



Towards an Understanding of the Commander's "Coup d'Oeil". Part 2

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“...the *idea of a rapid and accurate decision* ... based on an evaluation of time and space, received a name that refers to visual estimates only. ...But soon it was also used of any sound decision taken in the midst of action—such as recognizing the right point of attack, etc. *Coup d’oeil* therefore refers not alone to the physical but, more commonly, to the inward eye. (Clausewitz, 1834/1989, p. 102, italics in original).



"Coup d'oeil" is a form of expertise

- Clausewitz reserved the term "coup d'oeil" for "military genius".
- Our hypothesis is that it is a form of expertise that results from military education and training
- It should therefore manifest itself in the same manner as other forms of expertise
- Consequently, we decided to apply a standard paradigm used by psychologists in the study of expertise

The Chase and Simon paradigm

- The paradigm was first used to study expertise in chess
- In experiments following this paradigm, the participants are first asked to study a chess board with a number of chess men. They are then asked to recall what they have just seen by placing chess men on an empty chess board
- Variants of this paradigm has been used to study expertise in at least 19 different fields of expertise
- The results are consistent across domains

Results with the Chase and Simon paradigm

- The results differ for experts and novices
- For *meaningful* materials (such as chess positions resulting from a real game) experts recall the positions better than novices
- For *meaningless* materials (such as a chess board with randomly placed chessmen) there is no or little difference in performance between experts and novices
- These results we managed to replicate in last year's ICCRTS paper, using military scenarios presented in maps as our test material with Army Majors as our experts and undergraduate students of political science as our novices
- Our conclusion was that officers have a kind of expertise that manifests itself in the same manner as expertise in other domains

Two explanations have been suggested

- *The pattern recognition hypothesis* (Chase & Simon)
 - Experts have learned and stored a large number of patterns and interpret and store the scenarios in terms of one of these patterns and use it to reproduce the scenario. This is only possible for the meaningful scenarios, hence the better performance for these scenarios for the experts that have learned these patterns
- *The detection of constraints hypothesis* (Vicente & Wang)
 - Experts learn to detect the constraints that characterize the domain (what is possible and not possible with military units) and use their knowledge of these constraints to reproduce the scenario as it must have been, guided by their interpretation of what the scenario is about. Such constraints are valid only for the meaningful scenarios, hence the better performance in these scenarios for the experts who have learned to detect them

Are the hypotheses really different?

