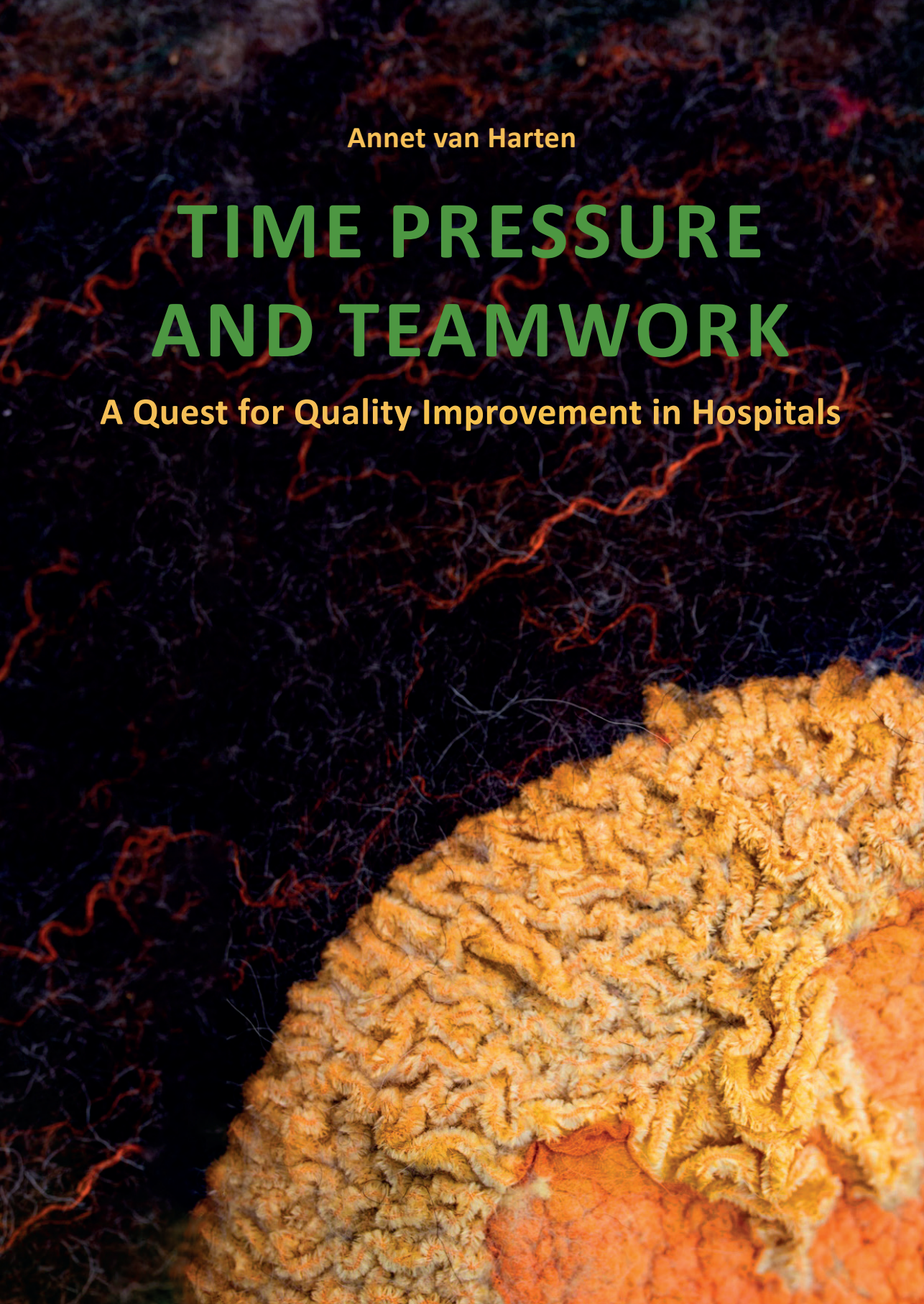
Time pressure and teamwork: a quest for quality improvement in hospitals

Harten, A. van

Annet van Harten

TIME PRESSURE AND TEAMWORK

A Quest for Quality Improvement in Hospitals



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A Quest for Quality Improvement in Hospitals

Annet van Harten

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Time Pressure and Teamwork

A Quest for Quality Improvement in Hospitals

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Illustration 1. Pade Crom ende Menich Foude

Voorwoord

“Dor dat donker van eenen woude

Quam hi gheloopen an eene woestine[1]

Daer Reinaert hadde de pade sine

Ghesleghen crom ende menich foude”

Uit: Van den Vos Reinaerde

“Dan wordt de woestijn een gaarde

En de gaarde gelijkt een woud

Dan woont het recht in de woestijn

En de gerechtigheid verblijft in de gaarde

Jesaja 32, vs 15 en 16

Dit proefschrift is een weerslag van mijn onderzoek naar de omgang met tijdsdruk in teams in ziekenhuizen, vanuit de aanname dat dit een sleutel is om te werken aan patiëntveiligheid. Tijdens mijn studie heb ik steeds aandacht besteed aan de complexiteit van de organisatie en de ambiguïteit in de samenwerking tussen zorgprofessionals. Ik ontdekte dat ervaren tijdsdruk onverwacht kan omslaan in een staat van flow, dat verstoringen vaak welkome afleidingen zijn en dat degenen die zich miskend voelen soms juist de meeste invloed uitoefenen. Ook heb ik regelmatig zelf geworsteld met de complexiteit en ambiguïteit in het onderzoek naar teams en hun omgang met tijdsdruk. De diverse perspectieven voor het genereren en interpreteren van data droegen bij aan een beter begrip van de complexiteit en boden inspiratie, maar konden ook een duidelijke boodschap naar derden in de weg staan. De opzet van de studie was bepaald geen spoorboekje dat ik kon volgen, omdat ik ervoor koos om responsief te werken in interactie met de diverse stakeholders (artsen, verpleegkundigen, patiënten, managers). Het onderzoeksdesign was niet vooraf vastgesteld, maar ontwikkelde zich gaandeweg (emergent). Dit betekende soms dat ik een pad insloeg dat doodliep. Ook het tijdspad moest regelmatig bijgesteld worden.

Dit is inherent aan het kromme pad dat zichtbaar wordt door erop te lopen. Op dezelfde wijze ontwikkelde het onderzoeksdesign zich terwijl ik het onderzoek uitvoerde. Wat de juiste route is, is vaak moeilijk te ontwaren en leidt nu eens de ene kant op en dan weer de

1 Heide, niemandsland, woestenij

andere. De kans op verdwalen is groot en er bevindt zich op deze paden allerlei volk dat de scheiding tussen goed en kwaad niet zo duidelijk ziet. Het niet-weten en de onbepaaldheid van de reis is bovendien ook niet een vaardigheid die onderzoekers in hun opleiding meekrijgen. Reinaert de Vos komt via deze paden uiteindelijk in het land dat in Jesaja 34 en 35 beschreven wordt, waar de woestijn een gaarde wordt. Koning Nobel daarentegen, de vertegenwoordiger van de gevestigde orde, kenner van de scheiding tussen goed en kwaad, begeeft zich via de brede rechte weg naar Kriekeputte om de schat van goud te vinden. Hij komt echter bedrogen uit en vindt niets dan donker woud. Oftewel, vaak is de weg naar inzicht en kennis niet lineair maar onvoorspelbaar en onherbergzaam. Achteraf kan vastgesteld worden dat het de juiste weg was en tot schone inzichten leidde.

Nijmegen, Annet van Harten

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Illustration 2. The Path

1

General Introduction

In 2005, Elaine Bromiley, attended hospital for an elective routine nasal operating procedure. She was an otherwise fit and well 37 years old, mother-of-two. On the day of the procedure, after applying monitoring and carrying out routine checks, anaesthesia was induced. Soon after, attempts at securing the airway were very difficult. Oxygen saturation dropped to 40% and her heart rate started to drop, too. Several attempts at intubation by two different consultant anaesthetists all failed. The team was now faced with a 'Cant' Intubate, Can't Oxygenate' scenario. Suggestions by theatre nurses to perform an emergency front of neck airway and admit the patient to the intensive care unit were not acknowledged. Forty minutes later, it was agreed to abandon the procedure and to wake Elaine up. Unfortunately, Elaine never regained appropriate consciousness. She sadly passed away 13 days later.

In hindsight it was recognised that the anaesthetists had acted in tunnel vision and lost track of time. The nurses, seeing what was needed, did not speak out loud to break the tunnel vision.

The report 'To Err is Human' (Kohn et al., 2000, p. p 881) highlighted the alarming prevalence of preventable harm in American hospitals, attributing a significant portion to human fallibility. Specifically, poor collaboration and coordination of care were identified as common causes of preventable harm. Research (Ghaferi et al., 2009) suggests that in reducing preventable mortality, the ability to "rescue" during incidents is more crucial than merely preventing errors and incidents. Effective teamwork is essential for timely intervention and mitigation. Consequently, many hospitals have initiated safety improvement programmes, with teamwork as a central focus. One such approach, developed by the U.S. Agency for Healthcare Research and Quality, is TeamSTEPPS™ (King et al., 2008; Sawyer et al., 2013).

In the Netherlands, NIVEL conducted a similar study on preventable harm (Langelaan, 2010) as in the USA. The Dutch government initiated the development of the 'Safety Management System' for hospitals. The method was inspired by safety approaches in the oil industry and obligatory implemented from 2008 to 2012 in Dutch hospitals. Around the same time, many Dutch hospitals adopted Crew Resource Management (CRM), a method derived from aviation safety practices, also focusing heavily on teamwork like the TeamSTEPPS™ approach.

Implementing and scaling these initiatives often proved challenging in all countries, giving rise to quality improvement (QI) and implementation science as distinct academic disciplines. Methods within these disciplines are largely rooted in evidence-based practice and the Plan-Do-Check-Act (PDCA) cycle (Taylor et al., 2014), aligning with a positivist paradigm that emphasises demonstrable improvement and control.

However, scholars have noted the persistent absence of large-scale, sustained behavioural change and improvement in patient safety within hospitals (Sujan, 2018; Vogus & Hilligoss, 2016). They plead for a new paradigm to advance the field. Emerging approaches, such as Safety II, mindful organising, and resilience engineering, view organisations as complex adaptive systems. These approaches are complemented by theories on cultural change and habit formation, which propose that organisational cultures and habitual practices are more enduring than individual project outcomes. Moreover, there is growing attention to the well-being of healthcare professionals alongside patient safety and patient participation, particularly against the backdrop of rising burnout rates (DeCaporale-Ryan et al., 2017) and worsening staff shortages.

RESEARCH QUESTIONS AND OBJECTIVES

Healthcare professionals often cite time pressure as a key reason for not participating in quality improvement initiatives or for allowing such efforts to lapse. From their perspective, quality improvement (QI) is just one of many non-patient-related tasks that detract from their primary responsibility: patient care. This dissertation aims to explore and understand the relationship between time pressure and quality improvement (Part 1) and to subsequently facilitate practical changes (Part 2).

This has led to two primary research questions, corresponding to the two parts of the dissertation:

1. What is time pressure, and how does it relate to quality improvement within a team?
2. How can teams contribute to ongoing quality improvement with less time investment and without experiencing time pressure?

In this study, we frequently refer to the term “quality of care” which includes patient safety. Our scope is limited to the circle of influence of hospital-based care teams consisting of doctors, nurses, and patients. Broader organisational or national prerequisites, and issues such as waiting lists are beyond the study's remit.

RESEARCH SETTING

The first part of the research was conducted in the operating theatres (OTs) of a single specialty predominantly performing elective surgeries, while the second part took place in a paediatric ward, which naturally involves a high proportion of acute care. These two distinct contexts were not premeditated but provided a unique opportunity for two reasons.

Firstly, it was interesting to investigate time pressure within a surgical team focused on elective care, as existing studies often address time pressure in acute settings. Secondly, the decision to study time pressure and teamwork within a ward context was informed by findings from the 'Monitor for Healthcare Related Harm' (Schoten, 2022)), which indicated that only about 35% of preventable harm and mortality occurs during surgical procedures. The remainder arises during other interventions, such as medication administration, diagnostics, nursing, or paramedical care. Although not all categories are location-specific, it is evident that organisational and human errors—frequent factors in preventable harm—extend beyond acute and intervention-based departments. Despite this, most studies focus on operating theatres, delivery rooms, ICUs, and emergency departments.

Teamwork in a ward setting poses unique challenges due to the lack of natural team consultation moments, unlike in operating theatres. Moreover, patients often play a more active role in wards. By conducting research in both settings, we created the opportunity to identify whether the differences in context were relevant.

There was also a pragmatic reason to choose for these two departments. Both departments expressed a desire to conduct an research project or improvement initiative aimed at enhancing team situational awareness[1] (SA) (Kaber & Endsley, 2004). Team SA is a core concept in the safety approaches of Safety II and mindful organising, as it is a prerequisite for responding effectively to the needs of the moment. This includes preventing incidents from escalating into harm or even fatalities, as in the case of Elaine Bromiley. Naturally, achieving team SA requires effective teamwork, including the sharing of all relevant information to develop a shared understanding of the situation.

THEORY

Our theoretical framework considers hospital organisations as complex adaptive systems (Homan, 2023; Stacey, 2001). Adaptability and resilience—or transformative capacity—are vital for responding to situational demands and recovering from setbacks. These adjustments do not occur through central control but rather through numerous initiatives and interactions within the system's fabric. Effective adaptation requires sufficient interactions of adequate quality among the various actors within the system. Complexity theory describes transformation but does not provide an actionable perspective for achieving transformation and change. For that, we draw on theory on transformative learning (Mezirow, 1997; Myren et al., 2022).

1 SA is the process of perceiving and interpreting the situation at hand and anticipating at what comes next.

Drawing on Safety II theory (Hollnagel, 2014), we view quality and safety as the active presence of behaviours, thinking patterns, measures, and conditions that support effective care delivery and not merely as the absence of errors, that can only be identified in hindsight. This perspective entails continuous learning and inherently involves patient participation, as they are integral part of the team and the system (Hollnagel et al., 2019; Koksma & Kremer, 2019). Hollnagel and Braithwaite (2019, p. 213) advocate for frequent reflection and learning from the variability in everyday practice that typically results in good care, in contrast to the widely adopted approach of learning from rare errors, conducting root cause analyses, and implementing best practices proposed by external sources. This perspective emphasises regular (daily) learning and understanding how teams consistently succeed in providing high-quality care.

We use the term 'mindful routines' (Vogus & Hilligoss, 2016) to describe the desired habitual thinking and actions in teams, based on the principles of mindful organising theory. In this context mindfulness refers to a heightened awareness and openness that facilitates the integration of information among team members, to achieve shared situational awareness (SA) and context-appropriate actions. Routines play a key role in embedding mindfulness and SA structurally and sustainably within the team's operations. For instance, a mindful routine could involve team briefings where members share information, seek feedback, and perform standardised checks to identify subtle yet relevant deviations.

METHODOLOGY

The ontological (nature of reality) and epistemological (ways of knowing reality) foundations of this dissertation are rooted in social constructivism, as articulated by Piaget and Berger & Luckmann (Berger & Luckmann, 1967; Pass, 2004; Von Glasersfeld, 1982). This perspective posits that reality is co-constructed through interaction with others and shaped by societal and cultural values, or what I term the "spirit of the times." Reality is thus historically situated and not objectively knowable.

However, it is possible to explore different conceptions of reality. By juxtaposing multiple perspectives, one's initial viewpoint is relativized and enriched, and by engaging with others, collective knowledge can emerge. Our epistemology also incorporates an ethical dimension, inspired by Fricker and Abma (Abma, 2020; Abma & Widdershoven, 2014; Fricker, 2007) we strive for epistemic justice, meaning that different forms of knowledge—experiential, scientific, professional, and embodied—each have intrinsic value and merit inclusion in research. By embodied knowledge (Varela, 1999), we refer to tacit knowledge stored in the body, manifesting as intuition (immediate action), automatisms, or artistic expression. This knowledge often eludes verbal articulation in the moment.

The methodologies (systematic approaches to gaining knowledge) aligned with this ontology and epistemology are predominantly ethnographic, participatory, and action oriented. The first part of the study was primarily ethnographic, while the second part employed participatory action research. Action research aims not only to understand reality through change but also views the change itself as a central goal (Reason & Bradbury, 2008, p. 1).

The following data collection methods were employed: participatory and non-participatory observations, interviews, reflection sessions, and informal conversations. These were documented in field notes, reports, observation forms, or audio recordings.

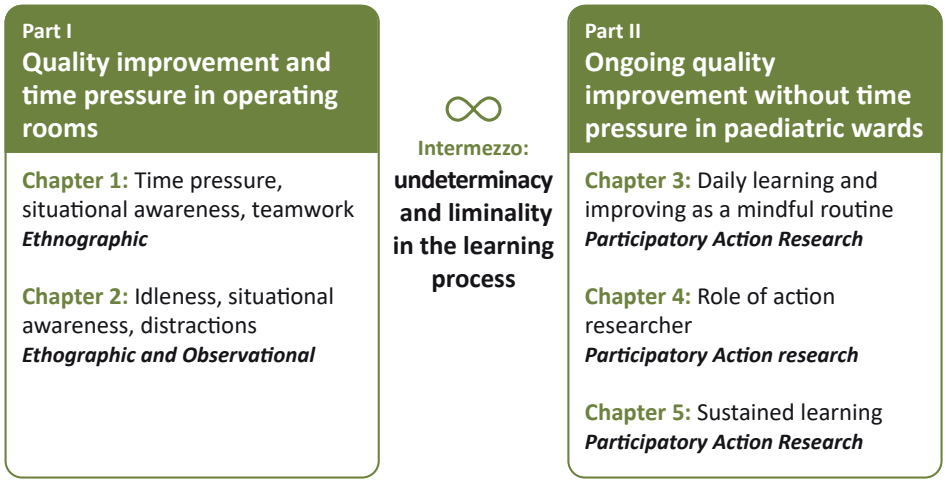
For data analysis, we predominantly employed the method of 'thinking with theory' (Jackson & Mazzei, 2022). This approach underscores the importance of remaining aware of implicit theories and assumptions throughout the interpretative process, while actively incorporating explicit scientific theories to generate novel interpretations of the observed phenomena. Our analytical objective was to adopt a comprehensive perspective based on several interpretations, followed by an intuitive choice for an interpretation that did justice to all stakeholders and provided direction for conclusions and subsequent actions. In the second study, limited statistical analyses were also performed.

GUIDE TO THE READER

The chapters in this dissertation are structured chronologically, following the timeline of the research. Part I addresses Research Question 1: *What is time pressure, and how does it relate to quality improvement within a team?* Part II focuses on Research Question 2: *How can teams contribute to ongoing quality improvement without time pressure?*

At the junction of these two parts, an intermezzo is included, offering a reflection on the crooked paths (indeterminacy and liminality) encountered during the research process. Figure 1 presents the structure and coherence of the dissertation.

Figure 1. Structure of the dissertation



The second chapter **Time pressure in Surgical Teams Improving Patient Safety** presents a naturalistic case study on how time pressure emerges in surgical teams, its interplay with situational awareness (SA), and how it interferes with improvement efforts within the interdisciplinary operating team. The chapter raises further research questions on change methodology, particularly on how to develop habits and align with team members' intrinsic motivations.

The third chapter **An Observational Study of Distractions in the Operating Theatre** explores moments of idleness in the operating room, during which individual team members seek distractions, sometimes to foster team spirit. However, they are often unaware that other disciplines in the team may be busy and require focus. We hypothesize that cross-monitoring—where team members actively observe each other's task execution—is essential for collective situational awareness, crucial for managing and respecting each other's time pressure.

In the **Intermezzo: Pade Crom en Menich Foude** we reflect on the "crooked path" of research, drawing parallels between crafting a tapestry and conducting a PhD study. It metaphorically leads to a garden of new insights, where moments of clarity and joy can be savoured. Concepts of complexity and liminality are introduced serving as a prelude to the second part of the dissertation in which we apply these concepts to changing hospital practices. While changing we search for change methods requiring minimal time investment (Chronos) and preventing the creation of time pressure (Kairos).

The fourth chapter **Interprofessional Learning and Improving at the Paediatric Ward: A Participatory Action Research Practising Safety II Theory** describes that training and

education interventions – such as the Crew Resource Management training in the first chapter - are often perceived as time-consuming and burdensome. Instead, this study focuses on integrating changes into daily routines during bedside rounds, aiming for a natural and minimally disruptive approach. While the team achieved significant progress, new questions emerged: 1. How can daily learning be embedded and expanded across all staff, including new and less frequent members? 2. Can the same results be achieved with less time and resources to make this approach feasible for other departments?

In Chapter 5 **The Participatory Action Researcher: A Starling in the Murmuration,** adopts a complexity perspective on participatory action research and reflects on the role of the researcher. We examine the researcher's contribution through two theoretical lenses: (1) theory on transformation in social complex adaptive systems, to identify developmental patterns; and (2) theory on desires, to analyse the drives underpinning interactions between the researcher and participants. These insights helped to shape the approach in the final study.

In Chapter 6 **Making Change a Habit at the Paediatric Ward, Participatory Action Research** we address the questions for further research from Chapter 4. This study explores how improvements can be anchored and disseminated within the team. It also examines whether participatory action research can be conducted with reduced time and resources.

The dissertation concludes with a general discussion of the conceptual relations between the outcomes of all studies.

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Illustration 3. The path as Orientation

2

Time Pressure in Surgical Teams, a Help or a Hindrance to Patient Safety?

A Naturalistic Case Study in a Dutch Academic Hospital

van Harten, A., Niessen, T. J. H., Koksma, J. J., Gooszen H. G., Abma T. A. (2025). *Heliyon*, 11(2), e41967. https://doi.org/10.1016/j.heliyon.2025.e41967

ABSTRACT

Aim

Patient safety requires mindful routines in the operating room. Usually, time pressure is presented as an unavoidable constraint to mindful routines and a consequence of workload imposed on teams. We aim to understand time pressure and how it interacts with developing mindful routines.

Methods

This naturalistic case study was conducted with a surgical team in a Dutch academic hospital using ethnographic methods including participant observation, interviews, and field notes. The researcher observed the team for 103 hours. Our analysis integrates habit theory and mindful organising principles.

Results

Team culture reflected deference to speed, preoccupation with productivity, conflict avoidance, and value on affective relationships. Conflicting priorities arose from differences in safety norms, worries about time, and beliefs about what saves time. Addressing these conflicting priorities, however, was rare. Creating shared Situational Awareness (SA) helped prevent or mitigate time pressure, though it was not a consistently embedded routine. New routines were often compromised under time pressure, while established habits showed resilience to time constraints.

Conclusions

Rather than being workload-driven, time pressure emerged as a co-constructed outcome of conflicting priorities and the preservation of affective relationships. The imperative to save time motivated shared situational awareness and the formation of new mindful routines. We recommend enhancing mindful routines by refining current practices in mortality and morbidity meetings, expanding stakeholder involvement, and addressing prevailing concerns.

2.1 INTRODUCTION

Over the past two decades, healthcare organisations worldwide have introduced numerous initiatives, programmes, and tools aimed at reducing preventable patient harm. While patient safety was defined as the absence of harm, it is now seen as an active capability rooted in both system robustness and human behaviours (Hollnagel, 2014; Smith & Plunkett, 2019; Weick & Sutcliffe, 2007). Adaptability and resilience have become recognised as essential capacities, enabling effective responses to unexpected events within an increasingly complex environment shaped by demographic changes, technological advancements, and specialised practices. Evidence suggests that hospitals with lower mortality rates do not necessarily experience fewer errors but are more adept at recovery and rescue (Ghaferi et al., 2009; Moreno et al., 2018). The patterns of thought and action that underpin this adaptability are known as mindful practice (Vogus & Hilligoss, 2016). However, hospitals fail to turn periodic mindful practice into a consistent enduring habit of action and thought (Vogus & Hilligoss, 2016). Surgical complication rates, for example, have remained largely unchanged over the past two decades (Moreno et al., 2018). In other words, hospitals fail to make the transition from episodic mindful practice to enduring mindful routines. Such routines might include performing safety checks with fidelity, habitual cross-monitoring during procedures, and inviting to speak up.

Research suggests that a key barrier to this transition lies in the increasing focus on cost efficiency and revenue by senior managers, which contributes to time pressure (Kerasidou, 2019; Moreno et al., 2018). At the team level, frontline workers often attribute suboptimal checklist performance and quality improvements to time pressure—the sense of having too many demands on limited time. (Jeffs et al., 2013). The sense of time pressure can be caused by a high workload, but not necessarily (Csikszentmihalyi, 1990).

Most quality and safety improvement studies regard time pressure as an unavoidable constraint within which individuals must perform reliably to ensure patient safety (Hollnagel, 2014; Weick & Sutcliffe, 2007). Consequently, many studies focus on developing individual resilience and competence to handle substantial workloads (Allen & Mellor, 2002; Bakker et al., 2001; Edland, 1994) and on mitigating adverse effects like fatigue and burnout (El Khamali et al., 2018; Montani et al., 2020). In contrast, we propose a novel perspective: we view time pressure not as an inevitable barrier to patient safety, nor solely as a matter of individual competence, but rather as a dynamic factor in developing mindful routines.

The purpose of this article is to understand time pressure and how it interacts with the development of mindful routines in the context of patient safety.

2.2 METHODS

Research Team Reflexivity

The research team comprised five authors from diverse backgrounds: change management and psychology, medical humanities, educational sciences, surgery, and nursing studies. All data were collected by Mrs A. van Harten, the lead researcher, who acted as a senior change facilitator and crew resource management (CRM) trainer. As such she was familiar with the field and several participants of the specialty of the case. She had a trusting relationship with the management of the operating rooms and anaesthesia and gained trust from the management of the surgeons by presenting her plans and intentions on two occasions. During the CRM training she introduced herself and her motivations. The core team was informed in more detail about the theoretical and methodological background of the researcher.

Given the importance of strong relationships with participants before, during, and after the study, there was a risk of biased observations and interpretations. However, as a trained consultant, coach, and psychologist, Mrs van Harten was equipped to reflect on her emotions, power dynamics, and interests. Throughout the study, she recorded reflections in a diary and discussed her role and observations in biweekly sessions with Dr L. Fluit who deliberately acted as a critical friend asking questions about presumptions and methodological decisions (Roulston & Shelton, 2015).

Setting

The study was done in a Dutch academic hospital. The case entails the interprofessional surgical team of one specialty (approximately 45 persons) involving all surgeons, residents, operating room (OR) nurses, anaesthetists and anaesthesia nurses. The surgeons were mostly male the nurses mostly female. The anaesthesia nurses and physicians were mixed male and female.

The team enrolled in a CRM training programme involving one hour of e-learning followed by a one-day group training. The training aimed to enhance awareness of their own human fallibility, risky team behaviours, and safe practices. Some surgeons viewed the CRM training as an externally imposed obligation. A core team, formed from team representatives, was tasked with improving work methods. They prioritised enhancing Situational Awareness (SA) through daily briefings at the start of the day and encouraging ‘speak-up’. These briefings—distinct from the pre-incision time-out—enabled the team to know each other, align on daily planning, and discuss patient procedures, risks, and resource availability. While familiar to the anaesthetists and nurses, this routine was new to most surgeons.

Each surgical specialty has a multidisciplinary workplace management team (comprising a nurse, anaesthetist, and surgeon) that coordinates weekly operating room schedules. Members of this team also participated in the core team.

Study Design

A naturalistic case study design (Abma & Stake, 2014) suits the explorative aim of the study. This means that we studied the setting in-depth to understand a single demarcated entity. This multidisciplinary surgical team, chosen for their commitment to implementing Crew Resources Management (CRM) and a new mindful routine (a daily briefing), provided an ideal context for studying time pressure and its relation to mindful routines. Furthermore, we wanted to study time pressure in a surgical specialty with almost only elective patients instead of a specialty with many acute patients. This surgical team met that requirement. This way the case offered most learning potential, one of the main selection criteria in case study research (Abma & Stake, 2014, Flyvbjerg, 2006). This academic hospital was chosen, because the researcher was familiar with the culture and procedures of the operating rooms as a result of her position as a consultant in this hospital.

Data were collected by the first author over ten months through participant observations in the operating room, handovers, morbidity and mortality meetings, and CRM training sessions; semi-structured interviews with key stakeholders; and informal conversations. Observations and self-reflections were recorded in a field diary. The stakeholders interviewed at the start of the study were selected to gain insight in: all perspectives on safety, their perceptions of their influence, their interest in and comments on the (preliminary) research question. These open interviews lasted approximately one hour each.

