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# Knowing What's Going on

## – situation awareness and team performance in interprofessional teams

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## Akademisk avhandling

som med vederbörligt tillstånd av Rektor vid Umeå universitet för avläggande av filosofie/medicine doktorsexamen framläggs till offentligt försvar i Aula Biologica, Biologihuset, fredagen den 29 januari, kl. 09:00. Avhandlingen kommer att försvaras på svenska.

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## Abstract
**Background** Within critical care, it is necessary to have an awareness of what is going on in order to be able to make the right decision at the right time. Situation awareness (SA) is a non-technical skill (NTS) that is important in stressful, complex environments such as the intensive care unit (ICU). Deficiencies in NTS are well known to impact performance and thereby cause adverse events. More knowledge about how background factors are associated to team performance and explore critical care team members experiences teamwork are of importance to develop models for improving teamwork. An educational intervention aiming to improve SA during critical events might be valuable to improve the performance of interprofessional teams. For this, instruments for assessment of SA and NTS are needed.

**Aim** The aim of this thesis was to test different instruments for measuring SA, team performance and task performance for feasibility and reliability; to investigate the relationship between team background characteristics, team performance and task performance; to evaluate an educational programme in SA for intensive care teams; and to explore team members' experience of teamwork.

**Methods** This thesis was based on data from 69 different video-recorded team training sessions with a simulator as a patient (studies I–III) and nine focus group interviews (Study IV). In Study I, the participants were 55 medical students, and the sessions took place at a clinical training centre. The participants in Study II ($n$=105) and III ($n$=75) were ICU staff members from two different hospitals, and the sessions took place *in situ* at the respective ICUs. In Study III, the participants were randomized into control or intervention group, where the intervention group received an educational intervention comprising lectures and reflective discussions. The control group only performed team training without lectures and reflective discussions. The training sessions were analysed with a focus on team and task performance using the TEAM instrument and the ABCDE checklist, respectively. In addition, a questionnaire (SAGAT) was used to assess individuals' SA (Study I and III). The data in Study I–III were quantitatively analysed. In Study IV, focus group interviews with staff members ($n$= 31) from the ICUs were analysed using qualitative content analysis.

**Results** The findings in Study I showed that SAGAT was feasible to use and that the inter-rater reliability for the ABCDE checklist and the TEAM instrument indicated sufficient stability. In Study II, higher *age* was associated with several aspects of good team performance such as teamwork, task management, team overall and total team. *Prior team training without video* was associated with better task performance, while *prior education in communication* was negatively associated with leadership. In Study III, the results demonstrated that the educational intervention improved the performance of the intervention group in the TEAM subscales of leadership and task management, as well as in the total score. In Study IV, the main finding presented as a theme was *balancing between knowledge and behaviour in teamwork*. The interviews revealed three categories of aspects that facilitate or act as barriers to teamwork: (1) having potential for excellence while coping with members who do not act as team players; (2) creating a safe atmosphere while working in an unknown environment and struggling to maintain one's positions; and (3) being in a workflow without becoming overwhelmed.

**Conclusions** By implementing an educational programme focusing on SA, different parts of interprofessional team performance could be improved. For optimal interprofessional teamwork in the ICU, both knowledge and behaviours were essential components. For the studies in this thesis, the different instruments used were both feasible and reliable. High age was related to good team and task performance, indicating that generic factors that is associated with age might influence team and task performance.

This thesis will probably contribute to a safer care of seriously ill patients at ICU.

## Keywords
Critical care, interprofessional education, leadership, learning, situation awareness, simulation-based team training, team performance, teamwork

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