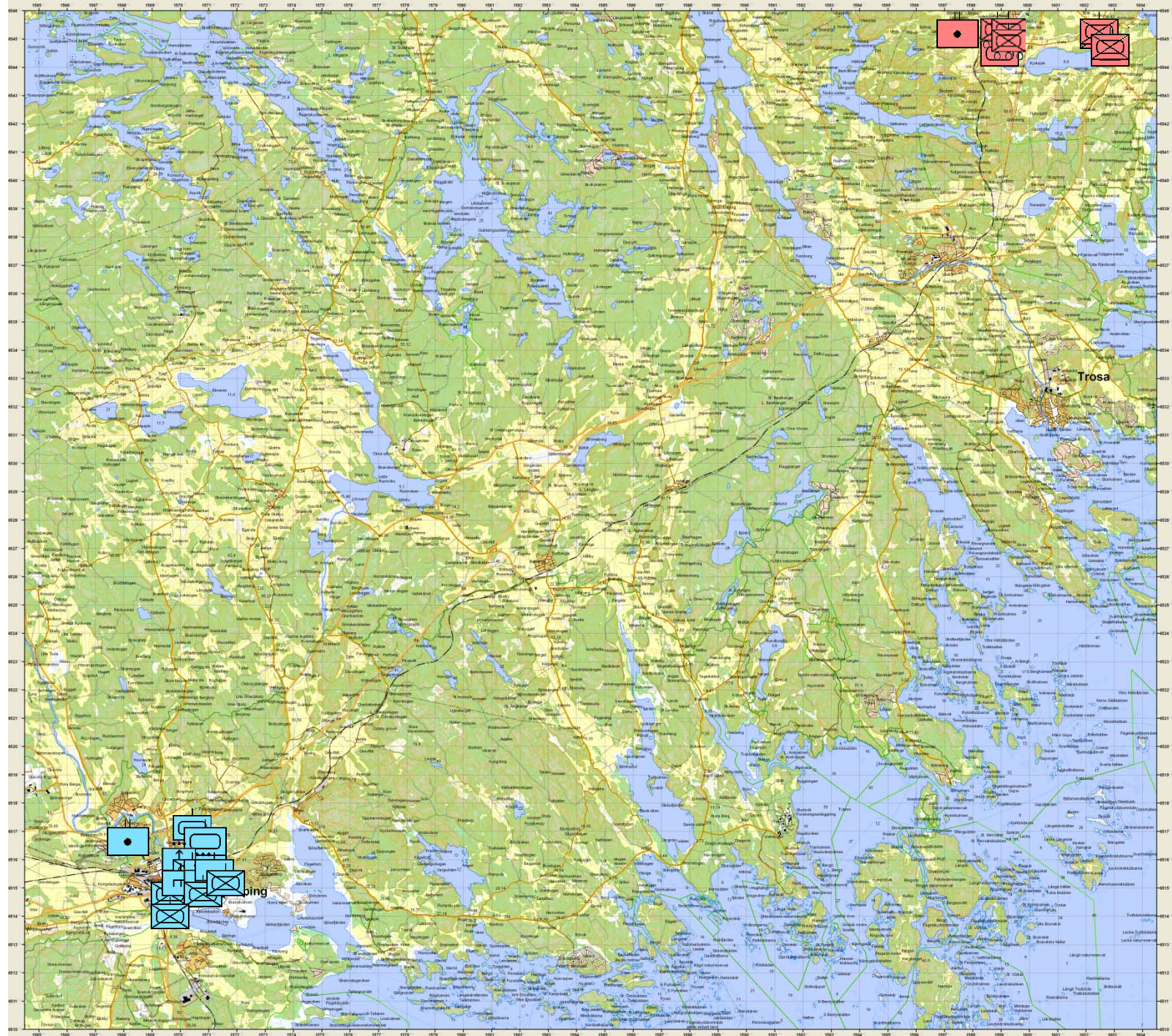
- Patterns exist only for the meaningful scenarios
- Only meaningful scenarios follow the constraints
- No patterns, no constraints and vice versa
- When only a "snap shot" of a scenario is shown it is not possible to distinguish between the two hypotheses