We studied time pressure as a subjective experience of individuals and groups rather than time spent objectively; therefore, we did not measure time quantitatively. Furthermore, we studied the development of observable mindful routines and, as mentioned in the introduction, took as a premise that the routines contribute to patient safety.

Table 1. Data Collection

Activity	Hours, numbers	Role and Method	Data recording
Stake holder interviews with key players of the following departments: Surgical specialty, Operation Rooms, Anaesthesia, Recovery, Quality and safety, Crew Resource Management (CRM) program, National Healthcare Inspection	8 hours, 10 interviews	Semi structured interviews with topic list.	Transcribed audio recordings
CRM trainings with OR nurses, anaesthesia nurses, surgeons, anaesthetists, management surgeons	24 hours, 3 groups	(co)-trainer, Participant observations	Field notes
OR observations	42 hours	Observations	Field notes
Informal conversations	8 hours	Unstructured interviews	Field notes and sometimes transcribed audio recording
Core team meetings (first meeting 1 day)	15 hours, 8 meetings	Facilitator, Participant observations	Transcribed audio recordings, minutes and field notes
Attendance of patient hand over and complication meetings	6 hours, 4 meetings	Observations (fly on the wall)	Field notes
e-mails, telephone calls	Not counted		Field notes

Analysis was conducted in phases through an iterative process. Field notes and transcripts were read by all co-authors and Dr L. Fluit and discussed in three research team meetings, the first held halfway through data collection. Using Jackson and Mazzei's 'thinking with theory' method (Jackson & Mazzei, 2013), we initially diverged perspectives by 'plugging in' theories to explore unexpected details and uncover new interpretations. which provided valuable insights for addressing the research question. In the third meeting, the researchers converged to two supporting fields of knowledge: mindful organising (Weick & Sutcliffe, 2007; Weick et al., 1999) and habit theory (Dewey, 1922; Duhigg, 2012; Vogus & Hilligoss, 2016) which provided valuable insights for addressing the research question.

To enhance the study's trustworthiness, we employed prolonged engagement, researcher reflexivity, member checking, and thick descriptions to ensure credibility and transferability. Appendix S1 provides further methodological details.

2.3 RESULTS

The results are structured around five key team dynamics. Three of these dynamics illuminate the creation of time pressure: deference to speed, preoccupation with productivity, and the avoidance of conflict while pursuing conflicting priorities. The remaining two dynamics demonstrate how team members either prevented or responded to time pressure: by creating SA and by skipping new routines and adhering to established ones.

Table 2. Quotes and Vignettes per Theme

Deference to speed	
Q1	'I always feel rushed, especially at the start of the day. We can start only in one room at the same time, and yet the second room is always annoyed when we show up 8.05am.' - Anaesthetist Susan
V1	Vignette 1. Being fast as a source of respect At the end of the working day researcher XXX is seated on the couch in the restaurant of the OR complex with a cup of coffee. Anaesthetist Bernhard, familiar to her, comes in and takes place next to her for a chat. At some point, they bring up the farewell of a mutually known colleague anaesthetist. A: 'Did he decline a big farewell feast because he felt he had received too little recognition from his colleagues?' Anaesthetist Bernhard: 'Indeed. He meant a lot for the department and the hospital, especially in the field of quality and safety. A lot of people comment on that because he is not a fast hero on the floor in the OR and he is wordy. But so what? He realised a lot of valuable initiatives that we would not have accomplished without him. […] How important is it that you are fast?' A: 'Is being handy and fast necessary to gain respect from your colleagues?'
Preoccupation with productivity	
V2	Vignette 2. Starting on time Several weeks after starting the implementation of the briefing, the main concern of the core team is how much time the briefing consumes. Jennifer (OR-nurse): 'Things are improving, but it takes quite some time before everybody is present for the briefing. If we perform the briefing, and then the time-out, then we're seeing the first activity in the theatre at 8.20 a.m.! [again, with emphasis] 8.20 a.m.! That's really too late in my opinion.' Jeroen (surgeon): 'We've got the charts with late starts and early endings. You can see that start-up time has slowly been moving back to normal since the introduction of the briefing.' Jorin (resident): 'I often have the impression that the anaesthesia consultant is eager to attend the briefing. While with us, a surgeon consultant often or sometimes doesn't attend the briefing. George doesn't show up before the knife is in the patient and then the resident is allowed to start.' Jeroen: 'I'd start at 8.00 a.m. with the team available at that time, with as many people present as possible. So, then you have to have sort of minimal requirements. Staff members must be there as much as possible, or you're going to be wasting time needlessly. We'll be unable to motivate a few of our staff members. For some, it's been the habit for many years not to show up in the theatre before the resident has made the incision.'
Q2	'We strongly feel that for a good surgeon clinical work comes first and research is the second assignment. All other tasks are of lower priority. No other department in this hospital does as much clinical work as we do.'- Medical head of the surgeons Bert
Q3	'We have a large supply of patients, so it is more that we receive a lot than that we push to produce a lot. Really, we produce too much, so rather not. We have a certain expertise, a large front door and the conviction and ambition that we are the best for those patients. So, we are not going to refer them to someone else, and then the solution is to keep one's shoulder to the wheel.'- Manager Saskia
Avoiding conflict and pursuing conflicting priorities	
Q4	'They walk the extra mile for you if they like you'. – Surgeon Kees
Q5	'Performing the briefing contributes to the feeling of being a team.' – Surgeon Sophie

V3	Vignette 3. Nurses safeguarding ending in time. Jennifer (senior OR nurse): 'The other day, it was really one of those days, you know. At the start of the day, it was already Murphy's law. So, at eleven o'clock my colleague said: "We really won't be going to make it before 4 p.m." So, I said: "You're right, we won't make it if we're going to do everything he (the surgeon) says. But we're not going to bring this up any sooner than when we've finished this, because otherwise we'll only get grumbling and discord." She said: "All right, are you going to say it?" "Yes, I will." So, at a suitable moment, when the patient had to be repositioned on the table, I said: "One thing, now or later, but I want us to look realistically at the programme for today and decide what's going to be done and what not. Then we can all agree on that, and we won't mention it again the rest of the day. If we must work overtime, we'll settle now who will be the one because I get really annoyed if people ask every two hours "How much longer will it take?" Then the surgeon said:" I'll try to reschedule the programme with the other rooms." So, he went off. When he came back, he said: "It's been arranged." I said: "Alright, when this patient is off the table, I want to hear how we're going to do it and how we'll divide the tasks the rest of the day." So, we did at the sign-out, when the patient was still asleep, and everybody agreed. So, in my room there wasn't any grumbling anymore because I knew what to do and so did my colleagues.' Researcher, XXX: 'This would be a really good example to share with your colleagues! Do you ever do so?' Jennifer: 'No, that's of no use; it's in your character and in your age. When I would be 20 years younger, I wouldn't have done it either. Now I have the position and the guts to do this.'
Creating team SA to handle time pressure	
V4	Vignette 4. The quick surgeon George enters the OR and takes a moment to overview the room. Then he says in a cheerful way to the anaesthesia nurse 'Hi Toon, fellow, how are you?' He asks the anaesthetist 'Do you want to advance today? Then, we will take care of that. The next operation will be done by Anton. so that will probably take 6 hours I'm afraid.' In this boastful but cordial tone, he has small conversations with most team members. The OR-nurse whispers with a smile to the observer, 'With him we will surely be ready on time, he is really fast'. Resident Arie gives a short recapitulation of the briefing and the sign in and shortly thereafter incision starts. During the operation George is looking around regularly and he stays in contact with the anaesthesia team about blood loss etcetera. At every stage during the operation (removal of organs for example) he asks whether all materials and all team members are ready for the next stage in a clear voice, and he only progresses when he hears their confirmations. By doing so every team member has awareness of the situation. In a small conversation with observer XXX the anaesthesia nurse says: *'Even when there is a bleeding, you can ask him questions. He goes on communicating very well, so you always know where he is heading for, and I can make myself clear where we are heading for.'*
Skipping new routines and adhering to old routines	
Q6	'There should be a certain format for such a meeting. For example, it is strange that the resident should always present a medical complication. Why? Then it becomes such an obligation, and there are already so many obligations. The next thing is that it is completely free what you want to discuss. If it would be a discussion about what could we have done differently, then that could be interesting. Now we present an article we found about the same treatment and where happened this and that. That is nice but not very instructive. So, I would think: less often, interdisciplinary [with nurses and anaesthesiologists] and a good format.'- Resident Bram
Q7	'I tell myself that the time out is really useful because it is not done to omit it. But if I'm honest with myself, I do not really believe it contributes to patient safety.'- Surgeon Johan

2.3.1 Results on the Creation of Time Pressure

Deference to Speed

A predominant aspect of the team culture was a strong deference to speed. The prevailing belief was that 'a good surgeon is a quick surgeon.' Delays in induction adversely impacted the average operating time, defined as the interval from the start of induction to the closure of the wound. Consequently, some surgeons exhibited irritability and restlessness when induction took longer than anticipated, even during periods of low workload. The waiting period induced a sense of pressure for both those waiting and those being waited on (quote 1). This deference to speed was evident across all professions, including anaesthetists (vignette 1).

Preoccupation with Productivity

Another significant cultural aspect was a preoccupation with productivity, defined as the amount of work completed within a given timeframe. This preoccupation was reflected in the managerial language used by Nurse Jennifer and Surgeon Jeroen when discussing operating room occupancy (vignette 2). It was also reflected in Jeroen's tendency to weigh the opinions of fellow surgeons, some of whom considered the briefing a waste of time, against the nurses' perspective, who viewed the briefing as a time-saving measure. The briefing helped the nurses in anticipating on required materials later in the day. Most surgeons were benevolent towards the new routine due to its potential to expedite processes and because their surgical specialty was among the last to adopt this routine.

Quote 2 from the medical head illustrates that the preoccupation with productivity stemmed not from economic motives but from professional pride. The department manager made clear (quote 3) that the urge to 'produce', was not imposed on the team by her. In fact, she preferred lower production rates, as overproduction was not being paid for.

Avoiding Conflict and Pursuing conflicting Priorities

A third characteristic of the team was the tendency to avoid conflict while pursuing conflicting priorities. The value placed on team cohesion, especially between surgeons and operating room nurses, was significant (quote 4). The core team routinely engaged in small talk to strengthen bonds, fostering numerous personal connections among surgeons and surgical nurses. Surgeons expressed a reliance on nurses for smooth and efficient processes (quote 5). However, the focus on maintaining affective relationships led to tension when team members faced conflicting priorities.

Table 3. Differences causing conflicting priorities

Differences in:	surgeons	Surgical nurses	Aesthetic team
Norms	Safety needs a skilled surgeon	Safety needs a briefing	Safety needs a briefing
Worries	Being perceived as slow and unproductive A cancelation conversation with the patient	Working overtime	Being perceived as slow and unproductive Irritated surgeons about delays at 8am Patient safety
Schedules	working day ends at 6pm Briefing starts at 8.00am	working day ends at 4pm Briefing starts at 8.00am	working day ends at 6pm First briefing is at 8.00am, second briefing at 8.05am
Experiences	Briefing costs time	Briefing saves time, because of early detection of missing materials. It manages time by agreeing on an evaluation moment.	Briefing saves time, because of early detection of missing materials. It manages time by agreeing on an evaluation moment.

2.3.2 Results on preventing or Responding to Time Pressure

Creating Situational Awareness

Team members endeavoured to avoid conflicts regarding their priorities when possible. Vignette 3 illustrates how, on one occasion, time pressure was alleviated through the initiative of Nurse Jennifer, who addressed the conflict and fostered shared SA regarding workload planning. To mitigate time pressure, nurses proactively raised awareness of missing materials during the briefing.

Surgeon George had his own routine to preventing time pressure. He adhered to a long-standing personal habit of calling the nurses the day before to inform them of the materials and instruments he would require. Vignette 4 highlights how he established SA, control, and pacing for himself during procedures. The spinoff was that he created SA for the team as well, effectively preventing time pressure. When the researcher asked the core team why George's practice was not emulated by his colleagues or residents, they shrugged and remarked that this was characteristic of George—a maverick.

Skipping New Routines and Adhering to Established Routines

We observed that the new briefing routine was frequently compromised by surgeons, despite their general trust in the judgement of the nurses and anaesthetists, who affirmed that the briefing saved time and enhanced SA and patient safety. In contrast, the established routine of weekly morbidity and mortality meetings was consistently conducted and usually attended by all residents and most consultants, even though participants did not regard them as particularly informative (quote 6). These meetings were mandatory for all departments involved in accredited training programmes for

interns and residents, though their frequency varied by department. The established time-out procedure before incision was also always executed, regardless of its perceived contribution to safety (quote 7).

2.4 DISCUSSION

This paper emerges from findings indicating that frontline workers often cite time pressure as a barrier to achieving quality and safety improvement goals at the team level. Therefore, the primary aim of this study was to explore the concept of time pressure and its interaction with the development of mindful routines.

Understanding Time Pressure

We illustrated how the team carefully fostered affective relationships by respecting and accepting that some colleagues are late adopters (vignette 2), carefully navigating sensitive topics (vignette 3) providing personal attention to all members of the operating room team (vignette 4), and engaging in small talk and private connections. Lingard et. al. (2002, p. 235) describe this careful interrelating in the operating room as: 'a complicated 'dance'' that maintains relationships and minimises tension while still achieving goals.' Edmondson (Edmondson, 2016) suggests that strong affective relationships enhance the willingness to assist one another, contributing to the psychological safety necessary for sharing information across professional and hierarchical boundaries.

However, our findings suggest that this approach also inhibited team members from addressing conflicting priorities and signalling time-related issues. 'It had to be in your character and your age' (vignette 3) to dare addressing the issue of ending in time. This distinguishes careful from heedful relating. Careful relating aims to establish affective relationships. Heedful relating (Weick & Roberts, 1993) aims to connect distributed activities and information in which individuals subordinate their personal interests (such as avoiding conflict) to those of the system. The more heedfully the interrelating is done, the more capable of intelligent action the collective mind is (Weick & Roberts, 1993). Collective mind conceptualized as a pattern of actions driven by connected distributed knowledge.

Both Nurse Jennifer and Surgeon George fostered SA through their unique styles of heedful relating, effectively mitigating time pressure. Yet, these approaches were perceived as privileges associated with their positions, rather than as exemplary practices. Such a culture sustains time pressure.

We conclude that time pressure did not stem from a workload imposed by management; rather, it was co-created through the pursuit of differing priorities while maintaining

affective relations. Therefore, addressing conflicting priorities and practising heedful relating sometimes alleviated time pressure, though these practices were not standard.

Further qualitative research is needed to explore how teams can develop skills to address conflicting priorities, engage in heedful relating, and develop collective mind.

Time Pressure as a Motivator for Mindful Routines

Our observations revealed that the team was preoccupied with time, speed and productivity [vignette 1, 2 and 4, quote 1, 2]. Several studies suggest that this is based in the surgical tradition of which anaesthesia is a branch (Finn, 2008; Katz, 1999). It is a deep structure that 'shapes organizational life because they manifest through practices that are routinised, and are continuously re-enacted over time' (Heracleous & Bartunek, 2020, p. 219). Research on the uptake of a briefing or the WHO surgical checklist also identifies time pressure as a barrier to conducting briefings with all participants (Braaf et al., 2013; Whyte et al., 2009). While surgeons were inclined to bypass briefings under time pressure, many were also willing to engage in the briefing because it was perceived by the nurses to save time (table 3). The nurses connected this new routine to the existing deep structure by emphasising its potential for time savings later in the day.

We conclude that within surgical teams, (preventing) time pressure acted as a motivator for creating SA and adhering to mindful briefing routines.

At the organization level this might be different though. At this level maximum working hours, CRM training programmes, obligatory morbidity and mortality meetings, redundant staffing are secured. Other studies indicate that a preoccupation with productivity or profitability at the organisational level can undermine the conditions necessary for effective functioning in the operating room (Espin & Lingard, 2001; Reason et al., 2002; Walker & Adam, 2001).

Habits for Withstanding Time Pressure

Our results suggest that once a habit is established - such as the time out (quote 7) or the morbidity and mortality meeting (quote 6)- the original rationale for the habit may become irrelevant to its execution, and time pressure ceases to be a threat. Neal et. al. (2012, p. 492) state that habits are not influenced by people's goals. Even moderately strong habits require substantial conscious effort to change (Neal et al., 2012). Developing new habits require environmental cues that trigger the habitual behaviour, repetition, and socialising processes (Cohen, 2007; Duhigg, 2012; Lingard, Reznick, DeVito, et al., 2002; Neal et al., 2012; Salvato & Rerup, 2017).

The process of socialising into a profession takes time. As noted by Resident Jorin (vignette 2), the anaesthetic team had developed differing convictions regarding safety

and excellence compared to surgeons (table 3). In the Netherlands, these beliefs have been embedded in anaesthetic training for decades. An article discussing the evolution of the patient safety movement highlights the long-standing connection between anaesthesiology and patient safety. (Warner & Warner, 2021) Yet, as indicated by Bernhard's quote (vignette 1), not all anaesthetists have yet altered their unconscious convictions.

Creating cues to draw attention to patient safety risks requires less time than changing ingrained social behaviours. All elements of the new briefing routine pertained to patient safety risks. However, signalling the same risks for identical procedures daily can feel like 'ticking boxes,' leading to procedural decay (Goodman et al., 2011, p. 163). Thus, we hypothesise that merely creating cues to signal risks is insufficient to support a consistent daily briefing. The immediate reward of saving time—a strong preoccupation receiving considerable conscious attention—contributed to the establishment of the new routine, alongside the fact that the routine was cued and repeated daily. The subsequent challenge is to execute all aspects of the briefing attentively and to prevent procedural decay, as noted by core team members (vignette 2) and supported by other studies (Braaf et al., 2013; Molina et al., 2022).

It is practically relevant for designing routines, that the likelihood of consistent performance increases when a routine is positively associated with a preoccupation.

The observation that the established routine of morbidity and mortality meetings was not highly valued aligns with findings from other studies (Fraser, 2016; Verhagen et al., 2020). Nonetheless, this existing routine is performed automatically, even under time pressure, as it does not demand significant conscious attention (bandwidth) (Dewey, 1922; Duhigg, 2012; Mullainathan & Shafir, 2013). This presents an opportunity to optimise the routine. Promising initiatives regarding morbidity and mortality meetings include involving patients in discussions, conducting online meetings, and evaluating successful procedures through resilience concepts (Cooper, 2018; Britt Jose Myren et al., 2022; B. J. Myren et al., 2022; Verhagen et al., 2020). These interventions have altered participation dynamics and broadened perspectives on quality of care.

The practical implication is that existing morbidity and mortality meetings can be enhanced by incorporating interprofessional participation—potentially including patients—to address preoccupations and conflicting perspectives, thereby fostering the development of collective mind. This will encourage daily heedful behaviours and a shared valuation of routines.

Further longitudinal qualitative research is needed to understand how teams can optimise the mindfulness of existing routines or routines in the making.

2.5 CONCLUSION

In summary, time pressure was not a result of workload imposed on the team but rather emerged from a co-creative process involving conflicting priorities and maintaining affective relations. The drive to save time acted as a motivator for cultivating SA and establishing a new mindful routine. Established routines appeared resilient to time pressure. We recommend optimising mindful routines by refining existing morbidity and mortality meetings to include a broader range of stakeholders and to address time-related concerns.

Limitations

We studied a single team in-depth with ethnographic methods as part of a case study research design. Therefore, we could only draw conclusions about this specific case and formulate questions for further research. To enhance the transferability of the study we used extensive quotes and thick descriptions of real-life situations in the vignettes. According to the literature on case study research designs (Abma & Stake, 2014; Simons, 2015) this enables a vicarious experience in the readers, especially operating room professionals, enabling them to recognise the situations of time pressure and teamwork and translate them to their own specific context. As Simons (Simons, 2015) argues: 'the overarching justification for how we learn from case study is particularization – a rich portrayal of insights and understandings interpreted in the particular context'. Furthermore, in formulating our practical implications about using existing routines, we drew not only on our findings but also on relevant evidence from other studies thereby contextualizing the local findings (Flyvbjerg, 2006).

Declarations

Ethics and Consent: Review and/or approval by an ethics committee was not needed in this study because it is not medical scientific research in which individuals are subjected to acts or rules of conduct. Therefore the Medical Research Involving Human Subjects Act (Wet op Medisch Onderzoek, WMO) did not apply to this project. The names of the participants in the narratives are fictitious to ensure anonymity. The members of the core team and the interviewed stakeholders gave written consent for audio recording and quoting. The core team members checked the interpretation of the data in the last meeting of the research.

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2.2 APPENDIX S1: ADDITIONAL INFORMATION ON METHODS

In this appendix we provide more detailed methodological information in addition to the methods paragraph in the article “Time pressure in surgical teams improving patient safety, A naturalistic case study in a Dutch academic hospital”. We do not repeat what is already described in the article.

Setting

The anesthetic disciplines participate in the team, but are not dedicated to one surgical specialty. The nurses work mainly in this surgical specialty, but all have a second surgical specialty in which they work part of the week as well. Most other surgical specialties had already started with Crew Management Resources and with briefings at the start of the day. Figure 1. Shows the items of the briefing

Figure 1. briefing and debriefing checklist for the OR

BRIEFING OR	DEBRIEFING OR
Personnel - Are we complete? Does everyone know each other? - Are functions and expertise clear? - Are there specific learning goals? (eg: performing double check, less door movements)	**P**ersonnel - What went well in teamwork, what can be done better? - How did we do on our learning goals?
Patients - Are there surgical particulars? - Estimated surgical time, risks, problems? - Materials, instruments, apparatus - Specific applications made? (e.g. rontgen) - Anaesthesiologic particulars?	**P**atients - Were procedures performed well, learning points, incidents, improvement suggestions?
Planning - If deviant staffing: who is doing what? - Who coordinates planning of the day? - When do we do the debriefing?	**P**lanning - Logistic improvement goals? - Who notes improvements suggestions and where?

Researcher Reflexivity

I have a background in organization psychology and change management and worked for many years as a management consultant and did so several years in the academic hospital where the research took place. My theoretical orientation has always been a constructivist one. I had done many projects in the operating rooms and as such was familiar with culture, procedures and safety rules in several disciplines.

The medical heads of the surgeons, the nurses and the anesthetists - three different departments - gave me the assignment for the implementation of Crew Resource Management (CRM) and also consented in participating in the research, just like the

core team and the participants. They agreed that I and the chair of the core team would primarily report progress to the management of the surgeons (medical head and manager). When desirable, the other heads could be contacted.

In my role as CRM trainer I delivered the training offering a mix of theory, discussion and exercises.

The training was given in groups of approximately 15 persons, nurses, anaesthetists and surgeons together. The training was given together with a co-trainer, to enable me to listen and observe more attentively.

In my role as facilitator, I tried to leave the initiative in the core team. I intervened by introducing theoretical concepts and by mirroring my observations and reflections. It was up to them to decide on next steps.

In my role as researcher, I could interview and observe whenever I felt that was useful. Members of the core team were mainly curious or sceptic about the ethnographic methodology of the research. In their view (medical) science requires countable data and statistical analysis. But they were willing to support the research and, working in an academic hospital, they were used to being observed and to participate in a study. The core team showed little awareness of the research side of their project during the meetings.

The research question was formulated together with the core team and was formulated initially as “how can we implement the intended behavioral improvements leading to situational awareness (SA)?” The behavioral improvements were specified as performing the briefing well and speaking up. However, during the research most energy went to implementing the briefing. The theme of time pressure emerged during the process. It was a dominant topic in almost all meetings of the core team.

The combination of facilitating the core team and observing, was most challenging. Part of the observations came into awareness after the meeting when making the fieldnotes or transcriptions from the audio recordings or in the bi-weekly reflections on the fieldnotes.

Trustworthiness of the Research

To enhance the trustworthiness of the research (Lincoln & Guba, 1985), the following procedures were used.

Table 1. Trustworthiness of the Research

Quality criteria	Realisation
Credibility	*Prolonged engagement*: The prime researcher (XXX) spent 18 months in the research setting and was familiar with the larger context of the operating room as a consequence of other projects being carried out. Co-researcher (XX) worked as a surgeon in other hospitals for many years and as the head of the operating room department of this hospital at the time. This prolonged engagement enabled the researchers to collect persistent and reliable observations. Because of their prolonged engagement in many surgical teams, they were sensitive to standard practice and deviations from that standard.
	Researcher reflexivity: During the data collection, the participant observer reflected every two weeks with dr XXX, a professor on medical education to stay as open-minded as possible. They reflected on the data, her thoughts, assumptions, feelings, role of participant observer and the way she influenced the course of events and the reactions of the participants.
	Member checking (respondent validation): Members of the core OR team were asked to give their comments on the story and the interpretation presented
	Transparency: by adding this appendix we provide detailed information on the process of the research.
	Method triangulation: data were obtained from: open interviews, informal conversations, observations, participatory meetings such as core team meetings and trainings.
	Theory triangulation: using different theorical angles to interpret the phenomena
	Researcher triangulation: five authors and one additional researcher from different backgrounds were involved in analyzing the data, to ensure different perspectives and interpretations. The backgrounds of the authors were: change management and psychology, medical humanities, educational sciences, surgery, nursing studies
Transferability	Rendering thick descriptions (Shenton, 2004) in vignettes evoking 'vicarious experiences' (Abma & Stake, 2014) combined with quotes. The vignettes were selected because of their learning potential, they illustrate a dynamic or mechanism (Anderson, 2006).
Confirmability and dependability	All authors read and analyzed raw data such as transcripts and fieldnotes individually. They discussed issues until consensus was reached on the selection of the most important data fragments, interpretations and themes. We described the research design and data collection in detail.

Analysis

As described in the paper, we performed a thematic analysis at various points in the project by reading and rereading the data and discussing them in the research team, thinking with theory (Jackson & Mazzei, 2013). In table 2 we provide more details on the procedure and content of the analysis.

Table 2. Process of the Analysis

phase	Themes and topics
First diverging phase (halfway data collection)	We all recognized time and time pressure as a dominant theme. The first author deepened our understanding of time pressure by reading sociological and philosophical literature on time and temporality, the societal context and tolerance for safety risks influencing the experience of time pressure. Other themes: boundary crossing, power relations and gender issues in building time pressure in the team.
Second diverging phase	We discussed the learning and reflective practices in handling time pressure in the operating team as well as in the facilitator. we chose an emic descriptive perspective by reflecting on the concrete experiences of time pressure for each discipline in the operating team and an etic interventionist perspective oriented at change and development of behaviors leading to situational awareness in a complex organizational context with many interdependencies.
Converging phase	We chose to stay close to the strong concrete ethnographic descriptions that can evoke a vicarious experience in the reader who will often struggle with time and projects as well. We interpreted the descriptions from an interactionist perspective. The vignettes and quotes show the interactively constructed nature of time pressure and the motives or drivers that guide the behaviors that build and resolve time pressure. To hypothesize about the relation to improving mindful organizing we chose for the concepts of habit and thus for the perspective on humans as habitual entities in a relational system.

