons

1. Background of the study

The Training Department of the Finnish Defence Staff (Colonel Erkki Nordberg) organized in 1997 a research project to study small unit combat at the grass-root level. Several Defence Forces' units and institutions took part in the project, which was completed in 1999 (see Haavisto & al. 1999). The research project included a field test, the aim of which was to explore what happens during an infantry squad attack at the grass-root level.

One part of the field test was the measurement of cohesion in the squad and an attempt to study its relation to soldiers' behavior during attack.

The whole research project with its field test was cross-disciplinary, involving of-ficers (specialists on small unit tactics, weapons, laser simulators), military psycholo-gists, military sociologists, medical personnel and specialists on sports medicine.

The overall plan of the field test was as follows:

1. A normal infantry platoon (conscripts) attacks against an enemy squad. Next day another platoon repeats the same procedure (identical starting situation: same terrain, same enemy, identical tactical situation).
2. The attacking platoon and the enemy squad start in a prearranged tactical situa-tion, but after that they are free to act as they choose.
3. The observation group is the first squad of each attacking platoon on two suc-cessive days.
4. Empirical cross-disciplinary data is gathered on two successive days before, during and after the attack.

The empirical data was gathered using the following methods:
before the simulated attack:

- sociometric measurement
- motivation, attitude and group structure survey
- medical measurement

during the simulated attack:

- the behavior of each of the seven members of the observation group (squad) was videotaped at close range during the whole simulated attack (on each day, the squad was videotaped with eight video cameras, one for each squad member and one for overall picture)
- at the same time all verbal and nonverbal communication was taped by video and audio recorders (small auxiliary microphones were attached to squad leaders)
- data about the use of weapons was gathered by BT 46 B laser simulation equipment attached to assault rifles, light machine guns and web belts (data about who fired at what exact time, who was hit by whom at what time) (it was the first time these soldiers used laser simulators; soldiers were equipped and weapons were loaded with normal daily amount of blank cartridges)
- laser simulators were attached to the weapons of the whole platoon and the enemy squad, not only to those of the observation group, and data was gathered from all simulators
- heart rate measurement devices (Polar Vantage and EKG equipment) were attached to squad members
- at certain points during the attack the action was "frozen" for a few of minutes for short medical measurements by nurses, situation awareness questions by officers and NASA Task Load Index measurement (measurement of mental and physiological stress)
- researchers followed the attacking squad at close range making observations
- officers followed the squad at close range observing the use of weapons, use of terrain, small unit tactics, leadership and marking the movement of the squad (incl. time) on the map

after the simulated attack:

- medical measurement
- interviews
- additional squad leader interviews, where squad leaders were shown parts of their own action on videotape and asked to explain their decisions at certain crucial points

Although the field test was cross-disciplinary, only some results of the cohesion part of it are reported here.

2. Research problems

Research problems concerning group cohesion in the field test described above were the following:

1. How did the observed squads and platoons differ as to their sociometric structure and cohesion?
2. What kind of informal groupings (cliques, sociometric pairs etc.) were found inside platoons and squads?
3. Was there any relation between the sociometric structure of the squad and the behavior of squad members during the attack?

3. Methods

3.1. Sociometric measurement

Each platoon member answered to four sociometric questions:

1. Who are your best buddies in your platoon? You can choose one or more persons from your squad or from your platoon.
2. If you were in real battle, which person would you choose as your mate? (You cannot choose more than three people.)
3. Whom would you choose a leader, if no one had been nominated as a leader? (it is possible to choose also your present squad leader; answer to this question even if you are a squad leader yourself)
4. Which six persons would you choose into your squad in a battle situation?

Before the sociometric measurement the soldiers were shown an educational video about modern battlefield, after which an officer described them the features of infantry battle. They were then asked to think how it would feel to be in a real combat situation. The platoon members answered to sociometric questions by writing the names of the persons they chose on paper.