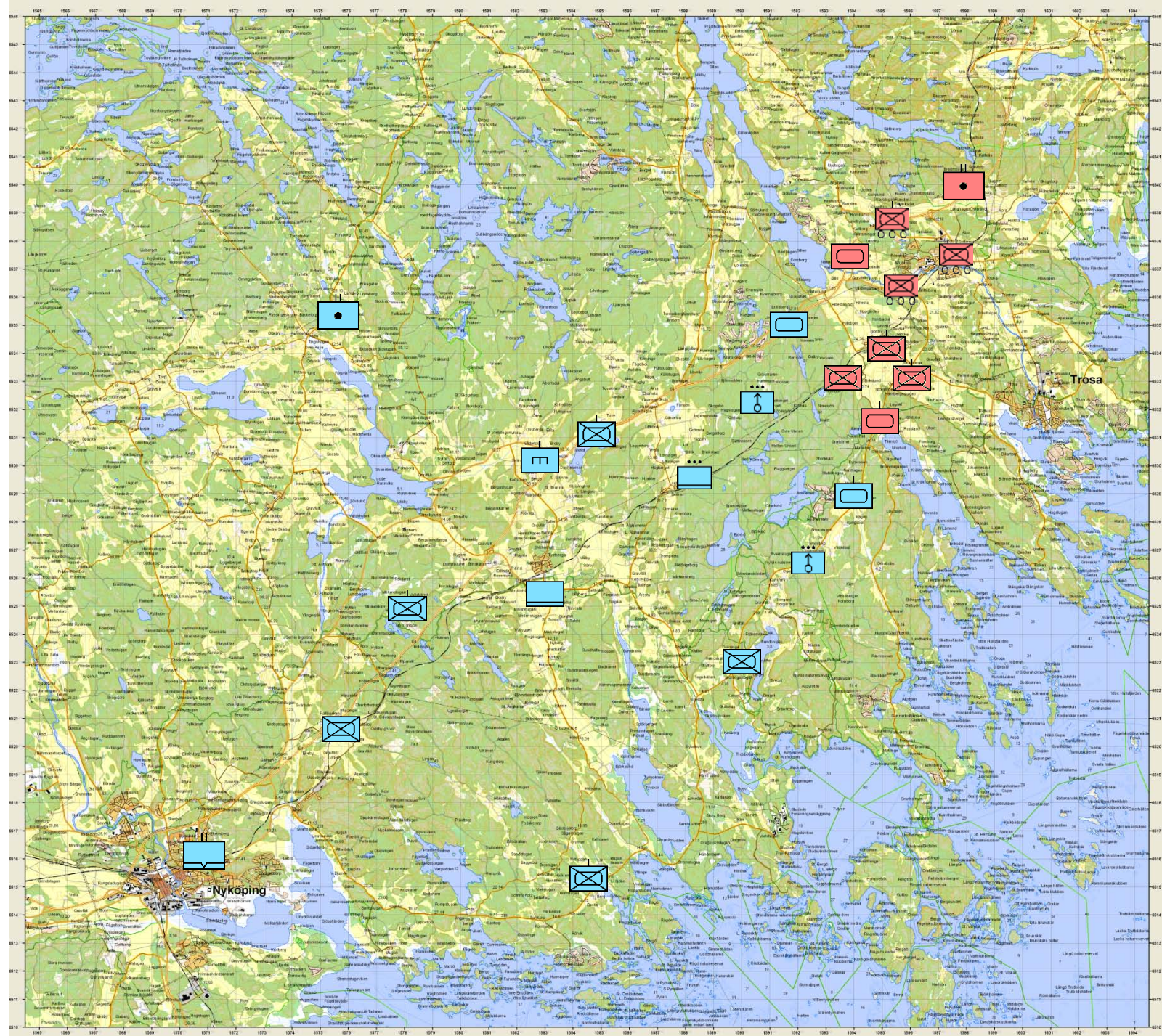
A possible method for distinguishing pattern and constraints recognition