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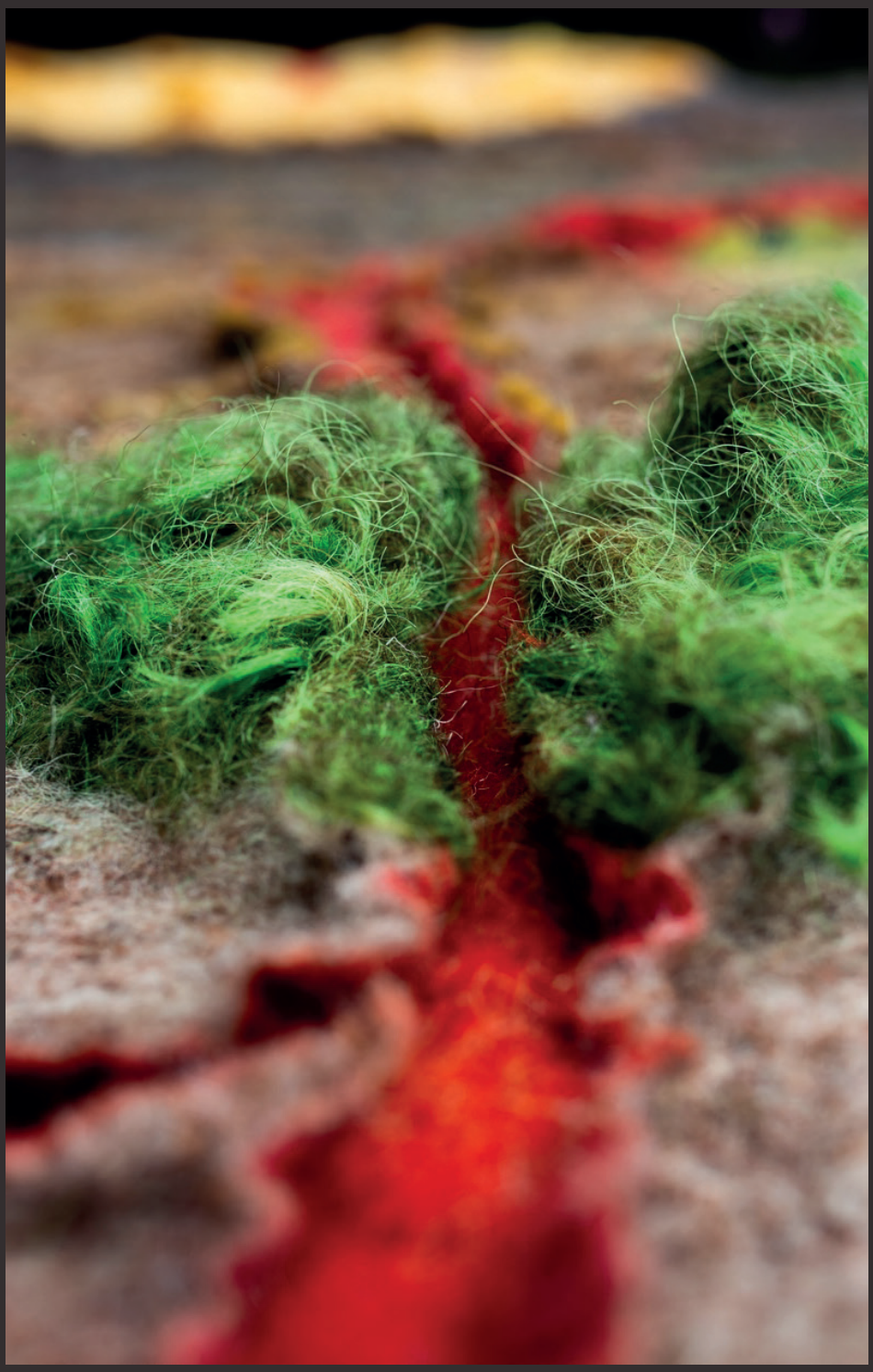

Illustration 4. Perspective for action

3

An Observational Study of Distractions in the Operating Theatre.

van Harten A, Gooszen HG, Koksma JJ, Niessen TJH, Abma TA, Anaesthesia 2021; **76:** 346-56. doi: 10.1111/anae.15217

SUMMARY

Aim

Several studies suggest a negative impact of interruptions and distractions on anaesthetic, surgical and team performance in the operating theatre.

This study aimed to gain a deeper understanding of these events and why they remain part of everyday clinical practice.

Methods

We used a mixed methods observational study design. We scored each distractor and interruption according to an established scheme during induction of anaesthesia and the surgical procedure for 58 general surgical cases requiring general anaesthesia. We made field notes of observations, small conversations and meetings. We observed 64 members of staff for 148 h and recorded 4594 events, giving a mean (SD) event rate of 32.8 (16.3) h^{-1}.

Results

The most frequent events observed during induction of anaesthesia were door movements, which accounted for 869 (63%) events, giving a mean (SD) event rate of 28.1 (14.5) h^{-1}. These, however, had little impact. The most common events observed during surgery were case-irrelevant verbal communication and smartphone usage, which accounted for 1020 (32%) events, giving a mean (SD) event rate of 9.0 (4.2) h^{-1}. These occurred mostly in periods of low workload in a sub-team. Participants ranged from experiencing these as severe disruptions through to welcome distractions that served to keep healthcare professionals active during low workload, as well as reinforcing the social connections between colleagues. Mostly, team members showed no awareness of the need for silence amongst other sub-teams and did not vocalise the need for silence to others.

Conclusions

Case-irrelevant verbal communication and smartphone usage may serve a physical and psychological need. The extent to which healthcare professionals may feel disrupted depends on the situation and context. When a team member was disrupted, a resilient team response often lacked. Reducing disruptive social activity might be a powerful strategy to develop a habit of cross-monitoring and mutual help across surgical and anaesthetic sub-teams. Further research is needed on how to bridge cultural borders and develop resilient interprofessional behaviours.

INTRODUCTION

It is recognised widely that human factors and non-technical skills play a key role for critical incident prevention in the peri-operative period (Jones et al., 2018). More specifically, the frequency of interruption and distraction have been associated with the incidence of human errors (Wiegmann et al., 2007). Previous research has associated distraction with: the performance of the surgeon (Antoniadis et al., 2014; Wheelock et al., 2015), the anaesthetist (Broom et al., 2011; Campbell et al., 2012; Savoldelli et al., 2010), or the team as a whole (Antoniadis et al., 2014; Wheelock et al., 2015); surgical delay and inefficiency (Zheng et al., 2008); cognitive overload and stress (Boehm-Davis & Remington, 2009; Li et al., 2012; Westbrook et al., 2010); and miscommunications (Wheelock et al., 2015). Case-irrelevant communication constitutes a significant proportion of the distractions observed in the operating theatre (Antoniadis et al., 2014; Healey et al., 2006). Outside of the operating theatre, distractions are sometimes seen as beneficial, for example in the context of medical device alarms and patient call alerts on wards (Myers et al., 2016). There have been calls for the use of more precise language around interruption and distraction in healthcare settings in the clinical environments and contexts in which they occur (Coiera, 2012; Grundgeiger et al., 2016)

Our aim was to understand when and why case-irrelevant communication manifests itself, how it is experienced and how members of the peri-operative team handle it. For this, we decided to conduct observations in the context of general surgical operating theatres at a large Dutch teaching hospital.

3.1 METHODS

According to local and national policy, formal ethical approvals were not required for this non-interventional observational study of healthcare professionals. We obtained consent from included healthcare professionals and did not observe potential participants who did not wish to be observed. All participants were aware that they would be observed during their normal duties, but they were not aware of the aim of the study or the nature of the observations.

The study was conducted at a large Dutch teaching hospital in three general surgical operating theatres. A variety of long and short procedures are undertaken including vascular, trauma and general surgery. We undertook observations during all days of the week during daytime hours. We aimed to capture a total number of observation hours as per previous comparable studies (Antoniadis et al., 2014; Healey et al., 2006), but data collection continued until ‘saturation’ was achieved, where no new themes emerged. The observer was granted permission to remain in the operating theatre unless the environment became crowded (more than ten essential individuals). The observer was

granted priority over non-essential team members, such as medical or nursing students. The approach to data collection was through the frequency of certain types of behaviours, unstructured qualitative field note observations, and informal participant interviews. Two authors recorded observations independently, which were cross-checked against each other at the end of every observation period.

The first phase of observations replicated the methods of previous research to determine the frequency and nature of distractions (Antoniadis et al., 2014; Healey et al., 2006). We also recorded free text field notes of case-irrelevant verbal communication in the operating theatre to develop themes around its persistence. During observations, the observer was there solely to observe and not to undertake a clinical or administrative role (Gold, 1958). Although they were visible and sometimes had to move around to be able to observe, the observers tried to minimise interaction to prevent being a distractor or influence behaviours. The categories of distractors were predefined and the observer recorded the frequencies with which these events occurred. Every distractor was weighed with an impact score (Table 1). The forms used to record these frequencies and the free text field notes are provided in Appendix A. Following the completion of the first phase of observations, we debriefed participants by explaining our aims and member checking our initial findings (Lincoln & Guba, 1985).

Table 1. The nine-point ordinal scale used to judge the impact of observed events as adapted from [12].

1.	Potentially distracting source, such as a pager that is not answered.
2.	Floating team member notices a distractor, such as a pager that is not answered.
3.	Floating team member attends to non-case distractor, such as the circulating nurse answering a pager.
4.	Team member is distracted momentarily from task, such as answering a phone whilst continuing with the primary task.
5.	Team member pauses the current task, such as an operating room nurse pausing her task for a discussion.
6.	Team member attends to a distractor, such as anaesthetist answering questions about the next patient.
7.	Team is distracted momentarily, the same as 4, but now two or more team members.
8.	Team attends the distractor, the same as 6 but now two or more team members.
9.	Operation flow interrupted, such as instrument failure, halting the procedure or someone coming in to discuss patient planning.

For the second phase of data collection, we focused observations on case-irrelevant verbal communication and smartphone usage, which we categorised as social activity. The role of the observer changed from passive observation to participant observer. Observers were asked to ensure that after the sign-out, the team make a judgment on whether they had kept quiet when needed. Their presence facilitated disclosure in small, informal conversations and enabled the observer to ask clarifying questions.

Analysis was performed in an inductive iterative process concurrently with data collection by the observer and a second investigator. We continually looked for differences and similarities within and between themes and this informed subsequent data collection.

After the first member check, the expanded field notes were read independently by all authors to diverge in interpretations as much as possible, resulting in a list of codes and their subsequent themes. The observer and second observer expanded this list in the next procedures. After 28 procedures in phase two, all authors read the field notes independently again, but no more themes emerged. They converged the list by consensus into four overarching concepts that served as a framework to present the results.

The qualitative data are presented in summarised observations, short extracts or quotes, and vignettes. These vignettes serve to evoke a vicarious experience, facilitating translation of findings to other settings (Abma & Stake, 2002). The selection of these vignettes has been guided by their potential to learn from it about the role of social activity in the operating theatre. Using a previously published observation scheme as a reference, we chose to present means instead of medians for reasons of comparability with earlier studies (Healey et al., 2006). Furthermore, to correct the frequency of a distractor for the impact of that distractor, we chose the interference criterion to determine the most prominent distractions (Table 2). For the analysis and discussion, we used previously published definitions of interruption, distraction and disruptiveness (Boehm-Davis & Remington, 2009). All quantitative analyses were carried out using IBM SPSS statistics 24.

Table 2. Definitions used in our study as adapted from [11,12].

Term	Definition
Distractor	The trigger that can cause one to become distracted.
Distraction	A momentary lapse of attention on the primary task without suspending it. Examples: answering a question while continuing with the task; listening to a story told by one of the team members while going on with the task or pausing for a moment; thinking about a private problem while fulfilling the primary task.
Interruption	The suspension of the stream of work prior to completion, with the intent of returning to and completing the original stream of work. Examples: pausing to answer a phone; waiting for an instrument to be replaced. Interruptions always create a distraction. Consequently, distractions include interruptions.
Disruptiveness	The degree to which interruptions have negative effects on the control of the process and are unsettling for a person and/or a team.
Impact	The extent to which a distractor leads to a pause and to which it involves more individuals. Example: When the procedure comes to a halt it is significant, because this takes time and includes all team members.
Frequency	The number of distractors per h.
Interference	A rated frequency enabling the comparison of frequent distractors with little impact and rare distractors with high impact. As such it is a measure for the disturbance of the operative process.

Term	Definition
Induction	The time frame that starts when the patient receives an oxygen mask or is positioned for a spinal or epidural to the time of the first incision. During this time frame, the surgical team enters the room (if not already inside) and gathers around the table.
Incision to closure	The time frame that starts at incision and ends when the sign-out starts (when instruments and gauzes are finally checked, and postoperative plan is set).
Sub-team	A part of the complete operating team. The team in the operating room can be divided in the following sub-teams: anaesthetic team: anaesthetist, anaesthetic nurse, anaesthetic residents and trainees. surgical team: surgeons, surgical residents and trainees. nursing team: scrub nurse, circulating nurses and their students. Depending on the topic, the division can also take form along the lines of sterile team versus non-sterile teams. Sub-teams are not fixed but consist of shifting configurations.

3.2 RESULTS

Participants included 27 surgeons, 17 operating theatre nurses and 16 surgical residents. From the large anaesthesia team (~60 consultants, 37 trainees and 62 nurses), only two nurses and two consultants were dedicated to general surgery. Operating theatre nurses, consultant surgeons and senior anaesthetists had often worked together for several years. Performing a briefing at the start of the day, a time-out before incision, and a sign-out before leaving the operating theatre was standard procedure. In this hospital, smartphones were allowed in the operating theatre for professional purposes.

The total observation time during induction of anaesthesia and for the surgical procedure was 148 h which included 80 (54%) h for phase one observations and 68 (46%) h for phase two observations. Of these, 32 (22%) h were during induction of anaesthesia and 116 (78%) h during the surgical procedure. In total, 4594 distraction events were observed with a mean (SD) event rate of 32.8 (16.3) h^{-1}. Door movements were observed most frequently, with 11.7 (9.2) per h^{-1} and were common during induction of anaesthesia, where there were 28.1 (14.5) h^{-1}, but these had little mean (SD) impact [1.9 (0.4)] on participants. Equipment failures or missing materials were of the most impact [4.3 (1.5)] but were not frequent, with 1.1 (0.8) h^{-1}. Door movements were of the highest mean (SD) interference during induction of anaesthesia [52.2 (29.3)], and case-irrelevant verbal communication plus smartphone usage were of the highest mean (SD) interference during surgery [23.1 (12.9)]. The results of phase 1 that were used for member checking in phase 2 are in line with the overall results (Table 3).

Table 3 Impact, frequency and interference of distractors. The interference rating is impact multiplied by frequency from each source in cases where those events were recorded. When case-irrelevant verbal communication involved members of different sub-teams, the initiating sub-team was marked as the source. Values are mean (SD). Impact is measured on an 9-point ordinal scale [12]. Impact and interference are dimensionless and allow comparisons to be made between categories of distractions.

		Impact		Events per hour; n		Interference	
Induction of anaesthesia							
0	Smartphone	2.9	(0.9)	3.8	(3.0)	11.5	(12.3)
1	Door movements	1.9	(0.4)	28.1	(14.5)	52.2	(29.3)
2	Phone	2.5	(0.6)	4.5	(4.5)	11.2	(12.4)
3	Pager	2.7	(0.6)	5.7	(4.9)	15.4	(11.9)
4	Radio	2.3	(1.1)	2.7	(3.1)	5.8	(6.1)
5	Case-irrelevant verbal communication – surgical team	2.9	(0.6)	2.5	(2.24)	7.1	(6.6)
6	Case-irrelevant verbal communication – anaesthesia team	2.8	(1.0)	2.9	(2.3)	8.0	(5.9)
7	Case-irrelevant verbal communication – nursing team	2.6	(0.8)	4.0	(5.5)	11.4	(19.3)
8	Case-irrelevant verbal communication - external personnel	3.1	(0.2)	1.9	(0.9)	5.9	(3.1)
	Case-irrelevant verbal communication - overall	2.6	(0.7)	5.8	(5.3)	16.2	(17.6)
9	Equipment failure	3.6	(1.6)	2.4	(1.1)	8.2	(4.9)
10	Work environment	3.4	(1.1)	2.4	(1.1)	7.6	(5.4)
11	Procedural	2.5	(0.7)	2.2	(1.0)	8.9	(5.4)
12	Shutter	2.5	(1.1)	2.3	(1.2)	6.1	(4.4)
	Overall	2.1	(0.3)	42.0	(22.5)	90.6	(56.8)
	Incision to closure						
0	Smartphone	2.7	(0.7)	2.9	(2.2)	7.8	(6.6)
1	Door movements	2.1	(0.4)	6.2	(2.9)	12.7	(6.7)
2	Phone	2.4	(0.6)	6.0	(2.4)	14.7	(7.2)
3	Pager	2.9	(0.6)	1.2	(0.8)	3.4	(2.9)
4	Radio	2.7	(1.3)	1.1	(0.7)	3.4	(3.1)
5	Case-irrelevant verbal communication – surgical team	2.7	(0.9)	1.7	(1.1)	4.3	(2.8)
6	Case-irrelevant verbal communication – anaesthesia team	3.0	(1.1)	2.3	(2.2)	7.1	(7.5)
7	Case-irrelevant verbal communication – nursing team	2.5	(0.6)	2.6	(1.9)	6.1	(3.9)
8	Case-irrelevant verbal communication - external personnel	3.0	(0.8)	1.7	(1.6)	5.1	(5.8)
	Case-irrelevant verbal communication - overall	2.7	(0.6)	6.7	(3.6)	17.9	(9.8)
9	Equipment failure	4.4	(1.6)	1.2	(1.0)	5.2	(4.8)
10	Work environment	3.1	(1.0)	1.0	(0.7)	3.2	(3.0)
11	Procedural	2.2	(0.6)	3.7	(3.0)	8.9	(8.7)
12	Shutter	2.9	(0.4)	2.8	(1.8)	8.1	(5.2)
	Overall	2.5	(0.3)	28.3	(8.9)	72.4	(28.7)

Most case-irrelevant verbal communication concerned 'small talk', defined as polite uncontroversial conversation. Work related case-irrelevant verbal communication typically concerned the planning of the next case or focussed on the education and learning of junior team members. In this study, smartphones were used frequently 337 (7.3% of all distractions) and most of the time 248 (73.5% of all smartphone usage), this was for private purposes. Typically, smartphones were used in silence and distracted the smartphone user rather than other team members. We observed incoming messages distracting the user and the user seeking distraction by sending messages or scrolling for information. Information retrieved from the smartphone sometimes triggered case-irrelevant verbal communication. We categorised all this as smartphone usage and case-irrelevant verbal communication.

Key themes with their accompanying extracts have been selected to illustrate both the typical observations and responses collated and the diversity and breadth of the data set. Four key themes emerged: low workload; disruptiveness; division of professions; and resilience.

Low workload

Low workload means being without active tasks. Passive tasks include monitoring, being available for requests, and watching the work undertaken. Low workload may occur when staff have few tasks at hand. These low workload episodes are not easy to avoid, as Extract 1 illustrates.

Extract 1 - Anaesthetist S

The anaesthesia nurse is attending a stable patient and Anaesthetist S is talking to another participant for some time when she says '*I really don't know what I have to do here, I feel pretty useless*'. Not long thereafter, she is leaving again. Later that day, the observer encounters her by chance when she is going home. The next conversation evolves.
Observer: 'Did you have a good day?'
Anaesthetist S: 'No, I have the feeling that I really didn't do much today, that doesn't feel good.'
Observer: '*How come?*'
Anaesthetist S: 'All rooms I had to supervise went very well, but I have to stay around because if anything goes wrong, I have to be there in seconds.'
Observer: 'And it is not possible to work on one of the terminals in the operating theatre complex?'
Anaesthetist S: 'No, I really can't concentrate there because I have to check my patients regularly, […] there are a lot of persons walking around there asking questions.'

Vignette 1, 2 and 4 (Table 4) provide further examples of participants in periods of low workload. Observed behaviours in these examples are talking, walking around, engaging with a smartphone and educating students. On other occasions, we saw participants yawning, rubbing their eyes, looking around, gazing, preparing for the next procedure, refilling stocks, or dancing to music.

We inferred that talking during periods of low workload, like the nurses in vignette 1, serves the need to stay active and alert, and sometimes even to fight the risks of fatigue. The behaviour of the surgeon in vignette 2 and anaesthetist S in extract 1, illustrates the inclination or urge to be active. The rise in talking after induction of anaesthesia and before the first surgical incision, as in vignette 1 and 4, again might illustrate this need for activity. Low workload evokes strategies to stay active and feel socially comfortable. Case-irrelevant verbal communication and smartphone usage are amongst those strategies. Making a distinction between work-related and private case-irrelevant verbal communication or smartphone usage may be useful, but should not be the basis for valuing their putative disruptiveness. Depending on the context, private small talk can contribute to better performance, and work-related education can be disruptive.

We observed that different team members had low workload during different phases. Low workload for the anaesthesia team was typical when the patient was anaesthetised and haemodynamically stable. They were observed to monitor the vital signs and refill medication. For long procedures, without many requests for materials, this was also the low workload phase for the circulating nurse. For the surgeons, the low workload phase was the period in which they waited for the team to prepare for surgery, and also the phase of closing the wound which they often left to the resident. Cycles of action and low workload were asynchronous for the sub-teams. Therefore, the evoked strategies to stay active and connect socially were often helpful for one sub-team but disruptive for the other. To establish the level of disruptiveness, the whole must be considered.

Disruptiveness

Disruptiveness is the degree to which interruptions have negative effects on the process and are unsettling for a person and/or a team, whereas interference is the impact multiplied by frequency (Table 2). On member checking the findings of the first phase with the operating theatre nurses, there was surprise that case-irrelevant verbal communication was of the highest interference. Their main concerns were with the phones and pagers of the surgeons, and a change of surgeons during the procedure. In their view, these distractors often lead to a risky situation of multitasking and cognitive overload.

Table 4. Four major themes emerged from the qualitative analysis. Four vignettes are given in which case-irrelevant verbal communication and smartphone usage occurred. Vignette 1-3 are examples of disruptive social activity for one of the sub-teams. Vignette 4 exemplifies a situation in which case irrelevant communication and smartphone usage are handled such that they do not become disruptive and are supportive for the team.

1. **The distracted surgeon**
The surgeon, the resident and the scrub nurse are operating on a patient. The anaesthesia team is talking about an upcoming professional examination and rehearsing their knowledge in a low voice. The circulating nurse and a student nurse are sitting on a stool watching their smartphones when suddenly, they start laughing at a video they are watching. The nurses find humour in this and the anaesthesia team becomes interested and joins the conversation. At the end of the procedure, when the silence-to-concentrate is evaluated, everyone expresses their satisfaction with the conduct of the day. The surgeon and the observer leave together for lunch. When asked about distractions, the surgeon admits, 'I was distracted by the gossip about the video. It made me curious and I wanted to see the video as well. I had real difficulty concentrating on the procedure.' Observer: 'So why did you not mention this in the evaluation of silence-to-concentrate?'
Surgeon: 'Well, I didn't want to be a bore. The next day we have to work together again, you know.'
2. **The interrupted anaesthetist**
In the briefing at 0805, the team decides that one anaesthesia assistant will guard the silence-to-concentrate. After the briefing, everybody but the anaesthesia team leaves the room. At 0830, the patient lies on the table and the anaesthesia team is administering induction agents. A trainee surgeon enters the operating theatre: 'Good morning everybody!' He turns to the observer and asks loudly, 'You are watching for distractions?' The observer whispers 'Yes'. The trainee surgeon, turning his eyes to the table, 'Oh I thought the patient was already asleep'. A few minutes later, the trainee, who is circling around the patient and touching the patient, is asked whether he is willing to insert the urinary catheter. He answers ironically, 'Sure, that is my hobby'. When finished, the anaesthetist asks, 'Would you mind putting on a mask, we opened a sterile set.' Her voice has a slightly higher pitch when she says, 'We have to take care that we are not going to be in each other's way.' Up to this point seven persons entered the operating room and leave again, without an obvious reason. They all came in talking, greeting and asking questions. Additionally, the ultrasound machine is not working and the anaesthetist has to fetch another one before they can proceed.
3. **The multitasking circulating nurse**
A patient with an acute traumatic injury is on the operating table. The team agreed to focus on no entrances during induction of anaesthesia. Nevertheless, there were 13 entrances. By now, the first senior circulating nurse is walking up and down to fetch materials and meanwhile, answers questions from the surgeons and the operating room phone, which is ringing all the time. Five times she answers requests with 'wait a minute' and once with 'just start with one thing at the time.' She mumbles to herself things like 'where did I leave my form?' There is a lot of movement, material failure, noise, music, loud talking about all kinds of subjects and a lot of apparatus that is to be put in place. There are 11 people in the operating theatre, but the second circulating nurse has her coffee break. The anaesthetist, looking at the situation, remarks to the observer: 'I go nuts, what an exhibition, I really need a pill.'

4. **The resilient team**

Today, there is a long eight-hour procedure on and it will be performed by an experienced team. Main surgeon, nurse and anaesthesiologist are all aged > 50 y. The team agrees in the briefing that today they will be alert regarding minimising door movements and silence-to-concentrate. A few minutes later, only the anaesthesia team is in the operating theatre. The anaesthetist is talking to the patient to provide comfort while administering induction agents, when a nurse silently brings in a trolley. She accidently knocks over a metal stool that bangs on the floor. Startled and apologetic, she looks up to the anaesthetist. The anaesthetist just pauses to observe the reaction of the patient, - no reaction - and then continues calmly his comfort talk. The nurse mumbles softly to herself 'who put the stool over here' and places the stool aside. After induction and before the incision time-out, there is some chatting and joking. Therefore, the nurse calls a team member by name to get his attention and asks to put on the mask before bringing in the sterile material. The surgeon puts his smartphone near the computer station in quiet mode. Halfway through the morning, the anaesthetist shows a picture of his son on his smartphone to the circulating nurse. They talk about it with a whispering voice at some distance from the sterile team. Thirty minutes later, the circulating nurse assists the intern by explaining the views on the monitor and by offering relevant information on her smartphone. Around noon, a large part of the sterile team and one of the anaesthesia team members leaves for a 15 min lunchbreak. At several moments, team members disclosed to the observer that they really appreciated this team because they could work together so well. During the debriefing, team members complimented each other with the good results including the few door movements (22 in total) and silence-to-concentrate.

There were 365 phone calls observed. The nurses answered phones or pagers for the surgeon eight times, and twice they left the phone of the surgeon ringing out. These moments stood out in the memory of the nurses as disruptive, and they connect these events to situations of multitasking and cognitive overload. From our observations, we cannot confirm this connection, but we can understand that in a situation where there is multitasking and cognitive overload (Table 4, Vignette 3), any distraction can be seriously disruptive. Situations with many distractions at the same time may stand out in memory as disruptive much more than numerous non-disruptive instants of case-irrelevant verbal communication, which generated a score as highly interfering.

During member checking amongst participants, the surgeons remarked that 'small talk' in the operating theatre was not harmful. However, on several occasions individual surgeons voiced their displease with the case-irrelevant verbal communication of the nurses or the anaesthetic team, which was felt to be disruptively distracting (Extract 2 and 3, Vignette 1, Table 4). Thus, the surgeons expressed that they can experience small talk as relaxing and as disruptive as well, depending on the situation and on individual preferences. In this study, the preference for silence was not associated with the age or experience of the surgeon (Vignette 4).

Extract 2 - Surgeon H

A nurse was looking at her personal messages and shared the content of the messages with the team. Shortly thereafter, the following conversation took place:
Surgeon H: 'Are you enjoying the chatting?'

Nurse K: ‘Is it bothering you?’
Surgeon H: ‘No not at all, feel free to go on.’
A little later, the observer asked the surgeon: ‘when do you experience disturbance during a procedure?’
Sugeon H: ‘The chattering away during the operation this morning was really too much. I made a sarcastic remark about it, but the nurses didn’t seem to understand.’

Extract 3 - Surgeons B and D

During a small pause, the following conversation evolved:
Observer: ‘What do you consider disturbing during a procedure?’
Surgeon B: ‘I really hate all that prattling.’
Surgeon D: ‘Yeah, that they are going to talk about movies or spouses or that sort of thing.’

For anaesthetists, door movement was rated as the most interfering factor during induction of anaesthesia. However, it was the talking and greeting accompanying the door movements that disrupted them the most. We observed this on several occasions. Anaesthetists sometimes asked for silence during induction of anaesthesia, but more often they did not.

All professions agreed on the fact that a serious safety threat arises when there is a change of surgeon (extract 4, 5 and 6). We did not observe a change of surgeon, but we observed several times that the trainee, who had been there all the time, finished the procedure alone. Although the research team was in doubt whether to categorise the situation as a handover and/or as a distraction, the professionals all considered it a distraction. The situation as described in extract 4 was scored in the observation instrument as category 1 (person leaving) and impact 2 (the leaving was noticed by circulating participants). Category 1 did not generate a high interference. There was no category ‘change of surgical team’ in the observation instrument.

Extract 4

‘A nurse came to me to tell me that there had been a complication that I had missed because, from my position at the moment, I was not able to hear the conversation at the table. When surgeon T assigned trainee A to close the wound, he did not specify that the drain had to be unfastened. The wound was already closed partially and had to be re-opened. The scrub nurse noticed. If she had not, it might have caused a complication later on.’

