

ANALYZING THE IMPORTANCE OF INITIATIVE IN AN INFANTRY COMPANY'S BATTLE EXERCISE

Jari SORMUNEN*, Harri ESKELINEN**

* LTC, National Defence University, Finnish Defence Forces, Finland

** D.Sc., Lappeenranta University of Technology PL 20, 53850 Lappeenranta, Finland

The purpose of this paper is to present how to study tactical phenomena from battle space situation pictures to find out if real initiative leads to success in the battle. In this paper, numerical values are calculated to determine whether there is also a correlation between situational awareness and initiative. The results are verified based on battle space situation pictures. In addition, the analyses of distributions describing the variation in the soldiers' feelings of their own forces and the adversary having the initiative are used to support the results showing which fighting side has the initiative.

Key words: *military tactics, infantry, company, attack, initiative.*

1. BACKGROUND

The tactical basic research, "Success Factors of Company Attack" (SCA research), which was carried out in the Finnish Defence Forces (FDF) during the years 2004-2007 forms the empirical background of this paper. The SCA research was focused on analyzing different individual effects of the measured variables, which were selected from the areas of tactics, situational awareness, battle task load, human factors, background factors and battle outcome. During this research, 59 attacks conducted during battle exercises by infantry companies were analyzed. The research material used for this paper consists of 590 schematic and illustrated tactical maps to describe the situation and 118 event catalogues to describe the actions taken in the battle space. Also, 103 written reports and numerical values of 118 measured

tactical variables and perceptions of 130 observed factors were utilized to compose this paper. [1]

2. THE TACTICAL VIEWPOINT & THE APPLIED RESEARCH METHODS

In the literature dealing with tactics [2] in the FDF regulations and field manuals, e.g. Komppanian taisteluohje [3], KOTO, 2008, and Prikaatin taisteluohje, PRTO, 1984 [4], and in recent tactical research, Huttunen, 2010 [5], initiative is regarded to have an essential impact on the success of a battle. In the literature dealing with tactics, e.g. Kuusisto, 2004 [6], in the FDF regulations and field manuals, e.g. KOTO, 2008 and PRTO, 1984, and in tactical research, e.g. Lind, 1985 [7], Huttunen, 2010, situational awareness is also regarded to have an

essential impact on the success of a battle. The SCA research showed that the largest differences between the values of measured variables were found in the mean values of initiative in successful and unsuccessful attacks.

To be able to establish the size of the critical time windows for the analyzed tactical actions and to recognize initiative, observation points and verifiable time delays are needed for the battle space model. The first observation point is set at the battle engagement moment of the company. The second observation point is set at the start of the weapon effect. Two time intervals are determined, from background data, between these two observation points. The first time interval covers the time used by the leader to decide and order the actions. The second time interval covers the time used to perform the actions to start the weapon effect. The tactical analysis of initiative produces three types of information about the differences recognized between the initiatives of the infantry company and its adversary:

- Separated or individual actions indicating Initiative;
- Continuous flow of action indicating initiative;
- The feeling of having initiative.

The dependency of initiative on the fulfillment of the battle task and the suffered casualties is defined by establishing probability values of initiative and the corresponding casualty ratio at each measurement level. The next step is to calculate if the advantageous initiative indicates a positive progress of the casualty ratio with a high correlation.

The phenomenon of changes in initiative is studied based on the Battlespace Situation picture series (BSP) of successful and unsuccessful attacks. The investigation concerns whether the observations from the BSP together with the quantified results from the written reports support each other. The final step is to compare whether the real initiative led to success in the battle.