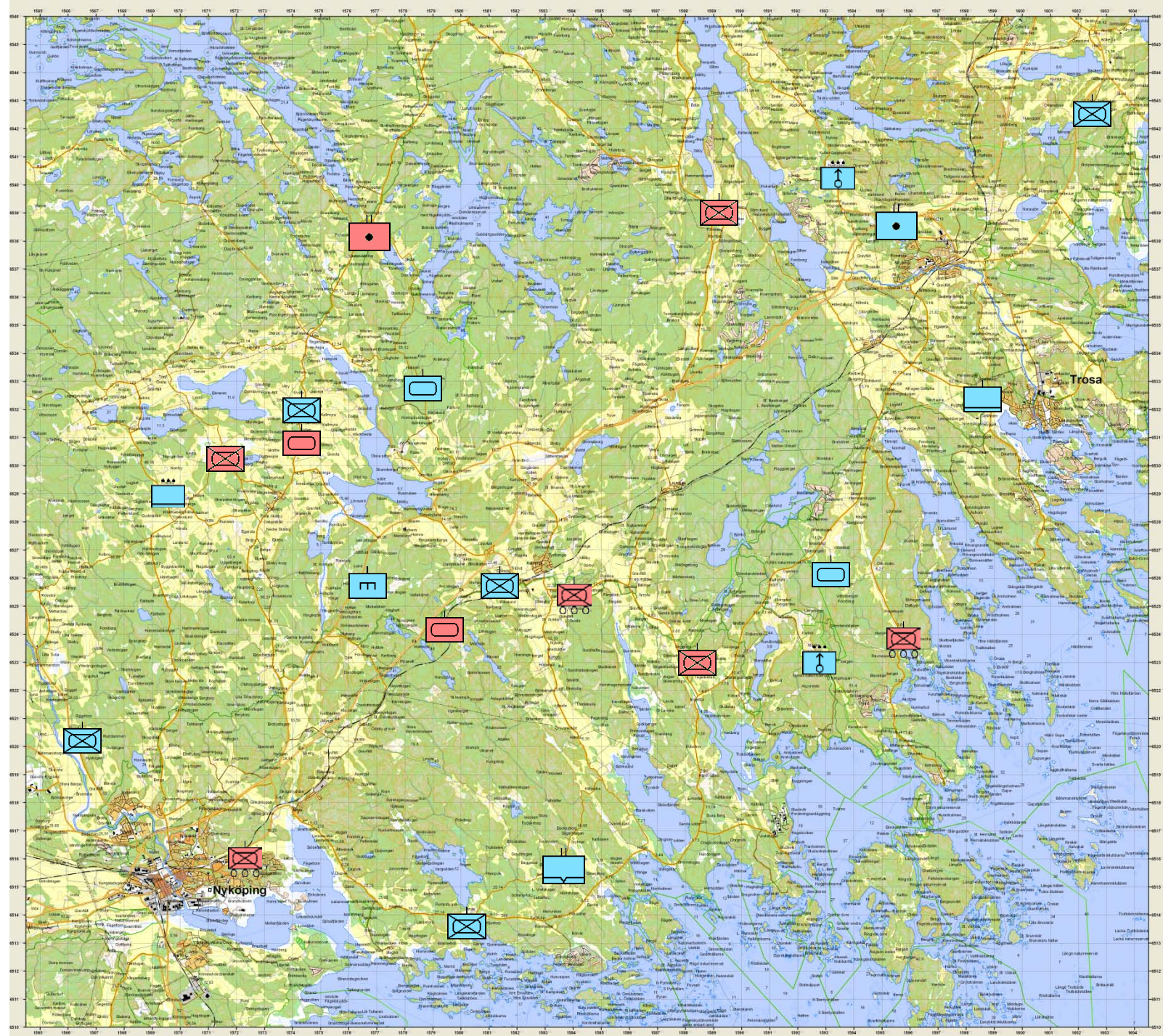
- *Dynamic* scenarios offer a possibility, for even though the "snap shot" of the final positions may not offer the information required, being shown *how the final positions are reached* by a process that violates or does not violate constraints would provide that information
- The first experiment is an attempt to test this conjecture.