Extract 5 - Surgeon K

Surgeon K: 'Most complications arise as a consequence of forgetting to perform the sign-out, a change of surgeon and leaving the closing of the wound to less experienced surgeons.'

Extract 6

'We presented the finding that a change of surgeon, a preoccupation of especially the nurses, was seldom observed. The participants responded to that by stating that this finding does not prove the nurses wrong because incidents from the past tell us that a change in surgeon, or leaving the resident to finish, poses a risk.'

In all of these findings, the interference rating did not match the experienced disruptiveness. All professions agreed that a change of surgeon or leaving the resident to finish the procedure was an important distractive event. This was, however, not a category in the observation instrument.

Division of Professions

The division of professions refers to the distance between professions, especially anaesthetists and surgeons, that becomes visible in space, interaction patterns, humour and the awareness of sub-teams. We observed that the operating theatre team are a collection of sub-teams, that each have limited awareness of the others perspective: the nurses; the surgeons; and the anaesthetic team. This lack of awareness in combination with asynchronous workload, influences the way distractions are handled in the team. In vignette 1, the circulating nurse nor the anaesthesia team were aware how distractive their conversation was for the surgeon. In vignette 2, the surgeon lacked awareness of the needs of the anaesthesia team. The anaesthetist tried to raise awareness, and to redirect the behaviour by giving a task to the waiting surgeon, but he did not respond in an understanding way to this. In vignette 3, the anaesthetist was aware of the needs of the nurse, but he did not step forward to intervene. The rest of the team lacked awareness and therefore, the team could not adjust to the situation effectively, for example by stopping the radio, asking for help, or coordinating communication.

We observed on several occasions that the surgical team left the room during induction of anaesthesia to create silence, showing they were aware of the necessity for it. However, it was often not clear at what instigation they returned to the room. Regularly, they came back when the anaesthesia team was not yet ready with administering drugs or intubating the patient.

In vignette 4, the whole team was aware of each other's needs. However, this was more an exception than the rule. The nurse as well as the anaesthesia team responded effectively to the distraction by the noise of the falling stool, and they were alert not to distract

others by their small talk, by choosing the right time, the right place and by adjusting their volume. Remarkably, this specific team had lunch together whereas usually every profession turns to its own corner of the canteen. Furthermore, in this team the green sheet, dividing the space of surgery and anaesthesia, was put up at such a height, that the anaesthesia team could easily watch the procedure and communicate with the surgeon. On many occasions, it was much higher, giving the impression to the observer that it served to shield the personal space for the anaesthesia team. Extract 7 shows a small conversation on this subject.

Extract 7

The surgical team is positioning the monitors and the anaesthesia team has positioned the green sheet at quite a high level, such that it might obstruct the view on the monitor for the anaesthesia team. The observer asks: '*Why has the sheet to be that high*?' The surgeon reacts by lowering the sheet and saying: '*There is no need to do so at all*'.

The team in vignette 4 was crossing cultural borders by ignoring the usual divisions in the restaurant and by lowering the green sheet. They had more awareness of the team. This awareness helped them to act appropriately and thus resiliently in the situation.

Individual Competence

Resilience requires awareness of the situation and acting accordingly. In most cases, lack of awareness seemed to be the bottle neck. The team tried to improve its awareness and handling of case-irrelevant verbal communication by making 'silence when needed' a common goal in the briefing and by evaluating it during sign out. Surprisingly, this hardly contributed to awareness of the needs of other team members. The team members rarely shared their need for silence (Vignette 1).

Reminding each other of the need for silence to concentrate during the team briefing was done consistently. However, the evaluation during the sign-out was performed less consistently. Sometimes, when the sign-out was not performed with the whole team, the observer evaluated with individual team members or in small groups. It appeared that when asked individually, participants were more negative about the shown awareness, than when they had to give their evaluation in front of the team. Participants tended to trivialise the experience of disruptiveness of case-irrelevant verbal communication in front of the team. This may have been the case when the surgeons stated during member checking that 'small talk' in the operating theatre was not harmful.

The anaesthetists asked several times explicitly for silence, yet conversations revealed that on several other occasions, they felt the need for it but did not ask for it. Vignette 2 shows how the distracted anaesthesia team was speaking up. First by elegantly requesting for help, later by saying 'We have to take care that we are not going to be in each other's

way.' In vignette 1 and 3, the surgeon and the nurse kept quiet about their need for silence, as did surgeon H in extract 2. If a team member does not share his or her need for silence, it becomes more difficult for the rest of the team to become aware of it and to act accordingly.

When asked why they kept quiet about their need for silence, participants answers were in line with those from vignette 1. They said they did not want to damage relations or their image. Apparently, one feels the expectation of being able to perform in a context with case-irrelevant verbal communication. Hence, it is framed as a matter of individual competence.

3.3 DISCUSSION

In all comparable studies (Antoniadis et al., 2014; Healey et al., 2006), case-irrelevant verbal communication formed a substantial proportion of the distractors. Phones, pagers and door movements came next. Other studies confined themselves to the surgical phase: incision to closure. In this study impact scored systematically lower than in other studies without affecting the relative importance of the categories of interruption and distraction (Fig. 1).

We found that case-irrelevant verbal communication and smartphone usage persist in the operating theatre because they fulfil a physical need to stay active and a psychological need to feel comfortable in the team in phases with low workloads. This is in keeping with previous suggestions that sitting next to others, doing nothing and saying nothing may precipitate tension (Goffman, 1971). It is also in keeping with earlier findings that conversations and jokes maintain relationships and minimise tension while still achieving goals (Lingard et al., 2002), for example when a waiting consultant makes a joke to relax a nurse. The nurse in turn, will be more inclined to return a favour later on, for example by staying longer or speeding up.

Contrasting the quantitative with the qualitative observations revealed that case-irrelevant verbal communication and smartphone usage have high mean interference scores, but that this does not necessarily reflect their experienced disruptiveness in a given situation. Case-irrelevant verbal communication is not always disruptive, and some teams handled it well, but most teams did not, mainly because of a lack of awareness of the needs of other sub-teams. This lack of awareness is fed by cultural divisions between sub-teams and maintained by keeping quiet about participants' own need for silence because of the prevailing culture of individual competence. The example of the resilient team shows that it is possible to bridge these divisions and profit from the positive functions of case-irrelevant verbal communication, while avoiding the disruptive consequences.

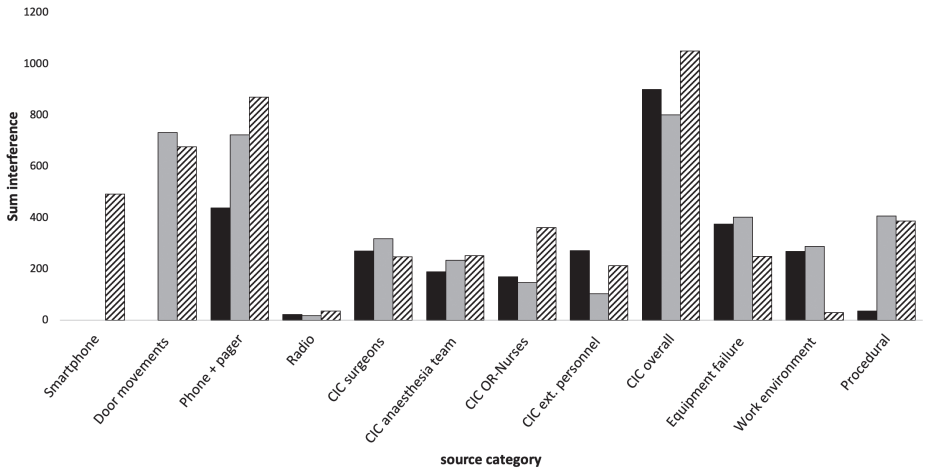

Fig. 1 Relative importance of the distractors during incision to closure in three studies.

Interference (frequency x impact) during surgery caused by different sources as measured in the study of Healey et al. 2006 (■), Antoniadis et al. 2014 (▒), Van Harten et al. 2020 (▨). Healey et al. did not count door movements. Smartphones were not counted in earlier studies. The pattern in all studies is similar.

There are several topics where our findings differ from earlier research on distractions, of were almost all were quantitative and most of the time restricted to one sub-team. We argue that our method and our scope of the team enabled us to generate some understandings that quantitative research focused on a single sub-team could not deliver. First, earlier research focused mainly on the relation between distractions and performance or outcome. Most studies, but not all, favour silence. Our ethnographic method enabled us to understand why case-irrelevant verbal communication and smartphone usage occur, or which function they fulfil. The understanding, that one needs something to stay active and to feel socially comfortable during periods of low workload, leads us to conclude that it is not expedient to expel case-irrelevant verbal communication, unless one has an alternative that would fill the void.

Second, team members can effectively adjust to the need for concentration, and case-irrelevant communication is not always disruptive (Widmer et al., 2018). However, in this study only case-irrelevant communication was observed within the scrub team from incision to closure. We rarely observed that sub-teams adjusted to other sub-teams, and consequently, case-irrelevant verbal communication was often disruptive. More importantly, our study implies that an observation instrument measuring the interference of distractors, generates an illusion of precision. We found that the interference criterion did not match the experienced disruptiveness. Disruptiveness of case-irrelevant verbal communication depended on timing, volume, distance, content, the simultaneity of other distractors, the availability of help, and the scope of the team. This complexity cannot be

built into an observation instrument. However, the researchers experienced the instrument as valuable, in that it fed the reflection in the team on what distractors really mattered to them. In this reflection, a new type of distractor came to the front: a change of surgeon or when a surgeon leaves during the operation

Third, the concept of a 'sterile cockpit' has been advocated as a potential remedy against noise during critical phases of a procedure, such as induction of anaesthesia (Broom et al., 2011). We argue that initiatives such as this apply very well to predictable phases. However, there are other critical phases that are less predictable and these events are different for different procedures and individuals (Wadhera et al., 2010). In informal interviews, we observed that team members do not always ask for a silent cockpit in unpredictable events, although as a team they agreed to do so.

Finally, our ethnographic approach gave us a holistic lens on the team and its cultural context, in which participants keep quiet about their need for silence. The arguments participants gave for not asking for silence came up in a study on barriers for speaking up (Beament & Mercer, 2016). The question of why team members, especially surgeons, feel it would hurt their relations or image has been addressed at length by others (Bosk, 2003; Jin et al., 2012; Orri et al., 2014). They describe the surgical culture as a culture of individual competence, the ability to operate effectively and efficiently. In a culture that unconsciously favours individual competence to operate under all circumstances above the team competence to create the optimal circumstances, it may not be possible to ask for silence. Campbell states 'distractions are common in anaesthetic practice and managing them is a key professional skill which appears to be part of the tacit knowledge of anaesthesia' (Campbell et al., 2012). We advocate to add a team perspective and organisational culture perspective to the professional skills perspective. If teams bridge their professional and cultural boundaries and develop mutual performance monitoring and mutual help, as did the team in vignette 4, they develop resilient behaviour in predictable and unpredictable situations.

3.4 PRACTICAL IMPLICATIONS AND FUTURE RESEARCH

Our study has important implications for clinical practice. Efforts to reduce disruptive distractions should not focus on new rules or training, but should instead stimulate situational awareness and mutual performance monitoring (Rutherford, 2017). This perspective is in line with the Safety-II approach (Hollnagel, 2014; Smith & Plunkett, 2019). This advocates learning from daily practice, because that provides daily feedback and offers the opportunity to develop new habits and routines. Therefore, learning to handle case-irrelevant verbal communication and smartphone usage might be a valuable exercise

in developing resilience or, more specifically, a habit of cross-monitoring and mutual help. That habit will help in handling rare life-threatening situations as well.

Regarding future research, we think that quantitative observation studies are useful in facilitating local reflections. But to further scientific knowledge there should be more participative action research methodology, to understand how we can bridge cultural borders and develop resilience. We might even need to rethink the concept of quality of care (Koksma & Kremer, 2019). We note that different research methodologies in the field of quality and safety are now upcoming and hope to have made a valuable contribution to that line of research.

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Competing Interests

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Illustration 5. Dead end path

Intermezzo

Pade Crom ende Menich Foude[1]

1 This phrase, meaning “the manyfold crooked paths”, is taken from the Flemish version of Reynard the Fox, and is mentioned in the prologue of this dissertation.

We—six women of varying ages, and no doubt differing degrees of artistic ambition—spent five days in a small, wool-strewn room, each of us working towards a grand goal: creating a tapestry. In my case, it was about the crooked path of doing a PhD trajectory. Now, some might say that five days isn't nearly enough time to master such a craft. But I, ever the optimist, secretly thought, 'Why not two tapestries: one of the crooked path and another of a murmuration of starlings? How difficult can it really be?' Our workshop leader, with years of scientific, practical, artistic and educational experience, sets us off on our creative journey. First, we design our tapestries on paper, we calculate how much it will shrink, and we produce a trial run on a small scale. Special techniques are practised, materials are collected.

I had no idea that there was so much to know about wool. My workshop leader suggests we use needle felt (thin layers of fine haired merino pricked together) as a base layer and then 'paint' the tapestry with fine merino wool top in the perfect shades for our design. I, however, had other plans. I'd come to the workshop armed with boxes of wool from sheep that had lived charmed lives in my own neighbourhood. It seemed a shame to use anything else, and besides, why take the easy route when you can challenge yourself, right?

By day three I was still experimenting with my materials, but time was ticking. So, I started to lay down all wool for the tapestry discovering that I had too little wool of certain structures or colours. Improvisation was my only option. I had a sudden flash of inspiration and switched up the design entirely. With all areas covered, I stepped back and realised that large parts of my masterpiece looked rather… dull. I searched for additional materials and threads, picked up some snips of organza from the floor, borrowed fleece from my fellow artists, and in a state of frantic flow I finished the design just in time.

The next day arrived, bringing with it the soap-sudsy ritual of felting. This was the hard labour part. I was hoping for a smooth ride, but of course life had other plans. The golden circle I had painstakingly crafted refused to stick to the background. I tried again and again, noticing that some colours started to fade, and the background wool was coming to the front - the consequence of not using needle felt. Thus, I decided I would sew the rebellious golden circle onto the tapestry later.

On the final day, we made the last-minute tweaks and just after lunch, we gathered to view each other's creations. Some tapestries were finished; others still needed work. We had all discovered, that despite all the meticulous planning, the final outcome was far different from what we had envisioned. But there we stood, each of us content and having learned the true lesson of tapestry-making: the learning evolves in the chaotic process of the doing.

This lesson is also applicable to learning how to conduct research. In the first study, I felt lost at the start. There was a lot of ethnographic material, but where should I focus? Gradually, the theme of time pressure emerged from the chaos. And as I began to write my article about it, the message of the article started to take shape. Despite my mentor encouraging me to stick to the description of a slice of life, and despite my knowledge of complexity theory, my mind kept searching for causal relations. When analysing with theory on mindful organising, I concluded that changing the 'war stories of leaders' might foster heedful relating and mindful organising. The logical next step seemed to be to design a study in which, following an incident, all participants would exchange their 'war' stories and lessons learned. By facilitating the conversation, a new type of war story might emerge. However, it became a dead-end path for several reasons. One of these was that it required considerable time from all participants, which created a barrier to qualifying and reporting events as an incident. I had to explore other paths.

Around that time, I happened to mentor a student willing to conduct an observational study on distractions in the operating room. I didn't yet know how to connect it to the theme of time pressure, crew resource management, or teamwork, but intuitively I organised the data collection in such a way that it might be used for a scientific publication in my PhD trajectory. It appeared that periods of low workload (idleness), teamwork, and distractedness were closely connected.

However, it seemed that I had no talent for academic writing; the first article was repeatedly declined, and halfway through the process, I fell into the trap of a predatory journal. With help from the legal department, I was able to free myself from that. Furthermore, I saw no possibilities for additional studies besides my full-time job. I felt lost. I informed my supervisor that if I did not find financial resources, I would finish the articles but stop the PhD trajectory.

Having just returned from my holiday, a colleague-friend drew my attention to a ZonMw grant on Safety II, which had its closing date less than a week away. This was the opportunity I had been waiting for! I took immediate action, and together with a paediatrician and a hospital quality advisor we managed to submit the proposal just in time. Once again, I had seized the opportunity that Fortuna had offered me.

Up until then, I had not made it easy for myself. I deliberately chose a supervisor I knew for her responsive evaluation approach and her expertise in action research, both unfamiliar concepts in the medical world, and I started without a budget. I persisted on this path because I believed that this type of research would provide insight into the real lived experiences of professionals and produce results that would benefit them. In my search for control during uncertainty, I sought new concepts that opened fresh perspectives fitting the situation. These new concepts changed my perception of reality and fuelled transformative learning. This learning was accelerated during writing. Scientific writing required me to

search for other studies on the topic. It also forced me to present my insights in a structure that was recognisable to others and that articulated the knowledge more clearly for myself as well. At one point, I tried a different format, an auto-ethnography, but I had to return to the code of conduct.

In the story of Reynard the Fox, the dark, bushy world with many crooked paths that houses his den is ambiguous, in contrast to the straight, broad paved streets where King Noble travels and holds his court. It is an unsettling environment, full of holes, barriers, and dead ends. It is a liminal space that medieval pilgrims must cross before they reach places of serene natural beauty or the house of God. Right or wrong are on the side of both the Fox and the King, with his greed and vanity, but in the end, the Fox embarks on a pilgrimage, while the King heads towards a pot of gold.

In medieval philosophy, the macrocosm is reflected in the microcosm and vice versa. All elements of the physical world are signals of the larger spiritual world. In theory on fractals and complexity, the repetitive patterns in the physical world are visualised and mathematically described, both at the level of the macrocosm of the universe, city structures, and plant forms, as well as in the microcosm of molecules. This is visualised in the well-known animation Cosmic Zoom (1968) by Eva Szasz. Contemporary theory on social complex adaptive systems describes the regularities in transformative processes in communities, organisations and groups.

In this intermezzo, I have sketched the similarity in the transformative processes of felting a tapestry and conducting a PhD research trajectory. In the second part of this dissertation, the reader may notice that the process I described in this intermezzo, also occurs in the participatory research team and at the ward when they learn to transform their ward practices and learn how to learn.

Learning to felt a tapestry, a single transforming process

Learning to do a research trajectory, multiple transforming processes

Team learning for transforming ward practices, multiple transforming processes in multiple stakeholders.

In the studies done at the ward I grew gradually to live in the complexity more and more. My mind no longer aims to discover causal loops, but tries to sense the patterns and connections, to participate in them and seize the occasions to the benefit of all. I still experienced every now and then despair and not knowing, but also more and more trust that that is a temporary phase before attaining the next level of understanding and skill.

By taking the fragment about the crooked path from Reynard the Fox in the prologue, illustrating the way of not-knowing and liminality, I honoured my background in Dutch Language and literature besides psychology and business administration. By giving shape to my intuitions about transformation into a tapestry I connected head, hart and hands and gave form to tacit knowledge. And by writing this intermezzo I foreshadow the second part of this dissertation, in which I learned to live with a social complex adaptive system, instead of observing it.

Illustration 6. Emerging Patterns

4

Interprofessional Learning and Improving at the Paediatric Ward. A Participatory Action Research Practising Safety-II Theory

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ABSTRACT

Aim

In the complex setting of hospitals professionals often lack time to improve patient safety. Safety-II theory advocates integrating safety improvement, patient participation, and interprofessional learning and proposes learning frequently from practice variability.

The aim of the research was to understand how interprofessional workplace teams can learn and improve daily from practice variability.

Method

Participatory Action Research (PAR) was conducted at a Dutch educational hospital paediatric ward to improve situational awareness in bedside ward rounds. Methods included 115 semi-structured interviews and participant observations of the interactions. The action research team consisted of a representation of all stakeholders and the first author, who introduced Safety-II concepts to reflect on their practice.

Results

The exchange of perspectives between parents, nurses and physicians, increased awareness of mutual expectations and experiences prompting individual learning. To foster collective learning at the ward, the research team introduced standards tailored to participants' concerns and stimulated everyday interactions about the ward round. This approach facilitated daily mutual perspective taking, expectation alignment, and recognition of practice variability thereby enhancing unit-wide learning and improvement. While aiming at increasing shared situational awareness, multiple improvements emerged simultaneously and unexpectedly including time management, professional pride, and job satisfaction. However, participants also discovered that lessons learned did not automatically spread to newcomers.

Conclusion

Everyday learning in hospital units can be enhanced through daily interprofessional interactions about expectations and supported by procedural standards. Fostering daily interactions and initiating standards that met participants' concerns, required the research team to spend considerable time addressing conflicting priorities. PAR proved to be a valuable and adaptive approach for learning, improving and engaging all stakeholders in a complex setting.

4.1 INTRODUCTION

The past decades have witnessed a paradigm shift in healthcare quality and safety (Junghans, 2018; Mannion & Braithwaite, 2017). The new paradigm emphasizes the vital connection between quality, a culture of continuous learning, and patient involvement (Hollnagel et al., 2019; Koksma & Kremer, 2019). In the new paradigm, often referred to as Safety-II, hospitals are seen as complex socio-technical systems and safety is defined as the ability to successfully navigate the stresses and tensions present in modern-day complex systems (Mannion & Braithwaite, 2017).

To improve quality and safety, Safety-II theory advocates to reflect and learn frequently from everyday practice variability that usually results in good care, as opposed to the widespread method of: learning from rare errors, performing root cause analysis, and implementing best practices proposed by outsiders (Hollnagel et al., 2019, p. 213) Practice variability refers to the variability in conditions that require variability in work-as-done. This differs from practice variety, which is usually associated with non-compliance and has a negative connotation. However, reflecting every day is not evident in hospital settings where professionals feel that they are already attending too many time-consuming meetings in addition to their primary duties. This is compounded by staff shortages in these workplaces. Also, it is not common for stakeholders (patients and relatives, nurses and physicians) to reflect together on their shared work processes in hospitals. Safety and core activity will no longer compete for resources if they learn to improve while working on their primary tasks (Hollnagel et al., 2019, p. 31). Then the process of improving will be more sustainable. Also, if an interprofessional team learns to improve while working, it produces its own interventions and adapts them to its circumstances.

Thus, a new safety science paradigm as well as limited reflection time requires hospitals to find ways to learn and improve every day on the job from everyday practice variability, incorporating experiential knowledge of patients. Several studies show the need to integrate patients' experiential knowledge in quality improvement (Abma & Widdershoven, 2014; de Wit et al., 2011; Myren et al., 2021; Myren et al., 2022). Advocates of Safety-II recognise an urgent need to appreciate the frontline efforts directed at improving everyday clinical work. They propose to embed these efforts within the formal organisational learning strategy instead of imposing work as imagined by office staff on the frontline workers (Sujan, 2018).

However, several studies have pointed out that complexity is easier to talk about than to act on (Haynes et al., 2020; Holmes, 2020; Rusoja et al., 2018). Therefore, practical examples of applying complexity theory to improve healthcare are scarce. Practical examples of interprofessional workplace learning with and from patients are equally rare. A recent review on interprofessional collaboration in surgical ward rounds concluded that there is a rhetoric on interprofessional collaboration, but that is has not yet become a reality,

notwithstanding its relevance for patient safety (Morris et al., 2023). Some educational studies have been focused on interprofessional workplace learning (Hamoen et al., 2021; King et al., 2019; Kuper et al., 2010; Liljedahl et al., 2023; Polansky et al., 2023; Stalmeijer & Varpio, 2023; Stoffels et al., 2022) and clinical learning environments (Bernal et al., 2023). However, these studies focus on the clinical learning of individual professionals in the workplace and not so much on the continuous and collective learning of the workplace. Our study aims to fill that gap by looking for tangible, real life, empirical ways a healthcare unit can learn on a collective level to improve quality and safety on an ongoing basis applying safety-II theory.

This article addresses the question: How can interprofessional workplace teams learn daily from practice variability? In this study the term 'interprofessional workplace teams' refers to both professionals and patients or, in our case, the parents of patients. To answer this explorative question, the researchers needed to start interprofessional daily learning in order to understand its process. In Participatory Action Research (PAR), researchers aim to collaborate with those whose lives or work are at stake to improve their lives which fits our explorative and actionable research question (Abma et al., 2019; Abma et al., 2017).

4.2 METHODS

Research Team and Reflexivity

Appendix 1 details the contribution of the co-researchers to the styudy. The names of co-researchers are fictitious except for the authors of the article. M (second author), paediatrician, and A (first author), action researcher and change consultant, were the study's initiators. M was the project leader and recruited the different co-researchers: two nurses, a ward manager, a ward physician (resident), a ward supervising paediatrician (educator), a junior consultant from the quality and safety department, and the director of the Foundation for Child and Hospital to guard the perspective of patient and family. All were female except for the paediatrician ward supervisor.

The action researcher is a professional senior change consultant and a PhD candidate. Her educational background is in psychology and business administration. She participated in all stages of the study, mainly by posing questions and holding biweekly online meetings with the project leader. She regularly mailed and telephoned the participating researchers to assess how the research progressed. The action researcher handled most of the data collection (interviews and observations) and facilitated the research meetings. All care providers in the research team participated in the daily ward rounds. To ensure the input of experiential knowledge of parents and children, parents were interviewed in their room at the end of every research cycle. All co-researchers participated in the analysis of the data and the decisions on and preparation of interventions.

Before starting the research, the action researcher and junior researcher spent one day at the ward familiarising themselves with the work processes and introducing themselves to participants. The action researcher was familiar with the processes in a hospital ward, from her experience as a consultant in another hospital. All participants were informed orally and by an information document about the research and the research team. Telephone numbers were provided in case participants wished for additional information. To the parents, the interviewer was introduced as an expert on quality and safety, who wanted to study how hospital care could be improved.

Design

Within the PAR, researcher A employed also ethnographic data collection methods to describe the work's complexity, contradictions, and conflicts as they appeared to the participants, and their efforts and concerns (Cook, 2019). The ethnographic methods included observing informal situations and interactions, asking for contextual information about the department, and making field notes of observations and conversations.

The study was multistakeholder and multi-phased and was organised as pictured in table 1. Findings from the previous phase were used as input for the succeeding phase. The research project ended after the reflection on action cycle 2. In this reflection the team decided on the actions for action cycle 3.

Table 1. Research Design

Phase	Goals and Actions	Data gathering
Introduction Forming the research team and goal setting (June)	Preliminary goal: Improving SA Learning how to learn daily	Discussion in the research team
Orientation Describing and analysing the current situation Definitive goal and deciding on actions in the next phase July-September	Reaffirmed goal: Improving SA Learning how to learn daily	Observations Questionnaires Interviews (at the ward and on the telephone) Small conversations Reading protocols Discussion in the research team
Action cycle 1 October-December	Actions: Improving SA by poster Adjusting the time frame Nurses speak before parents	Observations Interviews (at the ward and on the telephone) Small conversations Discussion in the research team
Action cycle 2 January- April	Actions: Refining posters and preparation of parents Adjusted Whiteboard Use of TRACTUS Leaving the telephone Cross monitoring and mutual aid	Observations Interviews (at the ward and by phone) Small conversations Discussion in the research team Member check participants (May)
Action cycle 3	Actions: Refining actions cycle 2 Adjusting protocols Structural periodic interprofessional meetings	

Participant Selection and Setting

The authors chose this paediatric ward of a Dutch educational hospital as the locus of research because it has the characteristics of a social complex system and they were interested in applying the concepts of Safety-II (Stacey, 2001; Turner & Baker, 2019). The complexity of the paediatric ward arises from its numerous acute, short admissions of patients with varying conditions and diseases. Also, a broad range of experts and parents are involved and there is a fluctuating and unpredictable workload. The patients in this ward were usually too young (under six years) to participate.

The chosen ward had 13 one-patient rooms. The inclusion criteria excluded children from other specialties to enhance research feasibility. Crying babies and anorexia patients were excluded in order not to burden those parents and patients. Some parents had more hospital experience than others.

The research team decided to focus on the daily bedside ward round as the opportunity for continuous learning and improving situational awareness (SA) as its improvement

goal. The ward round is a day-to-day work process in which all stakeholders — parents, supervising physicians and residents, nurses and student nurses — participate. The ward round has a crucial role in patient safety by creating shared SA. SA involves perceiving and interpreting the situation and anticipating what comes next (Kaber & Endsley, 2004). It enables teams or units to adapt to unexpected circumstances and act coordinated (Hollnagel et al., 2019, p. 98). SA is a core concept in Safety-II. The word medical visit is specifically used to refer to a single visit to a patient. The ward round consists of all medical visits on a day.