3. ANALYZED WRITTEN OBSERVATIONS

By quantifying the observations collected during the SCA research, three main results were achieved. Approximately 39% of observations dealt with such aspects as “initiative was taken”, “was kept”, “was developed” or any other “positive” phenomenon connected with initiative. A typical observation is “The attacker aimed to take and keep the initiative and succeeded well in this”. Roughly 41% of observations dealt with such aspects as “initiative was lost”, “was not utilized”, “was wasted” or any other “negative” phenomenon connected with initiative. A typical observation was “Now the initiative was given to the defender and the defender was able to stop the adversary’s attack with a small amount of soldiers”. In approximately 20% of observations, it could not be established which fighting side had the initiative. A typical observation is “The initiative alternates significantly between the yellow and blue side”.

4. ASPECTS DEALING WITH TIME AND TIMING

From the research material, seven types of timing dealing with battle situations of analyzed attacks can be found. In addition to this, the classification of the qualitative analysis produced five types of speeds which are relevant for analyzing different tactical phenomena connected with the time window.

Based on the results, the different types of timing are as follows:

- Type 1: Well-timed actions
- Type 2: Timing of situational evaluation (Well- timed evaluation)
- Type 3: Knowledge-based timing of actions (Acting in real-time)
- Type 4: Ineffectiveness in timing (Time is wasted on secondary actions)
- Type 5: Timing or time ratio dealing with trained and unexpected situations
- Type 6: Timing (time delays) of command and control chains
- Type 7: Timing of action of one's own force which is forced due to the adversary's actions.

The five types of speeds which are relevant for analyzing different tactical phenomena are as follows:

- Type 1: Absolute (max./min.) value of the action
- Type 2: Speed of the action combined with the surprise effect
- Type 3: Adjustable speed or flexible speed adjustment based on the battle situation
- Type 4: Tactical motion speed
- Type 5: Estimated speed for a maneuver or an action.

The evaluation criteria are constructed from the previous twelve items for analyzing aspects which deal with time, timing, the speed of actions and initiative.

The literature dealing with tactics contains qualitative results that support these observations. For example, Rekkedal (2006) [8] proposes a connection between the leader's initiative-taking and its effects on the timing aspects of a battle.

5. SOLDIERS' FEELING OF HAVING INITIATIVE

In the SCA research, soldiers' feelings of having initiative were measured through questionnaires and interviews. The results showed that the distributions of the results, which showed the soldiers on both fighting sides having feelings about initiative, partly overlapped, AF15339, Jakaumatarkastelut, 2009 [9]. It is therefore interesting to research if the quantified results from the qualitative analysis of the written reports from the SCA research support this finding of overlapping distributions.

In the background research, the soldiers of both fighting sides were asked to evaluate their own feelings about having initiative at each measurement level of an attack by making a mark at that point on a line, 100 millimetres long, indicating the strength of their feeling (see **Figure 1**). As a result of this measurement arrangement, quantified data was collected continuously. This way to produce quantified and scaled data made it possible to carry out the mathematical analysis dealing

with the soldiers' feelings about having initiative.

The NASA Task Load Index (NASA-TLX), presented originally by Hart and Staveland (1988) [10], is a subjective, multidimensional assessment tool that rates perceived workload on six different subscales: Mental Demand, Physical Demand, Temporal Demand, Performance, Effort, and Frustration. Based on the observations of one of the developers of NASA-TLX [11], the use of NASA-TLX has spread far beyond its original application area and focus for the past 20 years. In this paper, the measurement and analysis setup is applied to evaluate the level of "the feelings about having initiative".

Different types of instruments could be utilized for analyzing subjective human factors, e.g. vigilance under different workloads. For example Finomore et al. (2009) [12] have compared the output of the Multiple Resources Questionnaire (MRQ) and NASA-TLX in different task-types and operating environments. In this comparison, the MRQ indicated that the workload was greater when observers operated in a multi-task environment as compared to a single-task environment, a dimension to which the NASA-TLX was not sensitive. In this paper, the NASA-TLX principles for measuring subjective workload has been applied in the field of estimating "the feelings about having initiative", and therefore, all of the evaluation criteria of the original NASA-TLX method must be tuned. These types of restrictions must be understood when evaluating the observations presented in this paper.