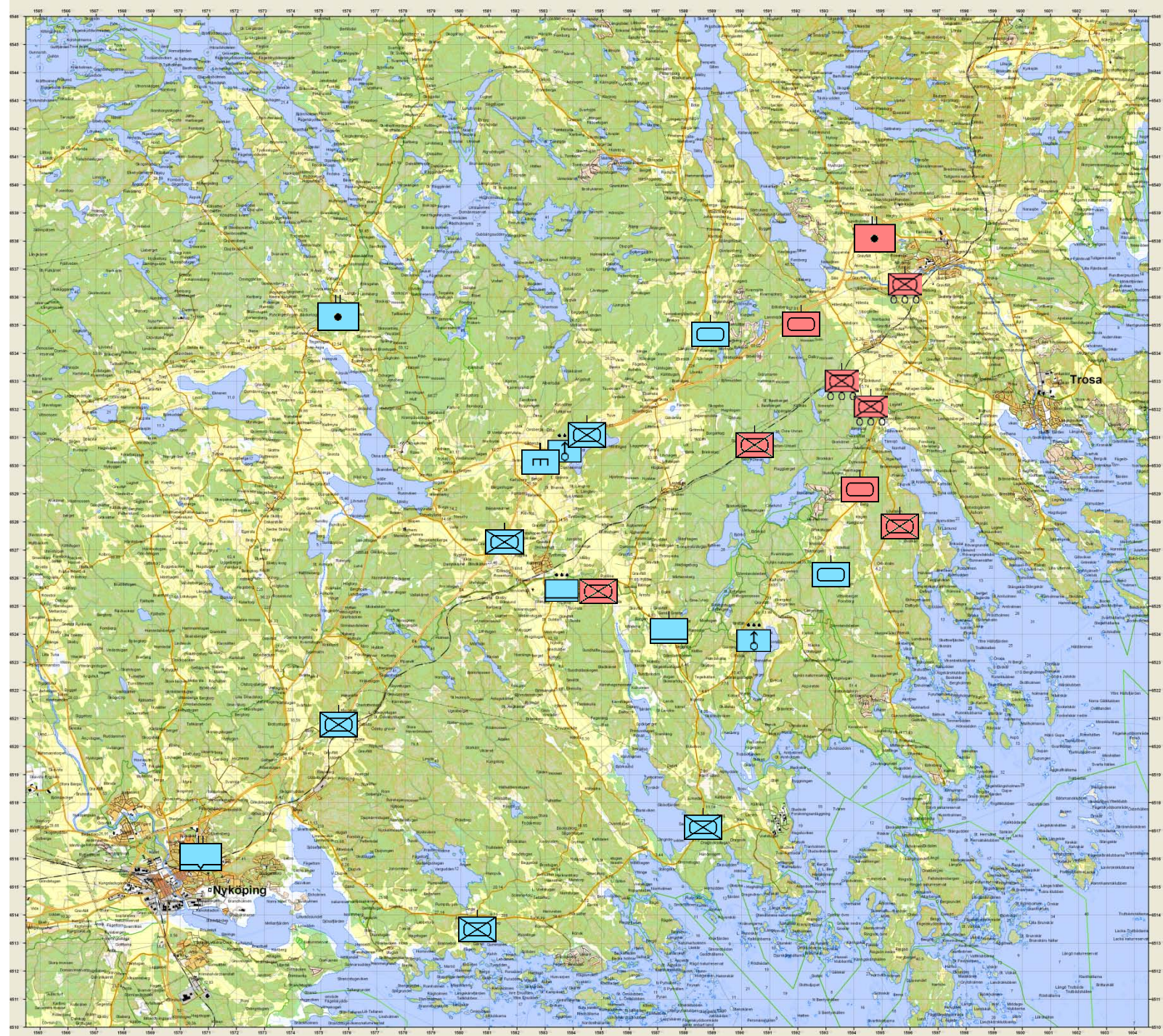
Experiment 1: Recall of the positions of military units when the participants have seen the scenario develop

- Participants were 18 Majors from the Higher Staff Course and 12 Lieutenant Colonels who were teachers in that course. They served as our experts. Novices were 30 undergraduate students of political science at our college
- All participants saw a military scenario develop for 2 min. twice on a screen in front of them.
- They were then asked to reproduce the final positions of the units
- For half of the participants in each condition, the units moved in a way violating military constraints and while for the other half, the units moved without doing so.