Data Collection

Observations and semi-structured interviews with all participants in the ward round were performed every cycle over two weeks from Monday to Friday to ensure enough variability in the observed groups. The number of parent interviews per day fluctuated according to the number of patients in the ward. In total 82 parents were interviewed during 29 observation days (Table 2).

Table 2. Number of Observations and Interviews

observation days	29
observed visits	110
interviewed parents/questionnaires	82
interviews by telephone	33
Research team meetings	10

Research team meetings were audiotaped and transcribed. The transcriptions were not returned for comment. However, the primary action researcher checked her interpretations with the team on an informal basis, which aligns with what Guba and Lincoln call a 'hermeneutic-dialectic process' to prevent bias (Abma & Stake, 2014; Guba & Lincoln, 1989). The research team learned from the orientation phase that questionnaires caused irritation among the nurses and physicians, and generated low-quality answers compared to short interview answers. Therefore, they chose semi-structured interviews instead of questionnaires in the following phases. During the interviews, participants were asked about their expectations, experiences, and wishes for the medical visit. Specific questions were asked about the interventions or changes that had been introduced. The interviews lasted 5-20 minutes. Parents were interviewed at the ward and via telephone when they returned home. This was to check whether parents rendered different answers once they were home. After two rounds, it appeared he process yielded little additional information. Thus, in the last cycle parents were only called if they had left the ward before the interviewer visited.

During the research, there were many short informal conversations and interviews about the ward round between the participants and the interviewing researchers. Typically, the interviews with the professionals took place in small groups in the nurse's station or the residents' room. Parents were interviewed in the patients' rooms. Whenever the action researcher engaged with one or more participants, field notes were recorded at the end of the day to reflect on the observations and the role of the action researcher.

Analysis

The research team discussed the observation and interview data after each research cycle. Three authors (A, J, T) analysed the observation and interview data, the transcripts, minutes and field notes. After action cycle one, data were coded and themes were developed. The codes were compared and grouped, and after some discussion the authors defined eight relevant themes.

The second coding, after closure of the research, did not lead to additional themes. All five authors participated in further iterative analysis and article writing based on the eight themes. In writing the results section the authors clustered the eight themes in four section headings (see Appendix 2). The codes, quotations and vignettes were translated from Dutch to English when the article was being drafted.

Authenticity and Trustworthiness

In PAR, the primary criterion is authenticity, whereby the participants recognise and confirm the mutual benefits of the results (Abma et al., 2019, p. 14). This was secured by research team's composition and the collaborative multi-stakeholder and multi-phased design of the research process.

The authors enhanced the trustworthiness of the research (Korstjens & Moser, 2018; Lincoln & Guba, 1985) through four procedures. First, they ensured transferability by providing thick descriptions (Shenton, 2004) and quotations evoking 'vicarious experiences' (Abma & Stake, 2014). Second, to enhance dependability and confirmability, the authors described the research design and data collection process in detail. Third, reflexivity was sought in all phases of the study by discussing the authors' conceptual lenses, assumptions, and the role of the participant-observer. Fourth, credibility was ensured by triangulation of methods, data, and investigators, and by prolonged engagement and member checking. Finally, the conversations with various stakeholders leveraged multiple perspectives and served the 'hermeneutic-dialectic process' that prevented one-sidedness and bias of the results (Abma & Stake, 2014; Guba & Lincoln, 1989).

Ethical Issues, Declarations

The institutional ethics committee: Medical Research Ethics Committees United (MEC-U) reviewed the study and determined the Medical Research Involving Human Subjects Act did not apply to this project: Niet-WMO advies MEC-U verklaring W21.026.

In addition to confidentiality and informed consent, the following ethical principles were considered: participation, mutual respect, reflexivity, representation, and power (Banks & Manners, 2012).

Parents received a lay version of the final report. All other participants were given the opportunity to engage in a discussion on the final results in a work meeting.

4.3 RESULTS

The nursing team comprised 40 female nurses of various ages, including student nurses, many of whom had worked in the ward for several years. Two male paediatricians (one more senior than the other) regularly supervised the ward, while eight paediatricians (a mix of men and women of various ages) supervised the ward on a rotational basis. Two residents served as the ward physicians for three months, and one intern for one week. The ward rounds were conducted five days a week at the bedside, involving the participants mentioned above, and parents and patients.

Participants refer to ‘the poster’ and TRACTUS in vignettes and quotations. The poster refers to a coloured laminated A4 material developed by the research team with pictograms and text to remind everybody of the timing, sequential steps, and the topics for the medical visit and to encourage parents to write their questions on the whiteboard in the patient room to which the poster was attached. TRACTUS is a mnemonic introduced to clarify what kind of information the physicians wanted to hear from the nurses and in which order to stimulate completeness of information exchange.

Discovering Differences in Expectations on a Daily Basis

During the weeks of data collection, the interviewer often mirrored in informal daily conversations what they had seen in the ward round or heard in earlier interviews. This way, the participants discovered that others held expectations, experiences, and interpretations other than they thought.

Vignette 1. An Iterative and Mutual Process of Discovering Differences in Expectations

Some parents did not know precisely what the physician needed from them. As a result, they took the nurses as an example. They shared information on oxygen levels, blood pressure, etc. The professionals realised that some parents needed some information before their first visit to understand the goal and procedure of the visit and the role of their specific experiential knowledge in it. Therefore, the nurses gave the parents more information than in the initial phase.

Nurse Anne: 'I did not show the poster, but I did tell the parents what was on it and that if they have questions, they can write them down. I think that was clear enough.'

In the subsequent step some nurses discovered that for many parents, just hearing information was not enough. Therefore, they started using the poster when engaging with the parents. Also, they ensured that discharge criteria were written on the whiteboard to help parents remember them and convey the information to absent relatives.

Mother Rianne (after instruction with reference to the poster) mentioned: 'That poster does help, then you dare to bring it in. In another hospital, I had the experience of forgetting questions every time and then thinking afterward 'hey, damn, I forgot to ask.' It is very good that it says here: write your questions on the whiteboard. I did that, too.'

Hearing the expectations, experiences and interpretations of others enhanced the readiness to accommodate each other. However, the individual insights and adjusted practices did not spread automatically to others on other days.

Periodically Setting Expectations for the Team

Knowing everyone had different expectations and assumptions about how the work would be done, the research team strove to align these expectations, by formulating standard operating procedures (SOPs) and developing visual aids such as the poster and a TRACTUS checklist.

Getting the research team together for a 1.5-hour meeting proved difficult enough, given the different schedules of those involved, the many projects, and the unpredictability of patient care.

Q5. Ward Physician Sonja: 'The meetings often took a long time when you have other tasks. For me, that was distracting during the meeting. Sometimes, I was already thinking about the work that was left, a physical examination that still needs to be done, e.g. you are with a small team and can therefore not transfer much, both for Rene and me that is difficult.'

However, spreading the shared goals and SOPs among peers (nurses and physicians) was challenging and time-consuming, especially in the orientation phase, where many colleagues were sceptical.

Q2. Nurse Gwendolyn during the orientation phase: 'There is only one thing that would really help to speed up decisions, that is the supervising paediatrician always attending the ward round. We said that very often before, but they will not do that. So, what's the use of this project?'

Q3. Paediatrician Gert: 'Is the ward round our biggest problem? This PAR approach is very vague; is this science?'

Q4. Paediatrician Rene: 'In retrospect, I really like being involved in this project, it is insightful. But to be honest, I started the project because someone had to do it. It took a lot of time, which I did not spend on my own project.'

Additionally, just informing peers was already difficult, especially for the nurses. Only few of the colleagues attended the work meetings and emails were often unread.

Q5. Paediatrician Margot in the last meeting: 'Structure is helpful, but it does take a lot of energy to introduce. Last week, someone still said: Poster? Poster? Are we doing something with a poster?'

Despite these barriers, the research team succeeded. Vignette 2 describes how.

Vignette 2: Developing Shared Goals through Constructive Conflict.

The data from the orientation phase were presented to the co-researchers by the first author. For every group (parents, nurses and physicians), the 'wings' of the butterfly in figure 1 was filled with specific examples. This showed the differences in perceptions and priorities between the groups, and the differences between work as done, prescribed, imagined and disclosed. The intention was to understand the differences without judgement.

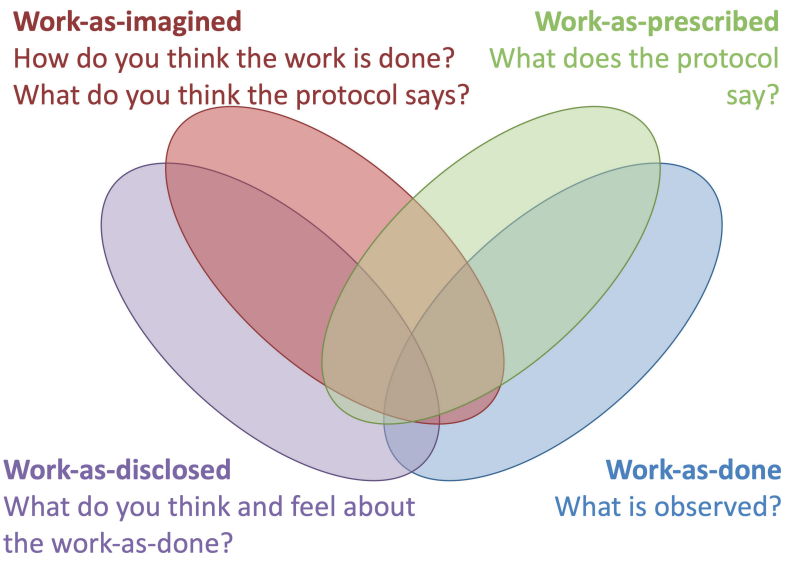

Figure 1. The Model used to Structure the Data of the Orientation Phase (adapted from Moppet and Shorrock (2018)) The model shows that the four domains overlap but also differ.

For the research team, the biggest eye-opener was seeing differences in their goals or priorities (work-as-disclosed) for the ward round. The paediatricians took pride in their roles as educators and valued teaching the residents and interns during ward rounds. They also appreciated that ward physicians were given the opportunity to conduct ward rounds independently, without the supervision of a paediatrician

The nurses felt that their expertise was not being used. The parents had already said so much that they had little to add to the issues that were raised. They had to listen to repetitive educational presentations by the physicians and, if the paediatrician was absent, they had to wait whole morning for decisions on discharges.

The parents appreciated that the team took time to listen and explain the process, that the physician took a chair to sit on during the medical visit, and many found the educational presentations interesting.

The research team concluded that all participants shared a common goal: enhancing clarity (situational awareness) regarding essential information about the patients' conditions and the treatment plans. Despite this shared objective, the differences between the groups became more pronounced and more harnessed. There was little exploration, and they disagreed on the conflicting priorities. However, afterward, they tried to accommodate each other. In bilateral conversations among the co-researchers and a small additional meeting between nurses and physicians they agreed on further arrangements.

Together they found a solution in which patient involvement, education, timely decisions and use of nursing expertise were better balanced (figure 2).

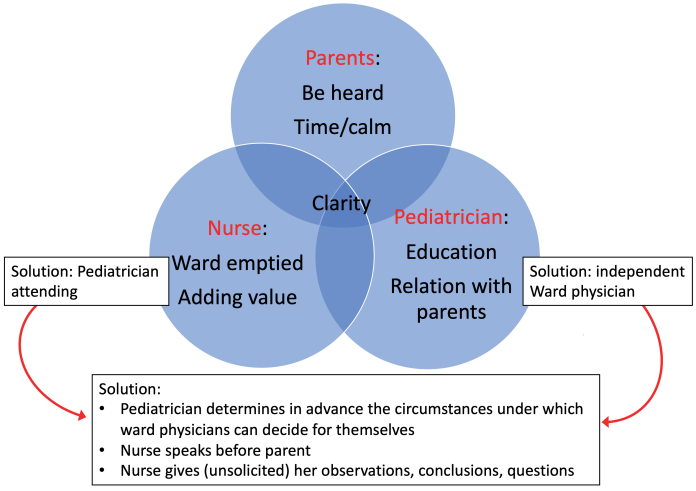

Figure 2. The process of Reconciling Conflicting Priorities

To the surprise of the physicians, the parents expressed that they were happy to listen to the nurses first and to hear that the nurses had watched over their children well and understood their concerns. The change in order was picked up quickly, even though some nurses found it challenging as it prompted them to prepare more thoroughly first thing in the morning. The change improved the completeness of information shared, clarified expectations, and recognized the nurses' position and expertise.

After each research cycle, the research team followed a consistent pattern: conflicting expectations and concerns were briefly and carefully exchanged during meetings, allowed to settle, and subsequently addressed through additional bilateral dialogues and interventions related to the ward rounds. The topics discussed within the research team reflected the heart felt issues of the broader team (see quotation 6). The proposed solutions were well-supported, fostering shared goals and expectations among participants and resulting in more improvements than initially anticipated. The research team also gained valuable insights into what they had learned and how they had learned it.

Q6. Nurse Jennifer: 'Because of the discussions after the orientation phase, I especially developed more awareness of the nursing role. I also felt that, […] you can express your own role and be more aware of your own profession that you are trained for. [...] Very often we were more caring than nursing.'

Q7. Ward physician Sonja: 'I think it is very important that you do it together and make the plan together. Thus, the process is just as important as the content. Some of the changes are things I have already experienced very positively in other hospitals: the use of the whiteboard, […] the struggle of who do you let speak first. These aspects, I believe, are widely shared. Therefore, it is the process itself that constitutes the learning here. This research created a nice team feeling to work on it.'

Q8. Action researcher Annet and Nurse Marie: A: 'Who is going to ask the Q8. daily questions about the ward round if I'm not there?' M: 'We might do that just as well. We can simply ask: What went well today, and what could we do better?''

Q9. Ward manager Anneke: 'I didn't know PAR, but now I do not want any other type of research any longer. It creates insight and it includes the involvement of the group. It is investigating and implementing at the same time.'

The team decided to continue their meetings after the closure of the research every three months as Table 1 shows.

Developing an Eye for Variability in Practice by Standards and Cross-Monitoring

Participants became aware of practice variability, after the research team introduced a more standardised way of sharing information and cross-monitoring by paying attention to the work of other team members instead of just performing one's own task. (Reeves et al., 2017; Sawyer et al., 2013)

Q10. Paediatrician Rene just before the introduction of TRACTUS): 'It really is a jumble of information now with all the tracts (organs and functionalities) mixed. Now that I pay attention to it, I notice that even more. It is so nice to be able to improve and change this.'

Initially the co-researchers were sceptical about succeeding in cross-monitoring and offering mutual aid.

Q11. Ward manager Anneke: 'It requires communication skills to do so, I don't know if everyone has those skills.'

In practice, communication skills appeared to be no problem. The barrier was the expectation that others would not appreciate the help offered.

Q12. Ward physician Jenny: 'The nurse was messy and did not have her picture in order and she caused noise about the paracetamol. I am not yet at the stage of giving Gwendolyn feedback on it. If I saw it more often I would. As a ward doctor, we have just been here for one week you know. I also just want to be liked; I'm very honest about that.'

Q13. Nurse Gwendolyn: 'I didn't feel like I missed things. I did try TRACTUS, but I sometimes get caught up because I react to what is said, and not everything has to be named. The order is illogical for me. Temperature is before paracetamol, but you often relate it to each other. I do have a cheat sheet because I don't have TRACTUS in my head, and I have a note with the vital signs. I keep finding TRACTUS tricky. I am an old hand and used to how things were. But it is good that we all give the same information and that we complement each other. I try to helpt he ward physician remember e.g., with patient Janneke, I said to Jenny: Maybe this afternoon a revision at a fixed time?'

When the interviewer revealed to the interviewees that both ward physicians and nurses were struggling to learn and appreciated help, they started doing so. It created team

spirit among participants, including parents, who often reacted with a smile when they observed mutual help.

Q14. Ward physician Bert: 'I felt helped by the nurse, for example when the mother of patient J. expressed nonverbally her concern about the afternoon. The nurse inserted very well by asking the mother "are you worried?". That's good; I might have said that, too. And I think I helped her by noting that the PEWS [Paediatric Early Warning Signs] was not zero. Nice that there is a culture where people appreciate the complementation.'

Spreading Lessons Learned

The research team was surprised to see that in the last action cycle, some improvements – or lessons learned- visible in the first action cycle, such as leaving the telephone behind and writing discharge criteria on the whiteboard, were lost again to some extent in the second action cycle. They had falsely assumed that when learning daily, lessons learned would spread. While individual learning was not impeded, they felt that learning as a team was hindered.

Q15. Ward physician Sonja: It is good that the poster is in the onboarding folder, but I think it is ambitious to think that everyone then has an active memory of the poster. As a newcomer, you have so much familiarisation information that you don't have everything ready. You learn by doing and following along. When doing the visit, it should be actively pointed out. [..] I was surprised that in the last round it hadn't improved in terms of time management and use of posters. Then you see that it is not so easily transferred between one team and the next.

4.4 DISCUSSION

The main research question was, How can interprofessional workplace teams learn daily from practice variability? The section below presents the key lessons from the research.

Individual Workplace Learning by Meeting Expectations

One of the main findings is that the exchange of perspectives on ward practices prompted interprofessional learning. This key finding aligns with Oborn's statement that multidisciplinary collaboration is about learning to talk in a new arena (Oborn & Dawson, 2010b). Also, this learning evolves by organising discussions, acknowledging other perspectives, and challenging assumptions, a dynamic the researchers also observed in our case.

The implicit premise of this research, in line with publications on Safety-II, (Hollnagel, 2014; Lawton et al., 2014; Patriarca et al., 2020; Sujan et al., 2024) was that participants would learn from practice variability. While the introduction of standards improved awareness of practice variability, as quotation 10 illustrates, most of the learning stemmed from interprofessional interactions in which expectations and assumptions were disrupted. Thus, participants did not learn as much from differences in work as done, but rather from differences in work as disclosed.

When expectations and assumptions were disrupted, they were immediately addressed to reestablish alignment. This way ward physicians and nurses overcame their hesitations to engage in cross monitoring and mutual aid. Nurses adjusted their instruction to parents, who in turn accustomed their contribution to the medical visit immediately after the interaction about mutual expectations. These results are consistent with the findings of Snoeren, Niessen and Abma (Snoeren et al., 2013).

The authors define workplace learning as the ongoing and relational adapting through the enactment of small and large perturbations in which both agent(s) and environment change and co-evolve towards enlargement of the space for possible action. This conception of learning builds on the work of Davis and Sumara, who view learning as enacted, happenstance, social and embedded in its context (Davis & Sumara, 2002; Davis & Sumara, 2005a; Decuyper et al., 2010; Snoeren, 2015). This offers an additional perspective to the Safety-II principles that seek to improve complex processes through a structured reflection on practice variability.

In conclusion, the findings suggest that, at least initially, individual participants did not learn from practice variability per se, but from the differing expectations and experiences revealed through communal interactions. These initiated the disruption and immediate adaptation, thereby fostering individual learning.

Workplace Learning as a Unit

A second key finding is that workplace learning as a unit was fostered by the research team initiating interventions that were attuned to participants' needs and concerns and provoked everyday interaction about the ward rounds.

In this way, the research team facilitated the transition from dyadic learning, occurring at the level of bilateral or small-group interactions, to learning at the unit level. This observation also aligns with Snoeren's case study in elderly homes (Snoeren et al., 2016).

Vignette 2 demonstrates how the non-judgemental Safety-II concepts helped the research team bring their different concerns and priorities to the discussion. It also illustrates that the co-researchers initially did not seem to reflect and learn but harnessed their conflicting priorities. This was found in a study on multidisciplinary learning as well (Oborn & Dawson,

2010a, 2010b). But by applying a complexity lens to learning (Davis & Sumara, 2005b; Decuyper et al., 2010; Snoeren et al., 2016; Snoeren et al., 2013; Van den Bossche et al., 2016) the authors perceived in the data an emergent pattern over time in which the professionals in the research team worked on their relations and their conflicting goals at the right time and in the right -informal- setting. They engaged in constructive conflict (Decuyper et al., 2010; Van den Bossche et al., 2016). In doing so, they opened up to a process of perspective transformation. This enabled them to develop interventions that effectively balanced patient involvement, education, timely decisions and use of nursing expertise. This way, they addressed their preoccupations and those of their colleagues.

Additionally, because the research team opted for cross-monitoring, mutual aid, and periodic interactive evaluations, as reported in table 1, they supported all participants in the ward round in interacting and changing perspectives. By agreeing to standardise certain practices, they facilitated the perception of practice variability and aligned expectations on how to perform the ward round. Consequently, these efforts led to collective learning and ongoing improvements at the unit level.

Notably, literature on interprofessional collaboration often identifies a lack of role clarity, and conflicting priorities and perspectives as barriers to effective collaboration (Wei et al., 2022). We redefined these issues as key opportunities to learn and improve as a team (including parents) and develop shared perspectives.

We conclude that the interprofessional learning developed by the co-researchers through constructive conflicts enabled them to initiate interventions addressing their colleagues' preoccupations, align expectations regarding each other's contributions to the ward round, and encourage daily interactions about their practice.

Time-consuming Learning and Time-saving Learning

The third and fourth key findings are that interprofessional learning processes proceed non-linearly and lead to many unexpected but interrelated outcomes, and that the nurses and physicians in the research team experienced the research as time-consuming.

Findings indicate that, by the end of the research, all co-researchers felt they had achieved far greater benefits than anticipated. They not only improved shared situational awareness (predefined goal and outcome), but also time management, professional pride for the nurses, work satisfaction and team spirit, a better position for parents, and several practical other improvements on the side (see table 1).

The emergence of unintended results aligns with the nature of change in complex systems. Safety-II theory recognises that, in complex systems, the components influence one another in a manner similar to an ecosystem—often in unpredictable ways. This is because

processes and conditions can resonate and amplify developments, leading to both positive and negative outcomes (Stacey, 1995).

The emergence of unintended results and ripple effects was also found in other PAR studies (Abma et al., 2019; Abma et al., 2017; Snoeren et al., 2016) Abma et al (Abma et al., 2019, p. 107) conclude that it is in line with the nature of change induced by PAR.

Moreover, the co-researchers acknowledged that they had realised practical improvements and gained insight into learning and improving by fostering daily interactions in the department and by thinking together with all stakeholders in the PAR research team (quotations 6,7,9).

This insight is crucial in the context of ongoing discussions within quality improvement science in healthcare. Dixon-Woods and Graham (Dixon-Woods & Martin, 2016) advocate for abandoning the pursuit of 'magic bullet' interventions and instead emphasising organisational strengthening, as highlighted in high-reliability studies (Weick et al., 1999) and resilience research into positive deviance (Hollnagel et al., 2019).

Despite the participatory action research (PAR) yielding more benefits than anticipated, nurses and physicians in the research team found the process time-consuming. The solutions developed for daily learning had not (yet) resulted in fewer projects or committees, and the ten research team meetings were perceived as an additional commitment. Physicians in particular, perceived their involvement in the research as time-demanding (quotation 1, 4). The difficulty in organising interprofessional meetings within the hospital is a commonly shared finding, stemming from the differing schedules and priorities of participants (Wei et al., 2022; Zerubavel, 1979).

Furthermore, the co-researchers realised that the daily effortless interaction was stimulated by the time-consuming observations and interviews conducted by the first author, and they were not used to initiating these interactions themselves (quotation 8, 11). Finally, the co-researchers noticed that turning new work procedures into a habit took a lot of effort (quotation 5, 15).

Nevertheless, when harvesting the results at the end of the research all nurses and physicians in the research team decided they wanted to continue their collaborative safety improvement meetings upon completion of the research (table 1).

Our initial premise was that integrating learning into everyday practice would ensure that improving safety and core activities would not compete for resources. However, we conclude that while the PAR has been efficient for improving their work, it did not eliminate the perception that improving safety and delivering care competed for resources. The PAR demanded significant time and attention from the research team.

The primary challenge for daily learning is using routine interactions among all stakeholders— parents, nurses, and physicians —to discuss not only patient care but also the nature of the work itself. The challenge for periodic interprofessional reflection lies in allocating dedicated time for interprofessional meetings and addressing and navigating conflicting priorities.

Limitations and Further Research

The researchers performed the study for one year in one setting to understand in-depth the dynamics and possibilities of daily learning. However, a year was too brief to observe whether the learnings the participants formulated would hold after the end of the research. The co-researchers noticed it was already difficult to bring the residents into the new working methods during the study. A year was also too brief to observe a reduction in projects and committees.

Furthermore, all co-researchers acknowledged that the action researcher had a decisive role in the daily learning of the team at the workplace and in the research team. However, units usually do not have an action researcher or facilitator at their disposal, which makes it more challenging to translate the findings to other contexts.

Further research will investigate whether the process can be reproduced in other settings, how the role of the external facilitating researcher in the team can be diminished, and how (individual) daily learning in the team can spread across all participants in the unit.

Practical Implications

Participatory action research might be embedded within the hospitals' formal organisational learning strategy to apply insights from a complexity perspective on quality and safety.

It is a co-evolving method for learning by action and reflection that fits in a Safety-II complexity perspective and that flexibly addresses the interrelatedness of safety, patient participation and the frontline efforts to improve everyday clinical work.

Declarations

Data Availability Statement: research data are not shared

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4.5 APPENDIX 1

Table S1. Contribution of Co-researchers

Researchers	Shaping	Generating	Sensemaking	Dissemination
Margot, Paediatrician project leader	Writing grant proposal, developing (initial) design recruiting researchers	Conducting informal conversations and three day observations and interviews. Sharing personal experience	participating in discussions about analysis and actions.	Writing research report for funder and lay language summary. Presenting results on congres, website and magazine.
Annet, Action researcher	Writing first draft grant proposal, developing (initial) design	Conducting observations, interviews and informal conversations, sharing personal experience. Making field notes.	Structuring observation and interview data, providing first analysis Facilitating discussions about analysis and actions	Writing first draft research report and lay summary. Presenting results to researchers from other hospitals.
Iris, Junior quality and safety officer	Making minutes conducting observations and interviews	Conducting observations, and interviews, sharing personal experience	participating in discussions about analysis and actions.	
Rene, Supervising Paediatrician	Thinking along with design, including interview and observation topics	Sharing personal experience	participating in discussions about analysis and actions.	
Hetty & Sonja, Resident paediatrician	Thinking along with design, including interview and observation topics	Sharing personal experience	participating in discussions about analysis and actions.	
Jennifer & Marie, Nurses	Thinking along with design, including interview and observation topics	Sharing personal experience	participating in discussions about analysis and actions.	Disseminating results on congres
Anneke, Ward manager	Thinking along with design, including interview and observation topics	Conducting one day observations and interviews. Sharing personal experience	participating in discussions about analysis and actions.	
Harmke, Director Foundation for Child and Hospital	Thinking along with design, including interview and observation topics Reviewing patient information letters	Sharing experience from similar research projects, garding the patient's perspective	participating in discussions about analysis and actions.	Disseminating results via website and adjusting existing promotional material
Katrijn, Senior officer quality and safety	Writing grant proposal, developing initial design			Reviewing and reacting to final report for funder and to dissemination materials.

The project leader Margot, was responsible for the organisation of the research and she recruited all researchers except for the nurses, who were recruited by the ward manager.

However, after the presentation of the orientation phase two nurses, Jennifer and Marie, brought forward that they felt they should participate in the research team, because they participated on a daily basis in the ward round whereas the recruited nurse seldomly did. Everybody agreed on that, and this coincided with leaving the hospital of the formerly recruited nurse.

Because the residents took up the role of ward physician for only 3 months, Sonja changed places with Hetty. Although in the last phase of the research Sonja was no longer ward physician in this department, she agreed to stay in the research team.

Action researcher Annet was responsible for action research methodology, collecting data, facilitating the research team, and writing.

4.6 APPENDIX 2

Table S2. Themes and Heading sections

Theme	Results section
1. Informal daily learning	1. Daily discovering differences in expectations
2. Confrontation with variance, other stances	1. Daily discovering differences in expectations
3. The presence of cues to trigger routines	1. Daily discovering differences in expectations
4. Team learning with PDSA	2. Periodically setting expectations for the team
5. Drivers for behavioural change	2. Periodically setting expectations for the team
6. Conditions for perceiving variety.	3. Developing an eye for meaningful differences by standards and cross monitoring (King et al., 2008; Sawyer et al., 2013).
7. Standardisation versus customized action	3. Developing an eye for meaningful differences by standards and cross monitoring.
8. Absence of contagiousness	4. Spreading lessons learned

Illustration 7. Navigating between Scylla and Charybdis, reinforcing patterns or losing the flock.