Fig. 1. Measuring and quantifying the data dealing with the soldiers' feelings about having initiative.

For tactical analysis purposes, it is necessary to establish which fighting side has the initiative at each moment of the attack and how strong the initiative is. This is carried out by calculating the size of the overlapping area of the two distributions describing the variation in the soldiers' feelings about own forces' and adversary's taking the initiative. (see **Figure 2**). The probability that both sides feel they have the initiative is calculated.

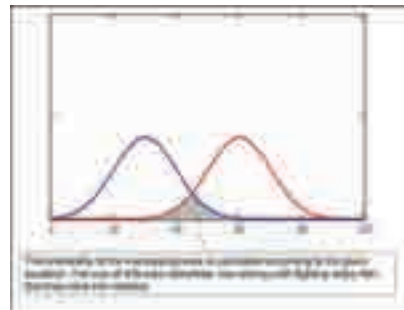


Fig. 2. The overlapping area of the two distributions describing the variation in the feeling of having the initiative.

The probability of the two fighting sides to have different opinions about having the initiative is calculated by applying the simple Equation 1.

$$z_p = \left| \frac{\mu_b - \mu_r}{\sqrt{\sigma_b^2 + \sigma_r^2}} \right|$$

where

- z_p = Normal distribution coefficient
- μ_b = Mean value (own side)
- μ_r = Mean value (adversary)
- σ_b = Standard deviation (own side)
- σ_r = Standard deviation (adversary).

According to the calculated results, on average, the calculated risk of a contradiction between who has the initiative is 2.1 to 2.7 times higher in unsuccessful attacks. In successful attacks, the correlation between the feeling of having the initiative and the casualty ratio is remarkable $|r|=0.694$. However, the coefficient of determination as a percentage is only 48%. Although the analyzed results of initiative indicate a remarkable difference between successful and unsuccessful attacks, these results only deal with the “feelings about having the initiative”. Therefore, more weight is given to the results gained from the BSP to find out how initiative affects the result of an attack. A practical case example is presented on a tactical map in **Figure 4**. Equation 1 is valid only when both distributions describing the feeling of the fighting sides' initiative follows a normal distribution curve. In this case, the normality of the analyzed curves has been checked both near the mean value (Kolmogorov- Smirnov) and at the ends of distribution curves (Anderson-Darling). If needed, the combination of normal distribution and Weibull distribution is available to calculate the probability of the overlapping area [13].

6. OBSERVATIONS FROM TACTICAL MAPS AND EVENT CATALOGUES

When recognizing and analyzing initiative, tactical maps and event catalogues play a key role. Items

to be recognized and their possible indicators are presented in Table 1. The principal flowchart (see **Figure 3**), which includes feedback loops to also check the right timing of each tactical action together with situation evaluation, success evaluations are therefore often used to illustrate tactical phenomena.

Relevance, importance, the right sequential order and timing of the followed items change constantly with the situation. The evaluation of these features is possible either relatively or qualitatively in a specified situation. This enables the expression of the differences between one's own forces and the adversary using the terms “more” or “less” and “faster” or “slower” corresponding to simplified values of “yes” and “no”.

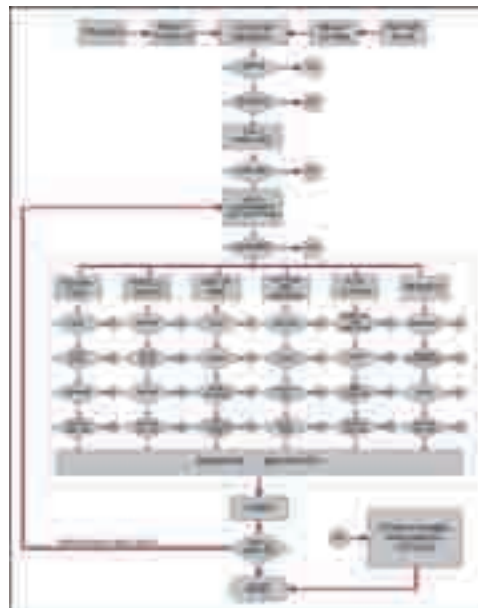


Fig. 3. Flowchart for analyzing attacks (notice also right timing of actions and situation evaluation).