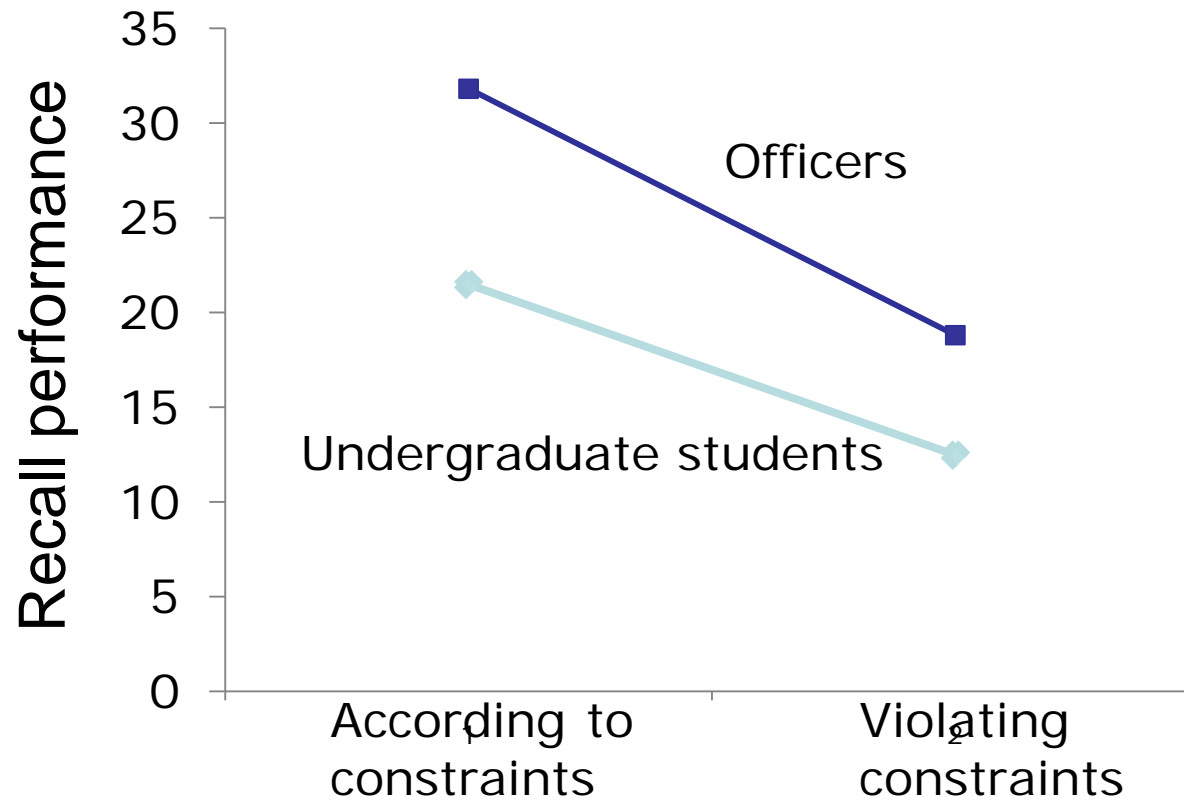








Constraints $F_{1/56} = 10.11, p < .01$
Expertise $F_{1/56} = 6.38, p < .02$



Results

- Both experts and novices gave the same general interpretation of the scenarios, but the interpretation by the experts was more detailed
- Experts outperform novices with respect to recall
- Experts and novices are affected by constraints violations in the same manner
- These results are not consistent with the pattern matching hypothesis even if the pattern are interpreted as movement patterns for novices have no experience of military units in motion

Experiments 2 and 3: Effect of time on interpretation of military scenarios by experts and novices

- In last year's experiments we found that both experts and novices gave the same general interpretation of the scenarios
- This may be because they were given a long time for inspecting the scenarios
- Clausewitz had said that given enough time, one would not have to be a military genius to interpret a scenario, but only a genius could do it with a "coup d'oeil"
- The purpose of Experiments 2 and 3 was to test this hypothesis

Experiments 2 and 3

- Participants in Experiment 2 were 24 undergraduate students of political science. In experiment 3, the participants were 16 Army Majors from the Higher Staff Course at our college
- In all conditions, participants were allowed to inspect a static military scenario and give their interpretation of that scenario
- In the Experiment 2, there were 3 conditions differing with respect to time for inspection: 5 min., 1 min. and 20 sec. In Experiment 3, there were two conditions 1 min. and 20 sec.
- Both experiments were done as between-groups experiments with 8 participants in each condition.
- All interpretation were scored by a Lieutenant Colonel from the Swedish Armed Forces warfare Center /who had also designed the scenarios)

Undergraduates $F_{2/21} = 3.54, p < .05$
Officers $t < 1.00$

| | | Interpretation score | |
|-----------------|--------|-------------------------|---------|
| Inspection time | 5 min. | 1 min. | 20 sec. |
| Officers | | 3.38 | 3.50 |
| Undergraduates | 3.63 | 3.25 | 1.13 |

Results

- The performance of novices is affected by the time for inspection, but that of experts is not (just as Clausewitz said)

Conclusions

- We have shown that officers have an expertise when it comes to handling military scenarios that manifests itself in the same way as that in other domains
- We have further shown that violation of constraints has a negative effect on both officers and novices
- In our view this result cannot be predicted from the pattern matching hypothesis and it strengthens the constraints hypothesis
- We have also shown that an officer's expertise is indeed an ability to pick up relevant information from a military scenario by a "coup d'oeil"
- A number of questions remain, the most important being for what kind of scenarios are they able to do this