5

The Participatory Action Researcher: a Starling in the Murmuration.

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ABSTRACT

Aim

This paper explores how a participatory action researcher supported transformation across first-, second-, and third-person inquiry levels, informed by social complex adaptive systems (SCAS) theory.

Method

Drawing on a participatory action research (PAR) project in a paediatric ward, we describe how change unfolded at personal, interpersonal, and organisational levels. Using a "thinking-with-theory" approach, we analysed narratives as critical friends.

Results

We use the metaphor of a starling in a murmuration to describe the researcher's role: not in control but subtly influencing direction by alternately following and bending the existing interaction patterns. By initiating overlapping circles of interaction, she enabled the emergence of interference leading to improvements at the ward.

Conclusion

We conclude that the PAR researcher seized opportunities to act as a messenger for workplace issues related to belonging and authority. This way she paved the way for direct interaction between professional silos on the work floor and parents. Addressing these issues released the energy among nurses and physicians in the research team to engage in constructive conflict. From this conflict, initiatives emerged, interfered, and transformed ward practices.

By enduring the discomfort of participating in constructive conflict, alternating between yielding and confronting connection, PAR researchers can influence transformation without controlling it.

Theoretical Contribution

Our findings contribute to action research theory by demonstrating the usefulness of SCAS theory in revealing patterns and interconnectedness of first-, second- and third-person inquiry, and to SCAS theory by showing how desires for belonging and authority drive cross-professional interaction.

5.1 INTRODUCTION

Safety is a fundamental value in hospital care. Over recent decades, perspectives on safety have evolved to acknowledge the complexity of healthcare organisations. A complexity perspective encompasses various approaches, including general systems thinking, systemic thinking, and organisations as (social) complex adaptive systems. These approaches share a focus on interactions, heterogeneous agents, self-organisation, non-linearity, interference, emergence, and feedback loops (Griffin et al., 1998; Homan, 2023, pp. 82-110; Phelps & Hase, 2002). In hospital care, Hollnagel and Braithwaite (Braithwaite et al., 2015; Hollnagel, 2014b) are influential thinkers who translated complex adaptive systems (CAS) theory to quality and safety improvement in hospitals under the banner of Safety-II, distinguishing it from the predominantly positivist Safety-I approach. However, there are still few examples of the practical application of complexity theory, or, more specifically, Safety-II theory (Phelps & Hase, 2002; Sujan, 2018).

In line with this theoretical shift, the Dutch government launched a national research programme on Safety-II (2021–2024) to explore its practical application in hospitals. The participatory action research (PAR) presented in this paper was part of that programme, An earlier publication addressed its practical implementation (van Harten et al., 2025); here, however, focus on the role of the PAR researcher.

A core principle of PAR is that research must respect the interests of those whose work or lives are studied and seek transformative action that serves them. To meet this principle the PAR researcher must engage in first person action research or self-reflective practice. This involves cultivating an inquiring stance towards one's own actions, acting choicefully and with awareness, and assessing effects in the outside world while acting (Reason & Bradbury, 2008, p. 6). This is often referred to as *reflection-in-action* (Coghlan & Shani, 2021; Gearty & Coghlan, 2018; Schön, 1983) in contrast to *reflection-on-action*, which takes place retrospectively. Marshall (2004) and Torbert (2001) emphasise the need to integrate first-, second-, and third-person perspectives in real-time and call for methodologies that do so. Building on this, Coghlan & Shani (2021) advocate abductive reasoning as a way to connect these levels of inquiry. Yet few studies examine their interconnection in practice through a complexity lens.

First-person inquiry involves practitioners developing awareness of their own actions and effects through reflection-in-action and on-action (Marshall, 2004; Schön, 1983). Second-person inquiry focuses on collaborative learning between practitioners, while third-person inquiry addresses broader systemic change and knowledge dissemination (Coghlan & Shani, 2021). Marshall (Gearty & Marshall, 2021; 2004) pioneered systemic approaches to first-person inquiry, emphasising how individual awareness is linked to wider patterns. However, most action research studies focus on single levels rather than examining their integration (Bradbury, 2024). Few studies have used complexity theory

to understand how these levels interconnect in practice, despite calls for such integration (Davis & Sumara, 2005a; Turner & Baker, 2019). This gap is significant, as action research's participative and emergent qualities align with CAS principles of self-organisation and non-linear change (Phelps & Hase, 2002). By examining how a PAR researcher navigated all three inquiry levels through the lens of social complex adaptive systems (SCAS) theory, this study seeks to address that gap.

The research question guiding this article is: How can the participatory action researcher, contribute to transformation, drawing on social complex adaptive systems theory?

We aim to support the interpretative work of other PAR researchers by enabling recognition of the interconnectedness of first-, second-, and third-person action research through a detailed account of how transformation evolved. Furthermore, we seek to contribute to the development of theory on both SCAS and PAR.

5.2 METHOD

Data Selection and Presentation

We chose to use reflection-on-action to examine how the PAR researcher contributed to transformation. First-person action research involves reflection-in-action, defined as 'widening our awareness to include possible incongruities among our intent, our strategy, our actual performance, and our effects' (Torbert, 2001, pp. 250-260). This definition reveals the interconnectedness of first-, second- and third-person inquiry. While our research closely aligns with this, it differs in that the reflection primarily took place afterwards.

During the action research (van Harten et al., 2025), the PAR researcher documented her observations, interviews, telephone calls, emails, and meetings through transcripts, minutes, and field notes. She reflected on her feelings, bodily sensations, actions, conscious thoughts, and unconscious culturally imbued assumptions in her field notes, in bi-weekly meetings with the project leader, and in peer discussions during a course on autoethnographic writing.

Stories reveal and elucidate underlying patterns (Heron, 1992, pp. 165 - 168; Heron & Reason, 2008). Therefore, we present detailed accounts of specific situations, articulated from PAR researchers' perspective and shaped through feedback and questioning by three critical friends (co-authors) and peer reviewers.

Situations were selected based on the learning potential they offered in relation to the main research question (Abma & Stake, 2014). These excerpts best illustrate PAR researcher's inner thoughts and feelings regarding her contribution to transformation, the interactions

and perspectives of other participants, and the interferences that occasionally occurred in cycles of action and reaction, leading to the transformation of their work. Collectively, the accounts illuminate the connections between personal, interactional, and systemic developments – corresponding to first-, second-, and third-person inquiry (Torbert, 2001, pp. 250-260).

Citations were translated from Dutch. Given the frequent use of incomplete or ungrammatical expressions in spoken language, some sentences were refined to better convey their intended meaning and enhance readability. To ensure anonymity, additional data are not publicly available, and all names are fictional except for the PAR researcher, Annet, who is also the first author.

Analysis

Following the conclusion of the research, all authors of the paper acted as critical friends and engaged in 'thinking with theory' (Jackson & Mazzei, 2013), discussing the PAR researcher's reflections to explore how her actions had contributed to transformation. All authors were also involved in the analysis and writing of the second-person action research publication (van Harten et al., 2025) relating to this case.

Thinking with theory aligns with our commitment to a horizontal epistemology (Schuurman et al., 2024). By 'plugging in' theories, this approach explores which new insights or narratives may emerge. It honours complexity and challenges binary distinctions such as knower/known, theory/ practice, and mind/body. Through an iterative process, we concluded that the theory of transformation in SCAS, when combined with theories of desires, provided the most illuminating perspectives and practical implications for future participatory inquiries.

Theory

Safety II applies CAS theory (Braithwaite et al., 2015; Hollnagel, 2014b) to improve healthcare. CAS theory describes how complex systems adapt to their environment or transform over time. Several authors (Griffin et al., 1998; Phelps & Hase, 2002; Turner & Baker, 2019) have outlined the development of CAS theory and it's connections to general systems theory and action research. While there is no universally accepted definition, several interrelated concepts are commonly associated with CAS.

- Complex systems are often characterised by emergent recurrent patterns - such as fractals – where micro-level patterns resemble those at the macro-level.
- Transformation occurs under the following conditions:
- Frequent interactions between neighbouring agents
- Sufficient variety among these agents

- Decentralised control, where all agents influence the system, but none is in sole control
- The ability to navigate frictions and operate at the edge of instability, marked by temporary phases of stability (Cilliers & and Spurrett, 1999).
- Transformation follows a non-linear trajectory, where small deviations or events can interfere and result in large scale consequences (Kauffman, 1995).

A *social* complex adaptive system (SCAS) is a CAS in which the agents are human. Unlike non-human agents (e.g. starlings), human agents assign meaning to their interactions. This process of sense-making shapes whom they interact with, how often, and in what manner, and about what (Homan, 2023; Phelps & Hase, 2002; Stacey, 2005; Stacey, 2001, 2003). Consequently, sense-making affects the first condition for transformation: the frequency and quality of interactions between neighbouring agents.

This study draws on a SCAS perspective on organisations (Homan, 2016; Johnson, 2002; Lansing, 2003; Stacey, 2001, 2003; Turner & Baker, 2019) to analyse interaction patterns between the PAR researcher, the research team and the ward participants and how these patterns shaped shifts (transformations) in individual perceptions, team viewpoints, and work processes on the paediatric ward.

To better understand the drives underpinning these interaction patterns we plug in theories on desires. From this perspective, humans are seen as fundamentally social, embodied and affective beings. The desire for belonging and for hierarchical order is deeply rooted (Baumeister & Leary, 1995; Gere & MacDonald, 2010), influencing our daily responses (Jackson & Mazzei, 2022, pp. 112-131; Verhaeghe, 2011).

The Setting

This PAR project aimed to improve the ward round practice at the children's ward in a Dutch teaching hospital. The PAR was conducted during a year in three phases. Table 1 provides an overview of the main actions, formal goals and observed results in each phase, offering context for the results section.

Table 1. Phases of the research with goals and results

Actions	(formal) Goals	Results
Phase 1: problem definition Observations and interviews	Confirm or refine the preliminary research question	Research question affirmed Insight into conflicting perspectives and priorities
Phase 2: action Changing the sequence in the visit Using a poster to inform parents Holding a medical pre-meeting to enable decision making in the ward round by ward physicians	Improve quality of information sharing Enable timely discharge decisions	All participants are better prepared for the medical visit information exchange is better structured and concise More concrete and visible information for parents with use of visual aids more timely discharge decisions fewer telephone interruptions
Phase 3: action Using Tractus*) as method of structured information sharing Offering mutual aid during medical visits	Improve information sharing Improve learning on the job	Nurses' input became more structured, complete, and relevant Improved handovers and patient files Greater collaboration and mutual help Increased professional pride and leadership among nurses More daily learning for all and learning how to learn among co-researchers (van Harten et al., 2025) Joint presentation at a national congress

*) Tractus: A method of structured information sharing, following a fixed sequence according to tracts: general, respiratory tract, urinary tract, gastrointestinal tract, nervous tract, infection, infusion, medicationE

Each action phase concluded with two weeks of observations and interviews by the PAR researcher, followed by a discussion of results in the PAR team and consequently in the work meetings of the nurses and physicians.

Throughout this article we use the term PAR researcher to refer to the first author, who acted as both scientist and consultant, facilitating the PAR. The term co-researchers or PAR team refers to the other participants in the PAR team. The term 'we' refers to the author group reflecting on the PAR. The PAR team consisted of nine stakeholders:

- Nurses Jennifer and Marie
- Ward physician Sonja (resident)
- Paediatrician and project leader Margot,
- Supervising paediatrician Rene
- Nursing ward manager Anneke
- Parents' representative Hedwig,
- A junior quality and safety advisor
- PAR researcher Annet

In the results figures also paediatrician Gert. Gert and Rene were jointly responsible for the education of the ward physicians. Gert was the seasoned paediatrician whereas Rene was the younger one.

The PAR was initiated by project leader Margot and Annet both of whom were motivated to engage in research. Prior to submitting a funding proposal, Margot secured consent and collaboration from the ward manager, her paediatric colleagues, and the patient's representative. The preliminary research question focused on team-based learning in practice as a means to improve the ward round. The PAR team considered the parents to be active participants in the medical visit and thus included their learning within the broader research aims.

The PAR team typically met for 1,5 – 2 hours. On two occasions, shorter ad hoc meetings were arranged between nurses, physicians, and the PAR researcher. Additionally , the PAR researcher met biweekly with the project leader online for half an hour. Follow-up contact by telephone or video conferencing with team members also occurred between observation rounds to maintain engagement and respond to emerging questions.

During daily ward rounds, physicians and nurses (and students) visited children and their parents in the hospital rooms to share observations, express concerns, raise questions, and agree on next steps. The number of patient visits during a round varied between four and twelve.

Ward physicians—typically residents completing part of their specialist training—stayed for several months at the ward and participated daily in the medical visit. One of the two supervising paediatricians joined the ward round two to three days a week to oversee the residents in practice. On other days, supervision took place in a separate educational meeting after the ward round, where treatment decisions could be finalised.

5.3 RESULTS

In six chronological paragraphs, we illustrate the feelings, thoughts and actions at three levels: those of the PAR researcher; the interpersonal level within small groups and the research team; and the level of visible changes in ward practices and interactions.

Kick-off PAR meeting

Project leader Margot and first author Annet, both initiators of the research, proposed in the research proposal, to explore how situational awareness can be improved by learning in and from daily practice. They identified the ward round as a key opportunity to improve SA, as it was the single moment in the day when all caregivers—nurses, ward physician, paediatrician, parents, and children—were present.

However, in the first meeting of the PAR team, senior paediatrician Gert (covering for his colleague Rene) is quite sceptical about the research method—"Is this science?"—and the objective—"Is the ward round our biggest problem?" Initially, the nurses seem to align with his views, but this changes when the ward manager says, "Well, I regularly hear the nurses complain about the ward round."

After the meeting, Annet realises that she failed to clearly explain the research's aim and method. She begins to suspect that the co-researchers' consent is perhaps not as wholehearted as she had assumed.

During the orientation phase, she notices signs of disengagement: some nurses do not turn around to respond to her greetings, and others say, "Can you deliver the informed consent forms for the parents yourself? I'm very busy." Several express doubt about the research's impact. Nurse Gwendolyn states: "There's only one thing that would really help to speed up decisions: the supervising paediatrician always attending the ward round. We've said that very often before, but they won't do that. So, what's the use of this project?"

The ward manager confides that some have asked for a shift change to avoid the paperwork. Unknowingly, Annet has become part of a conflict: the paediatricians, proud of their bedside ward-round routine—considered a showcase of patient participation and good education—resent an improvement project on it. The nurses sigh over another research initiative generating extra work for them while offering little in return. Annet feels neither appreciated nor trusted in her research expertise.

PAR Meeting Concluding the Orientation Phase:

To accommodate the co-researchers, Margot and Annet organise lunch for them. Paediatrician Arie, arriving late, shows no interest and does not eat. Annet presents the findings of the orientation phase. One of her observations is that during the medical visit, nurses are usually leaning against the wall and speak for only about 15% of the time. Arie is surprised—being used to the routine, he has never noticed this.

Nurse Jennifer comments, "Often the parents already have told almost everything [...] often we're just waiting while the supervisor educates the ward physician." All are surprised that parents often don't understand the purpose of the visit. One says, for example, "I think it's to check whether I feed my child enough." It becomes clear that conducting the medical visit at the bedside is helpful but not sufficient to enable participation from everyone. I ask, "Do you strive for a satisfied parent or a participating parent?"

At the end of the meeting, it is agreed that resolving all issues would be too time-consuming. Instead, the team decides to confine the intervention to creating a poster to inform parents.

After the meeting, Margot shares her disappointment: “I had expected more in-depth dialogue, more exchange.”

While producing the poster, the ward physician, nurse, and Margot decide to change the ward-round order so that nurses speak before parents. They claim to have checked with supervisors Gert and Rene. Gert, however, is irritated: “The parents are most important, so they should speak first.” Yet the change has already been set in motion, so he agrees to conduct a pilot.

Seizing the Opportunity for Exchanging Perspectives

In the next observation round, the nurses welcome Annet when entering the ward. They feel that things are changing. In practice, all improvement measures mentioned in the PAR meeting are realised. The co-researchers feel a renewed sense of purpose, and implementing the measures turns out to be less time-consuming than expected.

When Annet asks parents how they feel about the nurses speaking first, they respond positively or neutrally. One parent says: “Very good! I was touched to hear that they had seen my child so well!” Annet shares this feedback with the physicians whenever possible.

In the second action cycle, the PAR team decides on mutual help during the medical visit. However, as a ward physician says, “I’m not yet at the stage of giving Gwendolyn feedback […] As a ward doctor, we’ve only just been here for a week, you know. I also just want to be liked; I’m very honest about that.” Annet seizes the opportunity to tell her that the nurse has shared with her that she is still struggling with the Tractus method and would appreciate support during the visit. Later, Annet observes them helping each other tactfully.

When speaking with a mother, she tells to Annet that she hasn’t dared to ask when her child can go home: “I don’t want them to think I only care about myself wanting to go home […] I think we may go home tomorrow.” When I share this with the nurse, she is baffled and recognises the importance of being concrete and clear. She immediately goes to inform the parent that they will have to stay all week.

PAR Meeting Concluding First Action Cycle

During the meeting, paediatrician Rene displays scepticism in his posture and facial expressions. Everyone, including Annet, glances at him to gauge his response. While presenting the results of observations and interviews, Annet reports that nurses use a wide variety of styles in presenting their information during the medical visit, and that they hold differing—and often incorrect—assumptions about physicians’ expectations.

Ward physician Sonja remarks that in another hospital she used Tractus as a method. No one responds. Nurse Jennifer asks Rene which nurses he thinks perform well in the medical visit. Again, no dialogue follows.

When we leave the room, the PAR team has decided to refine the poster and work on a more consistent application of the earlier interventions. Annet feels lost—the team is optimising processes, but how does that answer the research question?

She initiates an additional meeting to open a dialogue about mutual expectations between nurses and physicians. This time, a genuine dialogue emerges. Nurse Jennifer proposes using Tractus. After an exchange of arguments, Gert withdraws his initial objections, and they agree to implement it. Annet feels glad to have steered the study in the right direction and to have facilitated meaningful dialogue.

Afterwards, she learns that nurse Jennifer and resident ward physician Sonja had prepared this proposal together without consulting or informing her.

After the Second Action Cycle - Interference

Reflecting on the first and second action cycles, Annet realises that simply sharing the observation that nurses had little to do during the medical visit had set in motion a spiral of events.

Since they had decided in the spur of the moment that the nurses would speak first, the nurses, concerned about appearing unprepared in front of the patients' parents, made sure to prepare thoroughly and they made sure they prepared the parents. The physicians, recognising the need to prevent parents from waiting unnecessarily for discharge and empathising with the nurses, organised the visit such, that ward physicians could make more autonomous decisions.

As the changes yielded positive results, the co-researchers became motivated to implement all suggested improvements, not just the ones originally selected. This occurred without a formal decision process. Because nurses now fully presented their contributions uninterrupted, it became apparent that their approaches varied widely. This led to the implementation of Tractus in the medical visit—and subsequently also in the morning handover and patient files. Moreover, applying Tractus provided a useful occasion for practising mutual support.

Lessons Learned

At the end of the research, the co-researchers articulate their lessons learned.

Paediatrician Arie: “Basically, the nurses are far more important and influential in improving ward rounds than physicians are.”

Jennifer: “First, we were treated as care assistants; now, our nursing expertise is called upon much more,” and, “We have taken on a leadership role.”

Sonja: “It’s actually the process of joint collaboration—that’s the learning here.”

Margot: “Just the casual conversations on the ward—we should do that much more often.”

Ward manager Anneke: “I didn’t know PAR, but now I don’t want any other type of research anymore. […] It’s investigating and implementing at the same time.”

The paediatricians fell silent when they realised that the nurses were going to present at a congress—for the first time in their careers.

Annet learned that, as a PAR researcher, she was like a starling in a murmuration: not in control, but nevertheless influential like all others—moving within the patterns while also disrupting them.

5.4 ANALYSIS

This article is guided by the following research question: How can the participatory action researcher contribute to transformation, viewed through the lens of social complex adaptive systems theory?

In addressing this question, we demonstrate the interconnectedness of first-, second-, and third-person inquiry. The analysis is presented in two parts: the first focuses on the experiences of the action researcher; the second explores emerging patterns in the participatory research team and on the ward.

5.4.1 The Participatory Action Researcher as a Starling in the Murmuration

Recurrent Patterns

Reflecting on the final PAR meeting of phase 2, the PAR researcher realised that she had participated in the ward’s patterns much like the co-researchers: accommodating paediatricians, seeking dialogue outside meetings, feeling out of control while having influence, feeling in control when she was not, desiring professional recognition, and assuming that bringing all stakeholders together (in the medical visit or in the PAR team) would ensure equal participation.

At first, she judged herself for reestablishing their (hierarchical) pattern, thinking that a skilful PAR researcher is capable of preventing that by reflection-in-action: understanding while (inter)acting what is going on and acting on it (Schön, 1983, p. ix; Torbert & Taylor, 2008).

Yet, when reflecting afterwards with the co-authors, thinking with SCAS, she withdrew the judgement. Recurrent patterns are a characteristic of SCAS. As a PAR researcher, she unconsciously partook in their patterns, because she needed to participate in the (complex) system and stay connected to all participants. Feeling uneasy about the reactions of the sceptical paediatricians was more than fear for rejection. She felt, like the other co-researchers, that there was a risk of losing the physicians' support for the research, and thereby an important perspective. From a SCAS perspective frequent interaction between a variety of individual agents is crucial for transformation.

She acted in the moment on her discomfort by professional instinct. Varela (1999) describes this as embodied knowledge about how to act rightly in the moment. Our body has stored many years of experience and reflection and knows how to act earlier than our conscious reasoning mind. This embodied knowledge comes close to the concept of reflection-in-action initially described by Schön (Schön, 1983, pp. viii-ix), and often seen as a hallmark of the PAR researcher (Reason & Bradbury, 2008). Schön describes it as follows: '*Competent practitioners usually know more than they can say. They exhibit a kind of knowing-in practice, most of which is tacit. […] practitioners themselves often reveal a capacity for reflection on their intuitive knowing in the midst of action and sometimes use this capacity to cope with the unique, uncertain, and conflicted situations of practice*.' Quite some PAR studies are dedicated to describing methods to master the art of reflection-in-action (Barlas et al., 2005; Mann, 2005; Marshall, 2004; Nolan, 2005). This paper wants to highlight the value of embodied knowledge combined with reflection-on-action with SCAS theory. Unlike reflection-in-action which focuses on the moment, reflection-on-action with complexity theory enables recognition of systemic patterns that mirror across all three levels of inquiry.

This finding contributes to action research methodology by showing how reflection-on-action using SCAS theory reveals patterns that span first-, second-, and third-person levels simultaneously.

A starling in the Murmuration

Applying SCAS theory to the pattern revealed that the PAR researcher was also disrupting the pattern. Nurses, physicians and parents regularly discussed patients, but not their work practices. The PAR meetings were the only occasions where collaborative practice was a topic of dialogue. In these meetings, the PAR researcher presented conflicting perspectives and priorities she had gathered through interviews, and mirrored observations from the ward. She also shared these insights in bilateral conversations and informal moments on the ward.

By fulfilling this role, She disrupted the siloed pattern of interaction and opened space for more direct, cross-boundary dialogue. One could say she initiated the murmuration.

In nature, a murmuration forms when starlings gather above a safe resting place for the night, continuously adjusting to the movements of their seven nearest neighbours preventing collisions while securing proximity (Goodenough et al., 2017; Storms et al., 2019; Young et al., 2013). As the starlings' circles overlap, starlings in each circle gradually change places, and as a result changes in direction in one circle inevitably affect all others. These overlapping circles of interaction allow the group to move fluidly without central control—each starling shaping, and being shaped by, the group. This dynamic allows the group to remain cohesive while creating beautiful (trans)formations, attracting other starlings seeking a safe place for the night, and adapting their formation swiftly when a sparrowhawk is threatening them.

Similarly, as staff began to interact more frequently and spontaneously about their work, participation widened. Once the murmuration emerged, the PAR researcher's role shifted: she became one of the starlings—sometimes following their initiatives yielding to their authority and sometimes changing the direction by offering new interpretations, showing her authority, and facilitating further interaction. Without control, she relied on recognising and seizing opportunities for connection and perspective-shifting.

Davis & Sumara (2005b) call this *occasioning*—selecting and responding to opportunities that arise in complex systems. They see it as a critical skill for PAR researchers in complex systems. Unlike reflection-in-action, occasioning involves acting in the moment with minimal deliberation, guided by attentiveness and chance. It also incorporates elements of luck, timing, and responsiveness. The PAR researcher started to actively create these moments, for instance by spending time at the nurses' station, where spontaneous interprofessional conversations could arise and interesting gossip be heard. She seized opportunities for learning by connecting experiences and challenging assumptions. Co-researchers seized opportunities by changing the sequence of the medical visit when designing the poster for the parents, and by proposing Tractus, when a conversation was planned about mutual expectations.

Seizing these moments required the PAR researcher being physically and emotionally present. Her continued presence on the ward—during observations, interviews, and follow-up calls—proved essential for fostering varied interaction and multiple perspectives. This level of involvement may be difficult to replicate in other settings.

We conclude that, at the personal level, reflection-on-action through complexity theory helped the PAR researcher to understand how her own responses mirrored systemic patterns—and when to adapt or challenge them. Embodied knowledge guided her moment-to-moment actions in navigating relationships, sometimes by yielding, sometimes by confronting.

At the interpersonal level, her role was to act as a messenger: connecting siloed professionals through overlapping dialogues. As the system began to shift, she became one of many shaping the murmuration. This involved recognising moments for introducing alternative framing to increase the chances of system-serving transformation.

5.4.2 The Scarf Produced by the Murmuration

Continuous Instability and Constructive Conflict

Initially all stakeholders remained within the safety of the familiar circle of their own silos. Within these circles the nurses complained about late discharge decisions and long waiting in the ward round. They assumed that they could not change it. Physicians took pride in their teaching role and bedside visits with parents. They accepted that some nurses provided better information than others. Most parents had no interaction with other parents but mostly they felt heard and seen. This was a form of stability, bearing the seeds of instability in it. When the PAR study on daily learning in the medical visit started, and the PAR researcher began asking questions and sharing the answers, the latent instability became active instability. The nurse's desire for recognition sparked constructive conflict with the physicians who wanted to save the ways they were proud of. This conflict, or open instability generated the chance for transformation, temporary stability and new instability. For example, the friction about who should speak first was resolved by changing the sequence, but the next friction about introducing Tractus as the method of information sharing, arose soon after.

SCAS theory holds that systems constantly hover near instability, which allows for adaptability (Cilliers & and Spurrett, 1999; Kauffman, 1995). For the PAR researcher this means that an important role will be to navigate these instabilities. By simply (unknowingly) awakening the latent instability, they already become part of the conflict. In this case, being part of the conflict raised the PAR researcher's desire for appreciation and recognition, mirroring those of the co-researchers, and prompting deeper reflection and connection-seeking.

Desire—understood as the need to meet others' expectations (Jackson & Mazzei, 2022; Verhaeghe, 2011) – is a primal need rooted in our nature as social mammals. For humans, it is necessary to belong to a group and to be reassured by the presence of authority (Baumeister & Leary, 1995; Gere & MacDonald, 2010; Waal, 1989). Since these desires are primal needs, it is not surprising that the desires for belonging and authority, and meeting other one's expectations, were prevalent in all, including the PAR researcher.

We came to understand instability as a disturbance in interaction patterns, often felt as friction or unease. Our findings illustrate how such discomfort—felt by the PAR researcher as well as by others—can act as a catalyst for transformation.

Desires Defining the Selection of Interactions

We illustrated that the primal desires were the basis for stability (belonging to a group), as well as for instability (acquiring recognition and appreciation from another group). At the outset participants primarily interacted about work processes within one's own circle of comfort. Discussing measures from which participants inferred meanings about belonging and authority released the energy needed to leave their familiar circles.