Table no. 1. The list of items (i.e. dealing with initiative) to be recognized and their possible indicators.

Tactical phenomena	Tactical maps		Event catalogues	
	Item	Probable indicator	Item	Probable indicator
Changes in initiative	Readiness to manoeuvre	Positioning related to terrain and adversary	Readiness to manoeuvre	High/low
	Readiness to use fire	Positions of mortars, antitank and light weapons	Readiness to use fire	Sign/order Preparation Signal links
	Decision making	Action/no action Action according to decision	Decision making	Decision/no decision Content and pursuit
	Deception	Patrol/subunit manoeuvre Use of fire	Deception	Sign/order and timing Content and pursuit
	Manoeuvre	Battle pull	Manoeuvre	Sign/order
	Use of fire	Casualties	Use of fire	Timing
	Reserve	Subunit position	Reserve Order/sign	Subunit readiness

The case study exemplified on the map (see **Figure 4**) shows that initiative is recognized in the case of this battle based on the following criteria:

- The dotted lines show the trained, planned and prepared maneuvers of platoons or other reasonable elements, which are planned for use in fulfilling the battle task (“BEAT”).
- The tactical symbols show how the leader has planned to utilize trained, planned and prepared reconnaissance to support situation evaluation and

decision making. It is essential to notice that unlike in unsuccessful attacks, in this case the leader has used his initiative to carry out reconnaissance processes actively and early enough.

- The tactical symbol shows that the leader has shown his initiative in combining the plans of trained maneuvers with the timely and justified use of indirect fire.

By applying the previous flowchart model, it is possible even to calculate the number of observed

characteristics. The results show that the number of positive replies to the questions in the flowchart is on average 2.3 times higher in successful attacks.



Fig. 4. An analyzed example of how initiative had an effect on the leader's decision-making in the deployment area in one of the successful attacks.

7. CONCLUSIONS

This paper has shown that initiative is in a key role when analyzing the aspects affecting the success of an attack.

When discussing initiative, it was shown that an almost equal amount of positive and negative observations about having initiative were recorded. Approximately 39% of positive observations and approximately 41% of negative observations of initiative were directly connected with timing or a time window. This means that the reasons for either the failure or success of an attack are connected with initiative, and furthermore, with time and timing.

When comparing successful and unsuccessful attacks, the following main result was gained: The dominant phenomena causing failure are found from aspects dealing with initiative. On the other hand, the

main aspect which unfavorably affected the result of the attacks was that the leaders had lost their freedom of action by giving the initiative to the adversary, which made it impossible to affect the adversary in creative ways. In the literature dealing with tactics, these kinds of aspect have been emphasized (e.g. Liddell Hart, 1954) [14]. In addition to this, the leader's personal character has not been open to looking for new possibilities to take initiative. These types of aspects have also been noticed by Tynkkynen (1996) [15]. Hannah et al. (2010) [16] have identified the importance of the leader's character, but they integrate also the leader's skills, knowledge and competences with different types of roles which the leader might have in the battlefield.

The quantitative analysis conducted in this research has shown that there is a positive correlation between one's own strengthened initiative and an advantageous casualty ratio together with the fulfilled battle task. Based on the analyzed situational maps of different attacks, it has been shown in this paper how strongly the initiative of one's own force affects the success of an attack and how initiative or actions of initiative can be observed in the situational maps. According to the results, a larger number of observations of one's own initiative indicated better success in battle. In addition to these, the analyzed numerical values have indicated that leaders seem to have a strong "feeling of initiative" in successful attacks.

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