3.2. Group member survey

Each platoon member also filled out two questionnaires. The first was a shortened version (25 questions, in Finnish) of the so called "Combat Platoon Cohesion Questionnaire" (Siebold & Kelly 1998). The second questionnaire which was constructed by the researchers, had 60 questions about group membership and cohesion. The survey data from these questionnaires is not analyzed in this paper.

3.3. Video and audio recording

The behavior of each squad member was videotaped through the whole attack. The research team tried to record on video or audio all verbal and nonverbal communication in the group. The result was tens of hours of videotape and audiotape. Heini Hult spent several weeks running the videotapes many times over with headphones and wrote down all verbal and nonverbal communication as completely as possible.

3.4. Observation in the field

Researchers (authors of this article and officers) followed the attacking squad at close range making observations.

3.5. After-action interviews

After the action researchers interviewed the squad leader and 2–3 squad members. The interviews were taped. The training instructors of the squads (officers) were also interviewed to get information about the background of the squads.

3.6. Reconstruction of events

The researchers wanted to build a detailed picture of what happened during the attack (where squad members moved, how they communicated, how they fired, casualties, situation awareness and so on).

Video cameras which were used to tape squad leaders generated time code that was synchronized with the time code of the BT 46 B assault rifle laser simulator equipment and heart rate measurement equipment at the beginning of the field test. In reality all time codes in the videotaped data were not completely synchronized (due to failing batteries, human mistakes etc.) and a lot of detective work was needed.

The communication from video and audio tapes was transferred to written form. Each video tape showed only one squad member's very limited view (very often literally at the grass-root level with the visibility of, for instance, five meters). It was necessary to run the tapes over many times to reconstruct the sequence of events and communication in the squad. By analyzing the videos Hult was able to write down the time-coded conversations between squad leader and squad members.

In the reconstruction attempt, other kind of data from other types of data gathering methods in the field test were added to videotaped and audiotape data, for instance data about:

- the use of weapons (laser simulator equipment data about who fired who at which time, who was hit by whom, number of shots per soldier/group/platoon, and the use of hand grenades as observed by officers)
- use of terrain
- analysis of leader's tactical and other orders, decisions and leader behavior
- situation awareness (as measured by situation awareness interview during "freezing")
- stress (as measured by NASA Task Load Index during "freezing").

4. Results

4.1. Sociometric structure and cohesion

The formal organization of the observation group (1st squad) before the attack was the squad leader and three pairs of soldiers (soldiers 47 and 48, soldiers 45 and 46 and soldiers 49 and 51). Soldier (corporal) 48 was also nominally vice squad leader. According to the Finnish field manual (1999) a soldier usually fights together with his pair (another covers when the other moves etc.), so there are no fire teams like in the U.S. infantry squad. 48 had a light machine gun, others carried assault rifles.

The results (sociograms) from the first squad of the platoon, which is the observation group, showed that in the 1st squad there was a three-man clique (squad members 45, 46 and 49) connected to each other with reciprocal choices. Two men (47 and 51) received and gave no choices, they were "outsiders". Soldier 48 chose two persons from the three-man clique, but these did not reciprocate the choice. No one chose squad leader (44) as his friend, but he chose 49, who was a member of that 3-man clique.

Results from the question "Whom would you choose a leader, if no one had been nominated as a leader?" produced the following results. No one from 1st squad had chosen the real squad leader 44 as a leader in a combat situation. The squad members did not trust their leader. In the 1st squad soldier 46 from the three-man clique had received three leader choices. So 46 was at least a potential informal leader in the squad.

It was interesting to note that 48, who had received no friendship choices, had received three choices as a leader in a combat situation. So it was possible to be both "not liked" and "a good combat leader" at the same time.

These results led to the following cross-tabulations. All members of the whole platoon were given points based on the choices that they received on three sociometric questions:

1. Who are your best buddies in your platoon?
2. If you were in real battle, which person would you choose as your mate?
3. Which six persons would you choose into your squad in a battle situation?