Stacey (2005) states that all interaction is imbued with meanings of power and identity. He defines identity as 'belonging to a group' and power as 'enabling and restraining each other'. The latter is different from our notion of authority or position. Furthermore, he states that transformations of work processes emerge organically through normal everyday interactions and spontaneous variations in work processes.

Our findings suggest that at the outset participants did discuss patients in normal everyday interactions, but not the work processes. Moreover, we observed considerable variation in these processes, not related to the variability in patients or conditions, which did not spontaneously lead to interference or transformation, because participants remained within their own circles. Facilitation was needed to break this pattern.

Drawing on Deleuze and Guattari (Jackson & Mazzei, 2022, pp. 112-131; Verhaeghe, 2011) we analysed how desires – for power and identity- work and for whom in daily situations, and how they formed a productive force for transformation. We concluded that they were the driving force behind crossing the silo's enabling perspective change.

While theorists such as Argyris (1990, p. 117), Senge (1990, p. 8), and Weick (1995) emphasise how interaction shapes cognitive sensemaking, our findings additionally suggest that emotional sensemaking—centred on belonging and authority—also shapes interaction. In this case, desires prompted participants to engage more frequently across silos in conversations about work processes. This led to shifts in perspective and contributed to transformation.

These insights refine Stacey's view that transformation emerges organically from routine interaction. Our findings suggest that transformation requires deliberate facilitation of cross-professional dialogue around emotionally charged topics. The facilitation is a role that, in a PAR study, typically rests with the PAR researcher.

Interference and Diversity Shaping Transformation

We described how the PAR researcher did a small thing by fulfilling the role of the messenger (first person), which evoked interaction among the co-researchers about issues that touched their desires (second person), resulting in simple measures - such as the sequence in the medical visit and the Tractus method - that interfered and transformed

their daily practice at the ward in much more aspects than only another sequence and another method of information sharing.

While tensions mostly occurred between nurses and physicians, parents' voices also played a pivotal role. Their positive responses ultimately convinced physicians to continue the new ward round sequence.

SCAS theory posits that small changes can interfere and lead to large changes. As Hollnagel (2014b, p. 58) notes, developments and measures can amplify or neutralise each other, like ripples in water. From the phenomenon of interference follows that first-, second- and third person practices are inextricably linked.

Interference required interaction in order to spread, just like in a murmuration of starlings. Because frequent, overlapping circles of interaction about work were realised, constructive conflict around belonging and authority emerged, with all voices being heard. We can't predict what would have occurred when the overlapping interaction circles would have stayed withing one profession, with much less variation in input. From SCAS theory follows that interference and transformation within a profession can arise, but the question is whether it will be a transformation or adaptation that serves the system as a whole. Effective adaptation or transformation requires variety.

The exact form of a murmuration at a specific time cannot be predicted or controlled by a single starling. But as spectators, we know that changing contrasting shapes like a scarf flowing in the wind will emerge, as depicted in figure 1. Discovering in the process that similar patterns emerged at the first-, second- and third-person level, made that the patterns at the third person level functioned as a reflection in the water for the first-person and vice versa. This enabled her gradually to seize the opportunities for constructive conflict purposefully and enlarge the likelihood that the transformation would occur at ward level.

Figure 1. Still water reflecting a murmuration of starlings ÓSue Side, www.sueside.com

Transformation Changing the Individuals

By the end of the research all experienced their collective capability of realising improvements. And most of them ascribed themselves a decisive role, which made them feel influential. Whereas at the start of the research all felt powerless. Furthermore, we described how all co-researchers formulated their lessons learned and redefined their role, including the PAR researcher.

A characteristic of SCAS is that the agents change the system, which in turn changes the individual agents. We illustrated in our case how such an ever-evolving process can be recognised in practice.

This study extends first-person action research by demonstrating how embodied knowledge operates within complex systems. In contrast to Marshall's (2004) emphasis on individual systemic awareness, we show that first-person inquiry necessarily involves participating in system patterns while simultaneously disrupting them. For second-person inquiry, we contribute by showing how cross-professional dialogue requires deliberate facilitation rather than emerging spontaneously. This challenges assumptions in collaborative action research about natural collaboration (Reason & Bradbury, 2008). Regarding third-person inquiry, our study demonstrates how systemic transformation emerges through the interplay of individual awareness and interpersonal dynamics, extending Torbert's (2001) framework through complexity theory.

5.5 CONCLUSION

Our research question was: *How can the participatory action researcher, contribute to transformation, drawing on social complex adaptive systems theory?*

We conclude that the PAR researcher was not in control but seized opportunities to act as a messenger around work issues related to belonging and authority. In doing so, she and the co-researchers paved the way for direct interaction between work floor professional silos and parents. These emotionally charged work issues released the energy needed to engage in constructive conflict across silos, generating initiatives that interfered resulting in transformation of ward practices, which in turn transformed participants' perceptions.

By enduring the discomfort of participating in constructive conflict, alternating between yielding and confronting forms of connection, PAR researchers in complex organisational settings can influence transformation without controlling it - like starlings in a murmuration.

5.6 THEORETICAL CONTRIBUTIONS

We have expanded on Safety-II theory by broadening its CAS foundation to a SCAS foundation. Furthermore, we extend SCAS theory by showing that human desires for belonging and authority shape interaction patterns more than proximity or random encounter. This challenges core SCAS assumptions about agent interaction and suggests that organisational transformation requires deliberate attention to professional identity and authority. Additionally, we demonstrate that discussing work processes related to belonging and authority releases energy for cross-boundary interaction, providing a mechanism for stimulating transformation in human complex systems.

We advance action research by demonstrating how complexity theory illuminates the interconnection between inquiry levels. Our findings show that effective multi-level action research requires: (1) first-person reflection on participating in systemic patterns and embodied knowing how to stay connected (2) facilitation of second-person cross-boundary interaction and constructive conflict (3) recognition that third-person transformation emerges non-linearly from local interactions. This extends existing action research literature by providing a theoretical framework for understanding multi-level integration, responding to calls for such frameworks (Coghlan & Shani, 2021; Davis & Sumara, 2005a).

5.7 PRACTICAL IMPLICATIONS AND FURTHER RESEARCH

By demonstrating how desires for belonging and authority can be leveraged to stimulate cross-professional interaction, this study provides actionable insights for PAR researchers seeking to facilitate transformation in professional settings.

The murmuration metaphor offers a practical framework for recognising that both following and disrupting existing patterns are sometimes necessary.

Strengths and Limitations

As is inherent to in-depth case studies, the generalisability of our findings is limited. We ensured transferability by providing thick descriptions (Shenton, 2004) and quotations evoking 'vicarious experiences' (Abma & Stake, 2014) enabling readers to translate these accounts to their own contexts. While each individual brings a unique character and history, desires for belonging and authority are common to the human condition.

Moreover, we made deliberate choices among a wide range of scholars in organisational complexity and theories of desires or drives. We acknowledge that we drew selectively from some thinkers and did not offer the broader context in which their ideas are situated. However, our guiding criterion was whether a concept helped us to reflect on and reinterpret experiences. The selected theoretical concepts proved valuable in this endeavour.

Compliance with Ethical Standards

Disclosure of Potential Conflicts of Interest: Authors have no relevant financial or nonfinancial interests to disclose.

Ethical Approval: The institutional ethics committee: MEC-U (Medical Research Ethics Committees United) waived the need for ethics approval. She determined that the Medical Research Involving Human Subjects Act (Wet op Medisch Onderzoek, WMO) did not apply to this project: Niet-WMO advies MEC-U verklaring (W21.026).

Informed Consent to Participate and Consent to Publish: All participating parents received information on the study and provided written consent to participate and to publish prior to enrolment in the study. Professionals consented verbally. To ensure anonymity, names are fictional, and additional data are not open to public.

This article is primarily about myself and my interpretation of situations. The participants in the second-person study were not involved in the self-reflective practice and writing. There is no doubt that each of them will have different recollections of how, when, and why things happened. Tamas (2011) discussed how to deal ethically with first-person research as it also reveals information about other persons. It is generally accepted to refrain from asking for consent or doing a member check on this self-reflection.

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Illustration 8. Learning as the place of struggle

6

Making Quality Improvement a Habit at the Paediatric Ward
Participatory Action Research practising complexity theory

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ABSTRACT

Introduction

Safety-II theory proposes to learn frequently from adaptations in everyday normal work. However, practical examples are rare and often not sustained over time. This study explores how interprofessional workplace teams in hospitals can cultivate habits of learning.

Methods

We conducted follow-up Participatory Action Research in a paediatric ward of a Dutch hospital that had developed daily learning practices.

Results

The action research team sustained daily learning at the ward by developing skills to organise periodic evaluative rounds at the ward and formulate challenging goals for themselves. They altered their assumptions about the nature of learning and the time needed for successful change. In hindsight they appreciated the insights and results, forgetting the effortful process. Furthermore, they recognised the necessity of a facilitator for addressing relational tensions, developing skills, adding different interpretations, and thus capacity for change.

Discussion

The action research team developed an enactive and relational understanding of daily learning. This transformative learning experience motivated them to continue fostering the daily evaluation routine in the ward after the research concluded.

Conclusion

While improved work processes can become habitual, transformative learning and improving work processes cannot, because it requires disruption of habitual thought and action patterns.

6.1 INTRODUCTION

In 2000, the landmark report To Err is Human (Kohn et al., 2000) revealed that patients in hospitals frequently suffer harm as a result of the care they receive. Consequently, efforts to enhance healthcare safety were intensified, with health systems around the world investing substantial resources in policies and programmes aimed at reducing adverse events. Yet despite these efforts, sustaining and scaling improvements in safety has proven difficult. Multiple studies suggest that there has been no measurable, system-wide reduction in preventable harm (Dixon-Woods & Martin, 2016; Mannion & Braithwaite, 2017; Sujan, 2018; Vogus & Hilligoss, 2016). In the Netherlands, a national monitor showed a significant decrease in preventable deaths between 2008 and 2012 following the introduction of safety management systems, new regulations, and inspections. However, progress stalled between 2012 and 2019 (Langelaan, 2013; Schoten, 2022). These data are only available in absolute numbers, which cannot be meaningfully linked to total patient number or to specific subgroups such as those with comorbidities or advanced age.

Like many other Western countries, the Netherlands faces growing challenges in healthcare: an ageing population with multimorbidity, workforce shortages, rising costs, increasing awareness of environmental impact, and rapid technological change. Without adaptation, these developments will inevitably affect healthcare quality and safety. A major shift may be required to maintain current levels of preventable harm.

To address this, a national programme was launched in the Netherlands (2021–2024) to explore practical applications of Safety-II theory. This approach represents a departure from traditional safety models focused on identifying causes of harm, implementing interventions, and enforcing compliance. Instead, Safety-II conceptualises hospitals as complex socio-technical systems and defines safety not as the absence of incidents, but as the capacity to adapt to the dynamic challenges and tensions inherent in such systems (Bergström et al., 2015; Mannion & Braithwaite, 2017; Norman & Stappers, 2015; Provan et al., 2020). This perspective emphasises adaptability, resilience, patient involvement, and a culture of continuous learning (Hollnagel et al., 2019; Koksma & Kremer, 2019).

To foster adaptability and resilience, Safety-II promotes frequent reflection on variability in everyday practice, that usually results in good care, rather than limiting learning to reflecting on rare errors and adhering to best practices developed at the 'blunt edge' by those removed from direct clinical work (Dixon-Woods et al., 2009; Hollnagel et al., 2019, p. 213). However, the concept has faced criticism (Bergström et al., 2015; Cooper, 2022; Karanikas & Zerguine, 2024). One concern is that Safety-II is primarily aligned with change management and quality improvement, and that it lacks empirical studies demonstrating its real-world application (Karanikas & Zerguine, 2024). This paper aligns with a change management perspective, as it focuses on the practical application of frequent learning within frontline healthcare teams. We recognise that such learning teams are only

one component of a resilient healthcare system, but they are crucial—and particularly challenging to establish in highly protocolised and siloed hospital environments. A large study showed that hospitals with low mortality rates did not necessarily experience fewer incidents but were better able to rescue (Ghaferi et al., 2009).

Safety-II appears to be embraced with enthusiasm (Verhagen et al., 2022) by those working in the field of patient safety, although the practical application of frequent reflection remains challenging in hospital settings. Healthcare professionals often report that they must already attend to too many time-consuming meetings and it was observed that stakeholders primarily interact within their professional silos (Finn, 2008; Morris et al., 2023; Weller et al., 2014). Quality improvement initiatives are frequently introduced by those removed from clinical practice and may not resonate with frontline staff (Sujan et al., 2024; Tresfon et al., 2025).

Several studies have highlighted the challenges of operationalising (safety-II) complexity theory (Cooper, 2022; Haynes et al., 2020; Holmes, 2020; Provan et al., 2020; Rusoja et al., 2018). Similarly, a gap persists between the rhetoric and the actual implementation of interprofessional collaboration during surgical ward rounds, despite its acknowledged importance for patient safety (Morris et al., 2023). One of the most widely known tools for learning from normal work is the Functional Resonance Analysis Method (FRAM). However, as Patriarca et.al. (2020) noted, 'the complexity of the system might be transferred to the corresponding FRAM model potentially leading to overwhelming graphical representations' making it difficult to use in daily practice. These types of interventions are typically grounded in a functional-analytical perspective from the 'blunt edge' of the system, rather than the 'sharp edge' where care is delivered. Sujan (2024; 2019; 2017) has repeatedly raised the question 'How can we learn continuously and meaningfully from everyday work?' He advocates to support informal learning processes that enhance the overall process of learning from experience (Sujan et al., 2017) at the sharp edge supported by the 'blunt edge'. Tresfon et al. (2025) argue for more ethnographic research to better understand how healthcare professionals experience improvement tools, how they learn, and what they find meaningful. In this way, we can avoid the circular trap of treating 'learning culture' both as diagnosis and solution. Only by understanding behaviours and their underlying motivations can we meaningfully describe the learning culture in a given context. Furthermore, it is only through the attempt to transform an existing culture into a learning culture that we begin to grasp its dynamics. In studying a high-performing paediatric ward, Quinn (2004) concluded that the secret of its success did not lie in formal procedures or tools, but in the collective process of 'building the bridge as you walk on it'. Yet most people are naturally averse to the unpredictable nature of experimentation and reinvention that this entails.

Educational scientists drawing on complexity theory, emphasise that learning extends beyond cognitive analytic reflection; they conceptualise workplace learning as essentially a dynamic process of immediately responding to disrupted expectations (Davis & Sumara, 2005; Madsen et al., 2024; McCaffrey, 2024; Sim & Nicolaides, 2024; Snoeren et al., 2013). From this view, learning is enacted, embodied, happenstance, relational, embedded in context, and often emergent in the flow of everyday work. Aligning with this perspective, Snoeren (2015, p. 170) defines workplace learning as 'the on-going and relational adapting through the enactment of small and large perturbations in which both agent(s) and environment change and co-evolve towards enlargement of the space for possible action.' However, this does not imply that learning and enlargement of the space for possible action emerge spontaneously. Scholars in both resilience engineering and education emphasise that learning and transformation in complex systems emerge from diversity, interaction, and decentralised control.

The point is that meaningful interaction about the work between different professions or participants is often lacking in hospitals. Physicians and nurses interact about patients, but seldom about how they value and experience the work processes and each other's contribution to them (Finn, 2008; Morris et al., 2023; Weller et al., 2014).

In a PAR study conducted on paediatric ward rounds (van Harten, Ernst-Kruis, et al., 2025) such interactions did begin to take place. Parents, nurses and physicians experienced that in daily short reflective interactions about the ward round, they learned how to improve it. This led to enhanced shared situational awareness, more effective information exchange during the medical visit, improved efficiency and work satisfaction and ultimately higher perceived quality and safety of care. However, the study left unclear whether the improvements and the daily learning had become a sustainable habit or whether it had spread across the entire team. As in other studies (Tresfon et al., 2025), adherence to newly agreed- procedures weakened at the arrival of new ward physicians. Furthermore, it seemed unlikely that frequent reflections about the work would persist after the conclusion of the study, which had prompted the interactions.

Reasoning that habituation leads to sustained behaviours (van Harten, Niessen, et al., 2025c; Vogus & Hilligoss, 2016), this ward provided a valuable opportunity to conduct a follow-up PAR study to explore the question: *How can interprofessional healthcare teams develop a habit of learning and improving in the workplace?*

To our knowledge, there are currently no practical thick descriptions of interprofessional hospital teams developing sustained learning from daily practice. Nor did we encounter within the safety-II literature an analysis of this process grounded in learning and transformation theories informed by complexity theory.

6.2 METHODS

Methodological Framework

In PAR, researchers collaborate with those whose life or work is at stake to improve their life and work (Abma et al., 2019; Abma et al., 2017) and participants start changing a phenomenon to understand that phenomenon; they build the bridge as they walk on it. Therefore, PAR is well suited to our explorative and actionable research question directed at learning at the sharp edge of daily professional practice. The PAR team, in which all participants were represented, was familiar with the methodology from previous research that had concluded one year earlier. Team members held a positive attitude towards integrating learning and doing.

To study self-organised daily learning over time, we adopted a minimal intervention approach, reducing the role of the action researcher in comparison to the previous study. This was made feasible by the action researcher 's prior prolonged engagement with the ward, which is considered a quality criterium in PAR. Drawing on social complex adaptive systems theory (Stacey, 1995), the action researcher fostered pluralistic sensemaking, daily interactions among all participants, and decentralised control. To achieve this, she posed critical questions and facilitated constructive conflict around issues that participants imbued with meanings of appreciation and position (van Harten et al., 2025b). Such issues are easily avoided, thus impeding frequent and spontaneous work-related interactions.

In addition, the action researcher concentrated on capacity building and organisational strengthening by fostering skills, insights, routines, and conducive conditions. While interventions and improvements are often context-specific, skills and insights may be transferable across topics and contexts and tend to have enduring effects.

In PAR, authenticity is the primary quality criterion, meaning, the results are recognised and affirmed by the participants as mutually beneficial (Abma et al., 2019, p. 14). This authenticity was ensured by the PAR team composition and the collaborative multi-stakeholder and multi-phased research design.

The authors enhanced the trustworthiness of the research (Korstjens & Moser, 2018; Lincoln & Guba, 1985) through four procedures. First, transferability was ensured by rendering thick descriptions (Shenton, 2004) evoking 'vicarious experiences.' (Abma & Stake, 2014) Second, dependability and confirmability were addressed by detailing the research design and data collection process. Third, reflexivity was sought in all study phases by discussing our conceptual lenses, assumptions, and the role of the participant observer. Fourth, credibility was ensured through triangulation of methods (interviewing parents, observing, one-to-one conversations, team discussions), data (contrasting observations and interviews with team opinions), and investigators (authors and co-researchers), along with prolonged engagement and member checking.

Research Team and Reflexivity

We distinguish between the Participatory Action Research (PAR) team at the ward, which conducted the research, and the author research team, who undertook the analysis and wrote this article.

The PAR team comprised two registered nurses, a paediatrician and a back-up paediatrician, a ward physician (resident), a pedagogical medical care provider (PMCP), all acting as co-researchers, and the action researcher. The co-researchers were invited by the paediatrician project lead, and all agreed to participate. All care providers were regularly involved in daily ward rounds, except for the PMCP. All team members were women, apart from the paediatricians. To explore how to develop a habit of learning and improving, the team engaged in this very process. The improvement goals centred on enhancing mutual monitoring and support, as well as time management. Table 1 outlines the specific goals per action-reflection cycle.

The PAR formed part of a larger study involving two additional hospitals. Three cross-site reflection meetings were held, bringing together paediatricians and nurses from all three research teams, the action researcher, and the director of the Foundation for Child and Hospital. The director contributed as a patient expert to safeguard the perspective of parents and children. Due to availability the paediatrician from this PAR team did not attend these sessions. The meetings facilitated shared learning through comparison of similarities and differences across sites. Contributions from this ward's participants were included in the dataset.

The action researcher, and first author, is a senior change consultant and PhD candidate with a background in psychology and business administration. She brings expertise in complexity theory, group dynamics, project management, and change processes. The action researcher, the nurses and the paediatricians in this study also participated in the preceding PAR.

To incorporate the experiential knowledge of parents -children were usually too young - parents were interviewed in their rooms at the end of each research cycle. The interviews were conducted by the PMCP who was skilled in engaging with families and was tasked with representing the parental perspective.

Throughout the study, the action researcher reflected on the research and her role in field notes, in dialogue with an external paediatric researcher, and in dialogue with one of the co- authors (author JK). At the study's conclusion, all authors reflected on the actions researcher's contributions and discussed their conceptual lenses and assumptions in interpreting the data.

Setting and Design

The research was conducted in the paediatric ward of a Dutch teaching hospital with many acute short admissions of patients with various conditions and diseases (van Harten, Ernst-Kruis, et al., 2025). A broad range of experts and parents are involved and there is a fluctuating and unpredictable workload which made this an interesting research setting for interprofessional learning. The patients were typically under six years old and therefore not directly involved in the study.

The ward had 13 single-patient rooms. Some parents had extensive hospital experience, while others had none. The nursing team consisted of 40 female nurses, including students. Two male paediatricians regularly supervised the ward, and eight additional paediatricians (men and women of all ages) supervised occasionally. Typically, two residents - physicians in training to become specialised consultants- fulfilled the role of ward physician for three months, and one intern – medical students - attended the ward for one week.

We use the term 'medical visit' for a single patient visit; the ward round comprises all medical visits on a day. Medical visits are critical moments for generating shared understanding among parents, nurses, and physicians regarding the child’s condition and treatment plan. Furthermore, the medical visit is an important educational moment for the ward physician and the intern. They also serve as key educational moments for the resident and intern. Medical visits were held five days a week and always attended by the patient and parents, nurses, the residents; and usually also an intern. The paediatricians joined approximately half of ward rounds. When not present, they discussed the ward round afterwards with the residents and intern for educational reasons and to finalise treatment decisions.

The study was structured into three action-reflection cycles, with findings from earlier phases informing subsequent phases. The research project concluded after action cycle 3, with the team reflecting on the overarching research question and planning future actions for a next cycle.

Table 1 summarises the improvement goals and outcomes, providing context for team discussions presented in the results.

Table 1. improvement Goals and Results per Action Cycle

Cycle	Goals, Improvement Actions	Status of Results
Action Cycle 1	Time management Informing parents with poster	Time management barely improved Attention to informing with poster could be more frequent
	Using the Tractus information sharing method correctly	Information sharing method goes well
	Discharge targets are written on the board in the patient's room	Discharge targets on the board could be more often (routine is slipping)
	Cross-monitoring and mutual aid	Cross-monitoring mainly done to supplement patient information, room for growth Learning points are picked up over the 10 evaluation days. Team spirit/work enjoyment grow through evaluation round
Action Cycle 2	Activate more parents with poster	Co-researchers think parents participate well, their responses provide little insight
	Further Improve discharge targets on the board through autocue in the physicians' app and by nurses standing near the board	Discharge targets (almost) always on the board and concrete.
	Provide feedback/education between nurses and physicians during medical visits and in the corridor.	Feedback was not visible in evaluation data, co-researchers think it does happen. Learning points are picked up over the 10 evaluation days. Team spirit/work enjoyment grow through evaluation round
Action Cycle 3 (2 meetings to decide on goals)	Improve time management	Time management well deployed appropriate to the situation. (Un) timely policy no longer an issue
	Provide compliments and mutual aid	Concrete, personal compliments on how a participant had done their work or what they had done. Greater awareness of purpose and operation of agreements Learning points are picked up over the 10 evaluation days. Team spirit/work enjoyment grow through evaluation round
Action Cycle 4	Continue to evaluate 3 days a week Quarterly formulate good questions for evaluation Whiteboards replaced in all rooms with fixed pre-printed layout to support discharge criteria and questions on the board Sharing feedback from parents via poster with speech clouds	Outside the research period

Data Collection

Table 2 summarises the nature and scope of the data collection.

Table 2: Data Collection

Data Type	Number	Hours
Interviews with parents	54	18
Evaluations of ward rounds	25	4
Meetings of the research team	7	7
Central reflection meetings (3 hospitals)	3	5
Field notes		

The research comprised three action cycles conducted over the course of one year. At the conclusion of each cycle, parents were interviewed over a ten-day period (Monday to Friday) by the PMCP about their assumptions, expectations, wishes, and experiences regarding the medical visit. The semi-structured interviews were guided by an interview guide with open-ended questions, and responses were recorded in writing. Where specific improvements had been introduced—such as writing discharge criteria at the whiteboard—parents were explicitly asked for their views on these changes.

During the same ten-day period, professionals who had participated in the ward round convened immediately afterwards to evaluate the process using a structured list of questions. Occasionally, these evaluations were missed. In the first cycle, responses were written down, but this yielded limited insight for the action researcher. Consequently, in the second and third cycles, the evaluations were audio-recorded, allowing the action researcher access to more immediate, rich 'direct observations.

All parent interviews and team evaluations were forwarded to the action researcher, who collated the data in Excel to support structured analysis and facilitate discussion during research team meetings.

All PAR team meetings were audio-recorded and transcribed, as were the three central cross-site reflection meetings—held during the second and third action cycles and at the end of the research. PAR team meetings focused on goal setting, progress reviews, and practical arrangements for the continuation of the research activities.

In addition, the first author maintained detailed field notes throughout the study. These notes included observations, email correspondence, meeting minutes, telephone conversations, and reflections on both the research process and her role within it.

Data collection concluded at the end of the third action cycle, as had been agreed in advance by the PAR team. The three cycles yielded sufficiently rich data to identify development and recurring patterns. As Gersick (1989) has shown, task-oriented teams

tend to accelerate their progress midway through a fixed timeline. Thus, the pre-agreed one-year timeframe proved beneficial in allowing the team to structure and pace its efforts effectively.

Analysis

The data were coded in relation to the research question after action cycle two and after the final meeting, independently by two researchers (the first author and JK). Using reflexive thematic analysis (Braun & Clarke, 2019) the initial 41 codes were compared and grouped into nine codes (Appendix A1). This analytical approach entails a reflexive and iterative process aimed at identifying concepts and themes pertinent to habituation and capacity building. After the two authors agreed upon nine relevant themes, as shown in Table 3, they shared the codes and themes with all authors. Subsequently, all authors engaged in thinking with theory, (Jackson & Mazzei, 2022) collaboratively interpreting the data from multiple theoretical perspectives preventing confirmation bias and supporting a holistic interpretation. This approach aligns with a complexity perspective on systems and learning. All authors were also engaged in the preceding studies (van Harten, Ernst-Kruis, et al., 2025; van Harten et al., 2025a; van Harten et al., 2025b) about this ward.

Table 3. Themes Resulting from Analysis

Theme	Description
Changing assumptions and expectations (deeper learning)	The PAR team became aware and changed their assumptions about issues including: the nature of progress, unwritten rules, the cognitive vs experiential nature of knowing, evaluating as a form of registration.
Acquired notions on learning and change	The PAR team learned how to stimulate ongoing daily learning.
Appreciation of the unexpected	The PAR team recognised that unexpected events and setbacks could become opportunities for improvement.
Changed concepts of time	The PAR team expanded their short-term horizon with a longer-term perspective.
Altered notions of quality	Co-researchers enhanced their appreciation of standardised routines and gained appreciation for non-measurable results.
Being seen and heard	It was important for the PAR team, parents, and professionals to be seen, heard, and appreciated by other stakeholders.
Leadership and Agency	The PAR team and professionals showed courage in addressing frictions and taking responsibility for changes in executing agreements
Team Situational Awareness	The PAR team, professionals and parents gained awareness of how to enhance situational awareness in the medical visit.
Availability of the action researcher	The co-researchers realised the contribution and indispensability of the facilitating action researcher in achieving their learning.

The results section presents the interrelated themes as a chronological narrative structured in five acts, designed to offer readers a vicarious experience of the ward's learning journey. This narrative form honours the conceptual richness and interconnections among the

various codes and themes (see Appendix A1), capturing the complexity of the learning process. The quotations were translated from Dutch.

6.3 RESULTS

Prologue: The Owners of the Research

A key takeaway from the previous study (van Harten et al., 2025a) was co-ownership: the importance of having one of the two ward supervisors willing to take on the role of project leader, ensuring that the project truly became 'their project'. The senior supervisor agreed to take this role, provided the meetings were fewer and shorter. The other supervisor, burdened with other responsibilities, took on a peripheral role.