Each soldier was first given one point for one choice on the first question. Then each was given one point for one choice on the second and third question. After this the two dimensions (points from question one vs. points from questions 2 and 3) were cross-tabulated (table 1). Naturally the results depend on the break points on the two scales.

Table 1. The classification of platoon members based on three sociometric questions

	Chosen as a friend	Not chosen as a friend
Chosen as combat squad member	45, 46, 49 from 1st sq. and eight men from other squads	48 from 1st sq. and three men from other squads
Not chosen as combat team member		44 (squad leader/1st sq.), 47, 51 from 1st sq. and three men from other squads

It was interesting to note that there was a strong correlation between friendship choices and choices that were based on evaluations about soldier's capability in combat situation. If a man was not thought to be at least a relatively good fighter (or a good combat leader), he was not a good friend. But it was **not** vice the versa: a soldier **could** be good fighter or a good combat leader while not a good friend. (These results point to the difference between affective and informal cohesion.)

Sociometric data from 2nd squad showed that in the 2nd squad there was also a 3-man clique and also one pair. No one was outsider. The squad leader received one friendship choice and four choices as a leader in a combat situation.

Table 2. Buddy choices inside and outside own squad in the two platoons (in parentheses reciprocal choices)

	First Platoon			Second Platoon		
	1st sq.	2nd sq.	3rd sq.	1st sq.	2nd sq.	3rd sq.
Choices inside own sq.	9 (3)	14 (4)	26 (7)	6 (2)	9 (1)	16 (6)
Choices outside own sq.	5 (1)	7 (2)	3 (0)	12 (6)	22 (11)	16 (13)
Squad size	7	7	7	7	9	9

Table 3. Buddy choices inside and outside own squad in the two platoons in percentages

	First Platoon			Second Platoon		
	1st sq.	2nd sq.	3rd sq.	1st sq.	2nd sq.	3rd sq.
Choices inside own sq.	64%	66%	90%	34%	29%	50%
Choices outside own sq.	36%	34%	10%	66%	71%	50%
	100%	199%	100%	100%	100%	100%

On the bases of these tables the buddy choices can be compared in the following way.

Table 4. Buddy choices in platoons inside vs. outside own squad (in parentheses results without drivers in two squads of the second platoon)

	First Platoon	Second Platoon
Inside own sq.	77%	38% (39%)
Outside own sq.	23%	62% (61%)
Sum of choices	100% (n=64)	100% (n=81)

From table 4 it appears that in the first platoon the choices were mostly directed inside own squad, in the second platoon they were more evenly distributed along the whole platoon.

There are several cohesion indices. One index shows the number of reciprocal choices divided by the number of all theoretically possible choices (table 5).

Table 5. Squad cohesion indices

	1st sq.	2nd sq.	3rd sq.
First platoon.	0,14	0,19	0,33
Second platoon	0,1	0,03	0,17

The most cohesive of the squads was the 3rd squad of the first platoon, which is also obvious from the sociogram.

4.2. Sociometric structure of the squad versus the behavior of squad members

4.2.1. First day

The tactical situation in the simulated squad/platoon attack was as follows. Enemy has moved troops to the area. One infantry company has orders to attack the enemy. Two platoons of the company are moving directly towards the enemy force. One platoon, including the observation group (squad) is ordered to cover the flank of the company.

Company commander has ordered the platoon leader to advance towards a crossroads and to hold the area. An enemy squad is reported on a hill governing the crossroads. Platoon leader receives orders to attack the enemy squad, move to the crossroads and to hold that area. Company commander informs the platoon leader about an artillery and mortar strike at enemy positions at a given time. After that the platoon has no indirect fire at its disposal.

The results of the sociometric measurement in the first day / first platoon showed that:

- members of the 1st squad did not select their formal leader when they were asked to select a leader for a combat situation, vertical cohesion (both affective and instrumental) seemed to be low (see table 1)
- there was a three-man clique in the squad (soldiers 45, 46, 49)
- one of the members of the clique, 46, was a potential informal leader
- soldier 48, the vice squad leader, was not selected as a buddy but he was thought to be a good combat leader (see table 1)
- two soldiers were “outsiders”–
- there were informal buddy choices between 1st and 2nd squad

The following reconstruction of events during both of the simulated squad attacks (which are not completely reported in section 4.2.) is very deficient and contains a lot of black holes and a lot of sheer guessing. Same goes for all interpretations based on it.

Soldiers 45 and 46 were a formal combat pair, soldiers 45, 46 and 49 formed an informal buddy group. At the beginning of the attack the squad leader broke the formal combat pair by ordering 46 and 49 to be point men.

When the squad tried to advance towards the point of assault tension begins to grow between the squad leader and others. The squad loses the right direction, the squad leader is not able to lead the squad to the point of assault.

The point men 46 and 49 communicate a lot with each other, with the squad leader and with 45, the third member of the buddy team. There is tension and quarrelling in the squad. 46 and 49, communicating with 45, seem to try to seek orders and advice directly from the platoon leader.

Soldiers 47 and 48, who are not members of the buddy team, are left relatively “outside”, although 48 is a corporal and nominally the vice squad leader.

Soldier 46, the potential informal leader, leaves the squad to advance to the point of assault without the squad leader’s order. He is afterwards joined by his former formal combat pair and buddy team member 45. Before this they were spatially separated, as the squad leader had broken the formal combat pair. Together they start to fight at the point of assault with men from the 2nd squad. From videotape it seems that 45 and 46 have no trouble in merging with the 2nd squad. (The sociograms show buddy choices between 1st and 2nd squad).

The squad leader of the 2nd squad and the vice squad leader have been put out of action by laser simulator hits earlier. While the platoon leader is busy helping the 1st squad to reach the point of assault it would seem that the rest of the 2nd squad, assisted by 45 and 46 from the 1st squad, fights at least part of the time without a formal leader. (??) But the platoon leader apparently tries to oscillate between both squads.

With platoon leader’s help the 1st squad finally reaches the point of assault, where 45 and 46 have already been fighting with 2nd squad. The squad leader does not make fast decisions but wants to rely on the platoon leader. The point man 49 leaves, perhaps (??) to join his buddy team mates 45 and 46 or his formal combat pair 48. The squad leader is put out of action by a laser simulator hit. The vice squad leader 48 begins to lead the squad. The enemy is withdrawing even before the 1st squad reaches the point of assault.

1st and 2nd squad fire at the retreating enemy. The vice squad leader and, in effect, the platoon leader leads the rest of the men to the crossroads, which was the objective. The platoon thus finally succeeds in doing what it was ordered to do.

4.2.2. Second day

The sociometric data from the second platoon (the platoon which attacked in the second day) includes the following results:

- the cohesion was more evenly distributed over the platoon than was the case with the first platoon (see tables 2, 3, 4)
- there was very high vertical cohesion between the squad leader of the 1st squad and the squad members

Not even a partial reconstruction of the second simulated platoon/squad attack is presented here. The squad advanced to the point of assault quite fast and there was relatively little verbal communication as the men used hand signs. When the squad had advanced to the point of assault, the squad leader was put out of action (laser simulator hit) almost immediately. The same happened to both the squad leader and the vice squad leader of the 2nd squad.

During the fighting at the point of assault the only formally nominated leader present was the vice squad leader of the 1st squad. The 3rd squad and the platoon leader were not present at the point of assault during the firefight, since the platoon leader had ordered the 3rd squad to give fire support from afar, and he was with 3rd squad.

The vice squad leader of the 1st squad begins to lead the remnants of the 1st and the 2nd squads. His leadership style is “democratic”, there is a lot of discussion. After many events they succeed in pushing the enemy out of the hill and advance to the crossroads, which was the objective. There they are finally joined by the platoon leader and the 3rd squad.

5. Discussion

About methods

Research problem 3 in the present study was as follows: Was there any relation between the sociometric structure of the squad and the behavior of squad members during the attack? The relation between group cohesion and soldiers’ performance and/or effectiveness has been the subject of many earlier studies¹The method in at least some earlier studies about the relation between cohesion and behavior/performance has often been something like the following. First some measures are established to measure cohesion, i.e. to find out, whether groups have low or high cohesion. Then some criteria and measures for the performance of the groups (or individual group members) would be established. After that cohesion measurement and a performance measurement would follow to find out, for instance, which groups had high and which had low scores in cohesion and performance. The results would then show whether there exists any correlation between cohesion measures and squad performance measures. (See for instance Yagil, 1995 and Alderks, 1992.)

¹ For instance Goodacre (1951, 1953), Berkowitz (1956), Siebold (1987), Alderks (1992) and Dana (1995). See also a review of relevant cohesion research literature: Oliver et. al. 1999.

Instead of this kind of fully quantitative method the researchers wanted to try a different approach to “dig deeper” into the dynamics between sociometric group structure and group members’ behavior in the field. To put it simply, the idea was to study the dependent variable, soldiers’ behavior during attack more comprehensively than in many other studies. This was done by collecting “qualitative” data in a systematic way and combining it with quantitative sociometric measurement. As for the dependent variable, the researchers wanted to find out which kind of *concrete behavior* took place during the different phases of the attack of the squad.² The relation between the sociometric structure of the group and this concrete behavior could then be analyzed, or so it was hoped. For instance, did the men who chose each other as buddies in sociometric measurement, thus forming a sociometric “clique”, communicate more during combat and did they fight well together as a team? Or did they, for instance, try to stay together even against orders? Or was there no visible relation at all?

The reconstruction of events, which was only partially reported above in section 4.2., despite the great amount of work it required, was very deficient and contained a lot of black holes and a lot of sheer guessing. Same goes naturally for all interpretations based on it. The reconstruction attempt showed the great complexity of the dynamics of infantry squad action at the grass-root level. Although infantry squad attack may seem relatively simple in a routine field exercise training situation with the training officers or NCO’s leading the action, observed in the field at close range in a situation where the conscript leaders had been given free hands to make decisions, the squad attack seemed very complex. The same impression stayed when the attack was later studied on videotape. Although the researchers had observed the attack at close range, only afterwards, after careful study of the available data, did it seem somewhat possible to try to build a somewhat detailed, but still very tentative picture of what had happened during the attack.

This kind of research is very time-consuming and the other negative feature was the small number of squads (only two) that could be studied, compared to, for instance, the 18 platoons and seven armor companies studied by Yagil in her group cohesion study (1995).

2 For instance, communication (when; what; to whom; how, for instance shouting, cursing, showing signs), movement (to which direction; how far; how fast, in what way, i.e. walking, running, creeping), co-operation (with whom, when, how), orders (to whom; what orders), discipline (obeying/disobeying orders), firing (at what time; at whom/what direction; with which result).

About results

Research problems 1–2 were relatively clear-cut and some empirical results have been presented above.

No detailed scientific answer could be given to research problem 3, which was about the relation between sociometric structure and soldiers' behavior during attack. The researchers could only partially describe the soldiers' behavior and point out some connections between the sociometric structure of the squad and the behavior of squad members. It can be argued, however, that the sociometric structure did have influence on soldiers' behavior.

Based on the available data the researchers formulated a tentative hypothesis that there should be both horizontal and vertical cohesion in a platoon and in the squads. If the formal leadership system is unable to function properly, the need for horizontal cohesion grows. The platoon may then have to rely partly on the informal organization ("safety net"). It may also be better if the horizontal cohesion is quite evenly distributed in the whole platoon. If parts of the platoon have to reorganize during the battle without formal leadership, this is probably easier to do if the men from different squads know and trust each other (other than own squad leaders included).

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