A resident pledged to remain part of the team throughout the year, despite rotations to other departments. The nurses also, agreed to rejoin, while the pedagogical medical care professional (PMCP) shouldered the task of parent interviews. The action researcher accepted responsibility for data curation. With these arrangements in place, the team was ready to begin.

Act 1: Embarking on the Journey: Redefining the Problem

The kick-off meeting is delayed from February 2023 until spring to ensure full attendance. All co-researchers express good hopes and trust for the research, even though the nurses at the ward are sighing at having to do another research project.

The team decides to start with reviving existing agreements on ward round performance, particularly time management. They agree to organise short evaluations with the team of the day after the ward round and to interview parents for two weeks.

When discussing the evaluation results all agree that there is no need to spend much attention to preventing setbacks in performance at the arrival of new ward physicians or night nurses who only incidentally attend the ward round.
Paediatrician R: 'That's going to take a lot of energy and time, with limited gains. [..] As physicians we will ask the nurse for information in a more active and focused way to create situational awareness.'
Nurse J: 'If a new resident is unfamiliar with the procedure, we inform them after the second patient. Then afterwards, we ask: Can you tell the difference? Usually, they appreciate our way of working.'
Paediatrician J: 'Yes, and you can see that for most of us, our work processes have improved over the past two years.'

I, action researcher A, realise that after the closure of the former research, the unit has continued learning while the formulation of the need for further research is frozen in time.

When changing the subject from retaining the improvements to realising continuity in improving, the team shares their surprise that although things were going very well already, there is still enough to be improved since some things have waned.

Paediatrician J: 'At least part of the solution will be to periodically repeat and refresh things.' They decide to adjust the goals for the next round slightly and repeat goals where improvement is still possible.
Action researcher A: 'I do not want to generate additional work for you, because part of the research question was to organise learning and improving with as little hassle as possible, to ensure a sustainable method. However, the written evaluation forms give me very little information. It would help me if during the evaluations you could turn on a dictaphone and send the file to me.'
The project leader J: 'Just make sure you get enough data for your research. Recording evaluation interviews is a small effort and big fun.'
Although she asks this for herself, she hopes this will generate more insights for themselves as well.

Act 2: Crisis and Catharsis: Unexpected Circumstances

Autumn's chill mirrors the unrest within the team. The viruses are affecting the children as well as the professionals. As the PMCP says in the meeting: 'I was rushing the interviews, because there were so many patients'. The nurses and physicians evaluated seven days instead of ten, the other days they failed to come together.
The meeting proved hard to organise, and the nurses are irritated that the physicians reacted slowly to emails. They seem not very involved. They feel that the organisation of the research rests solely on their shoulders. Furthermore, as nurse M states: 'There is a lot of turmoil right now [among the nurses] with the emergency room, and financial hassles, which just, doesn't always create a pleasant atmosphere'. And last but not least, paediatrician J has seriously fallen ill and he will not return. This is a shock and also poses practical and motivational issues.

Nurse M: 'Who is going to be the chair and project leader?'
Paediatrician R: 'I am just insanely busy. I deliberately agreed with J. at the beginning that I'd rather not do this on top of it and that J. would do it. And I also understand that if J. drops out that we have to take over everything. But then I notice that I have the least motivation for this, if I'm honest. Because it takes time, and I don't experience that much profit from it yet. I'd also rather not commit to something that I can then not live up to. So that makes me reluctant to do it.'
The nurses had stated right from the start that they did not want to be the project leader either because: 'If we stick our head above the parapet, they [the colleague nurses] cut it off'. We go on without a formal project leader.

The key issue for the rest of the meeting is: what is the relevance of the research?

Nurse J: 'In the first research we realised big changes, but now It feels like just dotting the i's.'
Paediatrician R: 'The feeling of "hey, we're going to move forward" or "we're really gaining something" is lacking.' While speaking about the value of the first PAR, he interrupts and corrects himself and slows his speech. Probably he realises that in the first PAR it was no sooner than at the end that he saw the gains.

After some discussion, the team concludes that to sustain learning in the workplace they need both a collaborative process and a relevant goal. In addition, to stay motivated themselves, they need a belief in the issues and a learning opportunity for themselves. As paediatrician R states: 'There is a kind of interaction. If I myself stand there full of enthusiasm "Come, we are going to do it again", I know that I will also get nurses to join me.' Several goals are brought to the table and rejected, such as time management, feedback and mutual learning. Finally, they decide to ask their colleagues about which issues they want to address.

Additional Meeting Several Weeks Later:

All had asked their colleagues for input, but they have no clear answers. The one thing that now feels valuable is time management; however, they fear this goal may be overly ambitious. As the paediatrician states: 'That is a very difficult goal because it depends strongly on the situation what is wise to do. Can you expect an unexperienced ward physician to be able to judge this?' Nurse J: 'Or a nurse?'. All agree that time management is a team effort and that the ward physician and nurses will collaboratively produce a list with examples of time management measures that, depending on the context, can be applied. This may prevent the standard answer: 'We were (not) ready before 10:30 am.'

The second goal is brought up by the nurses: giving compliments. Nurse J: 'This may improve the atmosphere in our nursing team as well.'

The meeting ends with cautious optimism. The action researcher offers to adjust the evaluation and interview forms since they have such a hectic period, which is appreciated. For her it is an opportunity to change the questions stated on the evaluation forms, such that they will elicit richer and more concrete conversation.

Act 3. New Horizons: What is Needed to Go on Learning and Improving.

Around Carnival in February 2024, the research team has their last meeting. The data from the last action cycle shows several surprises.

One nurse had answered three days in a row that she had not used the poster[1] when informing parents. The fourth day she had thought: 'it's in my head; I'm going to show the poster to the mother'. After she did that, the informed parent had stated to the PMCP: 'The poster was gone through with me step by step. That was very pleasant and clear. I was offered to write my questions on the board, but it was so clear to me that I didn't need it.' Other parents had remarked that the poster helped them in remembering what the medical visit was about and to write down their questions. When discussing that parents' memory functions differently in the hospital setting and that visually supported information is easier to recall, ward physician M says: 'In theory we know that…'.

They sense that the nurse, much like the co-researchers themselves, didn't initially feel a strong urge to show the poster—she believed verbal explanation would do. But once she started using it and saw its impact, her motivation grew. They also realise that the feedback from parents often does not reach the colleagues. Paediatrician R: 'The fact that you (MPCP) also hear it back, I think that's valuable'. And thus, they raise the idea to collect the feedback from parents on a large display they will hang in the nurses' station.

Another surprise is that the participants in the ward round changed their concept of time management from 'being ready in time' to 'taking measures to be ready in time', they learned how to do it, and experienced its effect. Several days in a row nurses and physicians couldn't find the example list produced by the PAR team, but also without the list they were very capable of applying measures fitting the situation. And when evaluating the measures after the ward round, they showed agreement on the decisions taken.

When action researcher A asks them for an explanation of this surprising change paediatrician R answers immediately: 'Yes…, I'll say it again, ward physician P is simply far more advanced in his training than the average ward physician [..]. Therefore, he approaches time management quite differently from a junior doctor who is just starting out.'

Other co-researchers suggest that it is probably because they had discussed and emailed the meaning of time management. Furthermore, the question on the topic list was made more specific, asking which measures had been taken to manage time. All conclude that the more specific formulation of the questions in this evaluation round elicited richer conversations, interesting insights, and concrete meaningful compliments.

They conclude that ongoing interprofessional interaction at the ward focussed at relevant goals are necessary for ongoing learning and sustaining and spreading the improvements.

Paediatrician R: 'I think it's a good idea, to keep some of that evaluation ongoing.'
Nurse J: 'Yes, I think it would be very valuable.'

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1 A laminated coloured paper with pictograms explaining the content and procedure of the medical visit

Ward physician M: 'Indeed, and it would be beneficial to reflect on our focus approximately four times a year during the quality meeting, don't you think?'
Paediatrician R: 'Yes, and then adjust the questions, that's nice.'

They decide to continue the daily evaluations three times a week and update the goals on the form four times a year.

The co-researchers share the conviction that they 'have no time for organising change and data curation'.

Paediatrician R: 'The practical benefits we gain from this are also due to all the effort you [action researcher A] have put into it. If we have to start recording, working it out, or writing it down, or if it requires even a little more administration, it will backfire. Time itself isn't the issue, but administrative time…., we already have quite enough of that.'
Nurse J: 'No, that is not going to work.'
Action researcher A: 'It will take approximately four hours quarterly. Is that too much in relation to the information it generates?' [Answer: 'Yes'].

Action researcher A checked afterwards with the ward manager, whether 16 hours per year for data curation would be a problem for the quality nurse. She answered: 'No, not at all. I think she can do it in the Thursdays she has for quality improvement. But if that is not enough, I am more than willing to give her that extra time.'

Epilogue: Relational Foundations for Sustained Learning

It is 10 minutes after the supposed start of the last meeting in February and nurse J says: 'I'm not surprised that the physicians are late. The study has just no priority for them.' She feels it has entirely fallen upon the nurses. She acknowledges that this is demotivating and threatens the continuation of efforts after the formal research period. We agree that she will raise the issue in the meeting.

However, nurse J does not bring it up in the meeting. Towards the end the action researcher decides to address it instead. The physicians show empathy, acknowledge nurse J's concerns and agree that the nurses had taken on the bulk of the work. They started a dialogue requiring no further moderation.

After the meeting, the action researcher checks whether nurse J feels recognised. With tears in her eyes, she admits she doubts the authenticity of the Paediatricians' response, saying, 'I've known him long enough to recognise this.' When asked what kind of behaviour she expects, she answers: 'that during the research period the physicians ask "How are you doing? What do you hear and see on the floor? Do you need help?" etc.' She expects attention, interest, a compliment, and swift reactions to emails more than action. And she is convinced that the physician knows very well that this is the way to show commitment.

Afterwards, the action researcher checks by telephone with nurse M whether she shares the feeling, and she asks nurse J if she has any objections to her calling paediatrician R to check whether the paediatrician understands what the nurses expect from them. She has no objections.

It appears he was unaware that a simple show of interest could make such a difference. He neither expected nor desired reciprocal interest. The depth of emotion and potential motivational impact on sustaining daily learning had escaped him.

It is April 2024, and the cherry trees are in full bloom. The right time to share the learnings and improvements of the research in the central reflection meeting with the three hospitals. In the learnings nurse M reveals some notions on the sustainability of the learnings and improvements.

'What I'm proud of is that the improvements that had subsided, were immediately back in place after the first action cycle, and that everyone understood […] the goal behind the agreements about the visit, and that everyone grew to experience, "Hey, it works". In the first project, it was like "We have to do this" and now it was like "Ah! This is the way to do it". She realises that progress is a process of setbacks, swift comebacks and further development.

'We always insisted on being ready by 10.30 a.m. And all at once that was abandoned. It was no longer "it must be ready at 10.30" but "how can we best allocate our time?" If everyone is good, well then we will be ready at a quarter to eleven. And all at once nobody grumbled about that. And that was very weird: we finished later but everyone is more satisfied.'

She continues: 'And because of our reminders, writing down the discharge criteria became more of a habit. […] We support each other in the medical visit, thus not: "You are the physician, I am the nurse, and they are the parents", no, "We have to do it together and we help each other, and we learn from each other." This took the situational awareness of all of us, to the next level. It surprised us that small things can do a lot. In hindsight it was a large step, even though it was a very small thing.'

When sharing that the project leader fell ill: 'We did learn that we need to demonstrate more leadership in other areas if we, as nurses, truly want to achieve something. Yes, that also provided valuable insights. However, we noticed that an external agency was needed to give us all that little push to say, "Yes, we're going to do this now." Otherwise, it could easily drag on for five years.'

When asked by the others why the Paediatrician did not participate in the central reflection meetings: 'The paediatrician had to take over this project from his colleague on top of other assignments. But at the ward, there is support; he attends the meetings, communicates to

his colleagues, and three times a week he attends the ward round. So, although we had to pull more, we have a good feeling about it now.'

When asked how to go on after the research: 'We continue three times a week the professional evaluations. We asked A to send us the questions of this and the first research, to learn to formulate them in the right way. Four times a year we will interview the parents and re-evaluate goal setting. A made a nice bridge to the team manager to say, "give them time for that." Furthermore, there is an important anchoring among the nurses to stand for the way we want to work, also when there are newcomers.'

6.4 DISCUSSION

Our research question was: How can interprofessional healthcare teams develop a habit of learning and improving in the workplace?

The results indicate that ongoing learning was a process characterised by stagnation, disruption, and acceleration. Initially, professional participants on the ward were reluctant to 'start all over again,' but they swiftly reacquainted themselves with the insights from the previous research. Learning and improvement occurred through experiencing in practice the value of implemented measures and by exchanging experiences, considerations, and compliments.

The research team encountered setbacks in maintaining a sense of relevance and progress due to unexpected developments. However, after establishing an ambitious and relational goal, the team achieved a significant leap in learning because of challenged assumptions and by becoming more aware of how to sustain learning and act accordingly by themselves.

Despite these advancements, the team still felt dependent on the action researcher for addressing relational issues and providing motivation when enthusiasm waned and the path forward was unclear.

We will further discuss what these findings mean for the development of habitual, and thus sustained, learning and improving along the lines of three themes and there concurrent theoretical perspectives: 1) changed notions on learning and improving; transformative learning 2) the relevance of being seen and heard; the relational nature of learning and improving and 3) the role of the action researcher, the outsider inside.

Changed Notions on Learning and Improving, Transformative Learning

Participants in the ward round engaged in perspective taking, experienced the purpose and relevance of measures, learned how to provide concrete compliments and learned to manage time more effectively (Act 3 and Epilogue). A large part of the learning came about by following the evaluation routine and other measures sustaining new work routines.

The ward had developed into a culture in which interprofessional learning, feedback, and mutual help (including parents) had grown more accepted, and several incremental small changes had accumulated over a period of three years and gradually transformed their practice.

The research team members also learned at a deeper, transformative level (Act 3 and epilogue). They acquired new or broader notions on change and learning, such as:

- One does not act because one is motivated but becomes motivated by acting (Act 3).
- One must continue a process without knowing beforehand whether or when it will yield in terms of learning and improvement, and having experienced this before does not make it easier the next time (Act 1 and 2).
- Small or less visible changes, can, in fact, accumulate into 'a large step' (Epilogue).
- We are not 'nurses having to do all the work,' but in fact the leaders of the project (Epilogue).
- Progress is a process of setbacks, comebacks and leaps forward (Act 1 and 3).
- Development becomes visible over the years (Act 1 and 2).
- Good (concrete as well as open) questions render good reflections (Act 3).
- Learning requires repetition, interprofessional reflections, appreciative relations, addressed tensions, audacious relevant goals, and dedicated time for data curation to make changes visible (Act 3 and Epilogue).

The physicians noticed that to stay motivated for initiating initiatives, they wanted to learn themselves; otherwise, they lost interest. We consider these learnings as a major disruption of their habits in thinking and acting.

The differences in learning between the ward and the PAR team show that there is a fine line where learning becomes more transformative. Transformative learning is defined as 'learning that transforms problematic frames of reference to make them more inclusive, discriminating, reflective, open, and emotionally able to change' (Mezirow & Taylor, 2009, p. 22). Assumptions were changed, but every small change alone cannot be called transformative. However from an enactivist viewpoint we think that most changes come about in gradual evolutionary processes in which small perturbations originating in interactions between participants can interfere or accumulate over the years into transformation of the ward (Niessen, 2007, p. 90; Stake, 1986, pp. 89-102). Particularly, gaining more experience with professional situations that elicit perspective taking, may, lead to broadening one's horizon; as is suggested by literature on patient participation (Myren et al., 2022).

Snoeren (2015, p. 170) defines workplace learning as 'the on-going and relational adapting through the enactment of small and large perturbations in which both agent(s) and environment change and co-evolve towards enlargement of the space for possible

action.' This definition fits our observation of learning at the ward. It contains 'on-going' and 'co-evolving', expressing learning and change over time in a slow process of incremental change. Furthermore, it contains the element of 'small and large perturbations.' We define large perturbations - disruptions of assumptions - as part of transformative learning (the so-called 'disorienting dilemma') and small perturbations as part of daily learning. Transformative learning requires slow effortful thinking, whereas daily learning requires fast thinking and acting simultaneously (Kahneman, 2011).

In general, humans prefer habits and predictability over surprises (Duhigg, 2012; Neal et al., 2012). Genuine disruption brings people into a 'liminal zone' that they find difficult to endure (McClain, 2024; Milazzo & Soulard, 2024). Some of the disruptions were enforced on them by circumstances, like the project leader falling ill, the issues in the nursing group, and the clash of expectations about each other's commitment. In hindsight, it was rewarding to realise that one had learned things, but the learning itself felt unsettling. The colleagues were sighing about having to evaluate again but felt energised when they did. The nurses felt victimised when they had to organise the research but were proud when they realised, they were in the lead. And the paediatrician, participating out of loyalty, became enthusiastic afterwards when he saw results which he had not anticipated.

Small and large perturbations, and thus workplace learning and transformative learning, both form a breach of habit. Yet since the small breaches are action/reflection, we think it can become habitual to develop them, whereas the large breaches require slow thinking and as such cannot become a habitual part of daily practice.

The results bring us to the conclusion that habitual (transformative) learning is somewhat of a contradiction in terms. One can set the stage for improving and learning by creating a 'reflection structure' and by developing the habit of mutual help during the work, but transformative learning requires substantial disruption and slow thinking, which is irreconcilable with habit. Nevertheless, it is possible that over time small incremental - non-transformative – changes together result in transformation.

This is a relevant conclusion for safety-II theorists. Following Argyris (Schön & Argyris, 1996) Sujan (2017) discerns single loop learning, such as individuals or teams learning to improve their information sharing with parents, and double loop learning questioning underlying values, assumptions and policies which may be necessary when a unit or a hospital needs to adapt at a fast pace or a more fundamental level. The elements of double loop learning are also incorporated in transformative learning. Our results show that the PAR team could develop transformative learning as a team, because they were in the position to engage in deeper reflection and in the position to foster daily learning at the ward. In the combination of daily learning and transformative learning lies the potential to realise the adaptability necessary to maintain safe care.

Being Seen and Heard; the Relational Nature of Learning and Improving

The findings show that 'feeling seen and heard' and 'seeing and hearing the other' is a basic condition for learning and improving (Epilogue), since it is a prerequisite for interacting with the other and seeing other perspectives.

Act 2 describes that the co-researchers lost the sense of relevance, for reasons we cannot fully grasp. Probably it was a combination of factors. The workload was high, and the results were not directly visible; they had more urgent matters on their minds and had no bandwidth left for learning (Mullainathan & Shafir, 2013). Besides that, the nurses missed the feeling that it was still a road they were traveling together, whereas the paediatrician had the feeling that it was not 'his' project, but the project of his colleague who had fallen ill.

It shows differences between the nurses and the physicians that were found in other studies as well (Espin & Lingard, 2001; Jeffs et al., 2013; Lingard et al., 2005; Makary et al., 2006; Tang et al., 2013; Thomas et al., 2003). Physicians speaking in terms of (not being) 'my' project and the need to feel ownership. The nurses stressing shared ownership and togetherness in the team. We can read in the epilogue how this led to mismatching expectations. It indicates the importance of being seen and heard for ongoing learning and improving.

Finally, in the example of using the poster to prepare the parents (Act 3), we saw the importance of seeing and hearing the parents and understanding their needs to fully participate in the medical visit. This enabled the change in perspective necessary for learning. Consequently, the team decided to share the parents' experiences with their colleagues at the ward.

Most research on learning and improving from a Safety II perspective stresses the importance of reflection as the way to improve, resulting in reflection methods and instruments to structure and improve the analytic cognitive process of reflecting on work processes (Jansen et al., 2024; Lips et al., 2024; Patriarca et al., 2020; Schlinkert et al., 2023; van Stralen et al., 2024). However, our results show that interprofessional team learning is mediated by feeling and acting and show the relevance of addressing the emotional sensemaking layer of the interaction. This fits our enactivist view on learning (Niessen, 2007; Varela, 1991; Varela, 1999).

The practical implication of this relational foundation of learning is that there are no simple solutions to copy. It is like learning to dance; you don't learn dancing by reading and watching, you must learn while doing and endure the uncertainty and mishaps.

Availability of the Action Researcher; the Outsider Inside

The results show that the facilitation of the process by the action researcher was crucial for developing sustained learning. Her presence played a vital role in multiple ways. She provided alternative interpretations of events, shared expertise on change management and insights from other hospitals, maintained focus on the research question, and acted as an intermediary between participants when needed. In doing so, she actively contributed to broadening the diversity of perspectives and facilitated meaningful interactions among differing viewpoints. From the perspective of social complex adaptive systems, such a role is critical. The development of complex systems relies on the dynamic exchange of meanings, which necessitates a variety of interpretations, the creation of spaces for interaction among them, and a decentralised approach to managing this exchange of meanings and the subsequent actions (Homan, 2023; Stacey, 2001).

Stacey (2001) underscores that these processes are rarely linear or entirely predictable but are instead emergent and adaptive. Homan (2023) adds that facilitating such interactions requires not just observation but an active role in encouraging open and reflective conversations where participants feel safe to explore new ideas and question assumptions.

Mullainathan and Shafir (2013) argue that in times of scarcity (of time) it is important that there are reminders to help actors stick to their goals. Simply being present and reminding the participants in the action research team was already a valuable role, which in this case was not fulfilled by the team members themselves.

Simultaneously, the ability to shift between different roles and approaches reflects the concept of 're-actorship.' This entails not passively waiting or attempting to steer through an overarching vision but actively creating iterative interventions that foster spaces where new patterns can emerge. This approach aligns with the idea that complex systems cannot be directly controlled but evolve through local interactions where participants gradually discover what works and is meaningful.

Understanding the need for and the role of a facilitator, implies that hospitals can foster their capacity for sustained learning and change by offering units the support of facilitators that help the units to develop insights and skills, and that can support at times when projects stall.

6.5 CONCLUSION AND PRACTICAL IMPLICATIONS

We conclude that the habitual creation of situational awareness and thus quality and safety is possible. However habitual transformative learning in the workplace is not possible, since the element of disrupted assumptions and slow thinking is inherent to transformative

learning. Yet it is possible to transform-as-a-team over time by the accumulation of small disruptions and fast reflection-action cycles.

Second, to sustain daily learning and improving, it was important that the co-researchers developed transformative learning by reconceptualising the nature of learning and improving as a relational and enactive process. The redefinition of signals of stagnation into signals of progress, and the acknowledgement of their feelings and perspectives by the other co-researchers, motivated the co-researchers to continue.

Third, we conclude that to develop the capacity for daily learning and improving at the workplace, an interprofessional (research) team needs a facilitator who can develop missing skills, knowledge, and organisational conditions in the team, challenge assumptions, broaden perspectives, and address tensions in interactions.

The conclusions have relevance for policy. A facilitator helps clinical leadership to flourish without a heavy burden besides primary tasks. It requires, however, that there are facilitators in the hospital who have the skills to fulfil the roles as described above and that are available and affordable for teams. Policymakers can take care of the education and availability of facilitators.

Glossary

Bedside medical visit: a meeting between patient and family, nurses and physicians, to create a shared mental model about the patient's condition and treatment plan.

Ward round: all medical visits held in one morning

Supervisor: a consultant supervising the resident in his role as ward physician

Consultant: a physician that completed his training in a specialty such as paediatrics.

Resident: a physician in training to become a consultant, who for a period of several months fulfils the role of ward physician.

Intern: a student in training to become a physician

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Declarations

CRediT Author Statement: **Annet van Harten**. Conceptualisation, Methods, Data curation, Funding acquisition, Formal Analysis, Investigation, Writing- Original draft, Project administration **Theo Niessen:** Formal Analysis, Writing- Reviewing and Editing **Tineke Abma:** Formal Analysis, Writing- Reviewing and Editing **Jur Koksma:** Formal Analysis, Writing- Reviewing and Editing**,** Supervision

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Ethics and Consent: The institutional ethics committee, METC- Oost Nederland (Medical Ethical Assessment Committee Eastern Netherlands), reviewed the study and determined the Medical Research Involving Human Subjects Act did not apply to this project: Niet-WMO advies verklaring METC Oost-Nederland: 2022-15831.

All interviewed parents signed an informed consent form, all research team members consented orally to audiotaping and the use of quotes.

In addition to confidentiality and informed consent, the following ethical principles were taken into consideration: participation, mutual respect, reflexivity, representation, and power (Banks & Manners, 2012). Parents received a lay version of the final report. Research team participants were given the opportunity to engage in a discussion on the final results in the last meeting and to provide their reactions to the written summary of findings. All colleague professionals were given the opportunity to engage in a discussion in a work meeting.

Data Statement: Due to the sensitive nature of the questions asked in this study, participants were assured raw data would remain confidential and would not be shared; if shared, the data would be anonymised. Furthermore, the qualitative data were in Dutch and of no value to an outsider without knowledge of the context.

Declaration of Interest: We have nothing to declare.

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6.7 APPENDIX A1 CODE TREE RESULTING IN NOTIONS ON (HABITUAL) LEARNING AND IMPROVING

1. Learning from each other, rather than within one's own professional group 2. Focusing on setbacks, coming back, and continuing 3. From knowledge to action and embodied knowledge 4. Encouraging action rather than persuading people of the goal 5. Deeper change: small actions can later prove to be significant 6. Shifting from agreements to intent of the agreements 7. Requesting time for measuring rather than assuming there is no time 8. Evaluating as administration versus evaluating as learning 9. People arriving late does not mean they lack motivation	Changing assumptions and expectations (deeper learning)	Changing assumptions and expectations
10. Repetition is not the failure of spreading but the act of spreading 11. Both routine and reflection/challenge are essential 12. The research team adjusting goals 4 times a year 13. Understanding how visual and auditory triggers function 14. Insight: asking the right question to facilitate a meaningful conversation 15. Developing a routine in which the right questions are regularly posed 16. Integrating feedback and appreciation into (existing) routines	Acquired notions on learning and change	
17. Recognising that the project leader's illness became an opportunity to shift from a victim mentality to increased leadership among the nurses 18. Setting periodic goals to align with current concerns and needs 19. Spontaneous initiatives from the sidelines evolve into key elements of the change 20. Modifying agreements spontaneously throughout the process (self-organisation)	Appreciation of the unexpected	
21. Time for meetings is relevant 22. Time management is not about finishing on time, but about ensuring we have done the right things. 23. It takes time to embed new working methods and see results 24. Reflecting is also work	Changed concepts of time	
25. Recognising mindful routines (teamwork routines, triggers, standards) 26. Insight: the role of standardisation 27. Notions on improvement (concrete and measurable versus less tangible) 28. Insight: the strive for situational awareness concerns the department as well as the patient	Altered notions of quality	

29. Articulating expectations, interpretations, and disappointments (recognising differences in mindset) 30. Actively engaging parents to ensure their different perspective 31. Providing specific compliments during daily evaluations	Being seen and heard	Relational dynamics
32. Courage in interpersonal relationships: addressing conflicts and offering compliments 33. Modifying agreements throughout the process	Leadership, Agency	
34. Clear roles and responsibilities, with an emphasis on mutual support 35. Insight: We tend to complement each other on medical content, but not on how the work is done 36. Parents experiencing the value of writing questions and discharge criteria on the whiteboard	Team Situational Awareness	
37. Facilitator with the following skills is necessary: 38. The 'stick' behind the door 39. Dedicated time en project management skills 40. Maintaining focus on the underlying goal 41. Enabling self-experience and discovery 42. Redefining and recognizing subtle changes by zooming in and out	Availability of the action researcher	Catalyst, facilitator

Illustration 9. Understanding as the holy grail

7

General Discussion

7.1 INTRODUCTION

This thesis presents new insights on the nature of time pressure and how it relates to learning to improve quality and safety in hospital teams.

Collaboration in hospitals is a crucial factor in improving the quality of care and, more specifically, in reducing avoidable patient harm (Schoten, 2022). Research has shown that hospitals with low preventable mortality rates do not necessarily have fewer incidents but are better equipped to respond to incidents and prevent escalation through effective collaboration (Ghaferi et al., 2009). At the same time, studies indicate that while the narrative of collaboration has become well-established in hospital care, in practice, silos still prevail (Finn, 2008; Morris et al., 2023; Weller et al., 2014) These include interprofessional silos between doctors, nurses, and patients, as well as multidisciplinary silos such as surgery and anaesthesia.

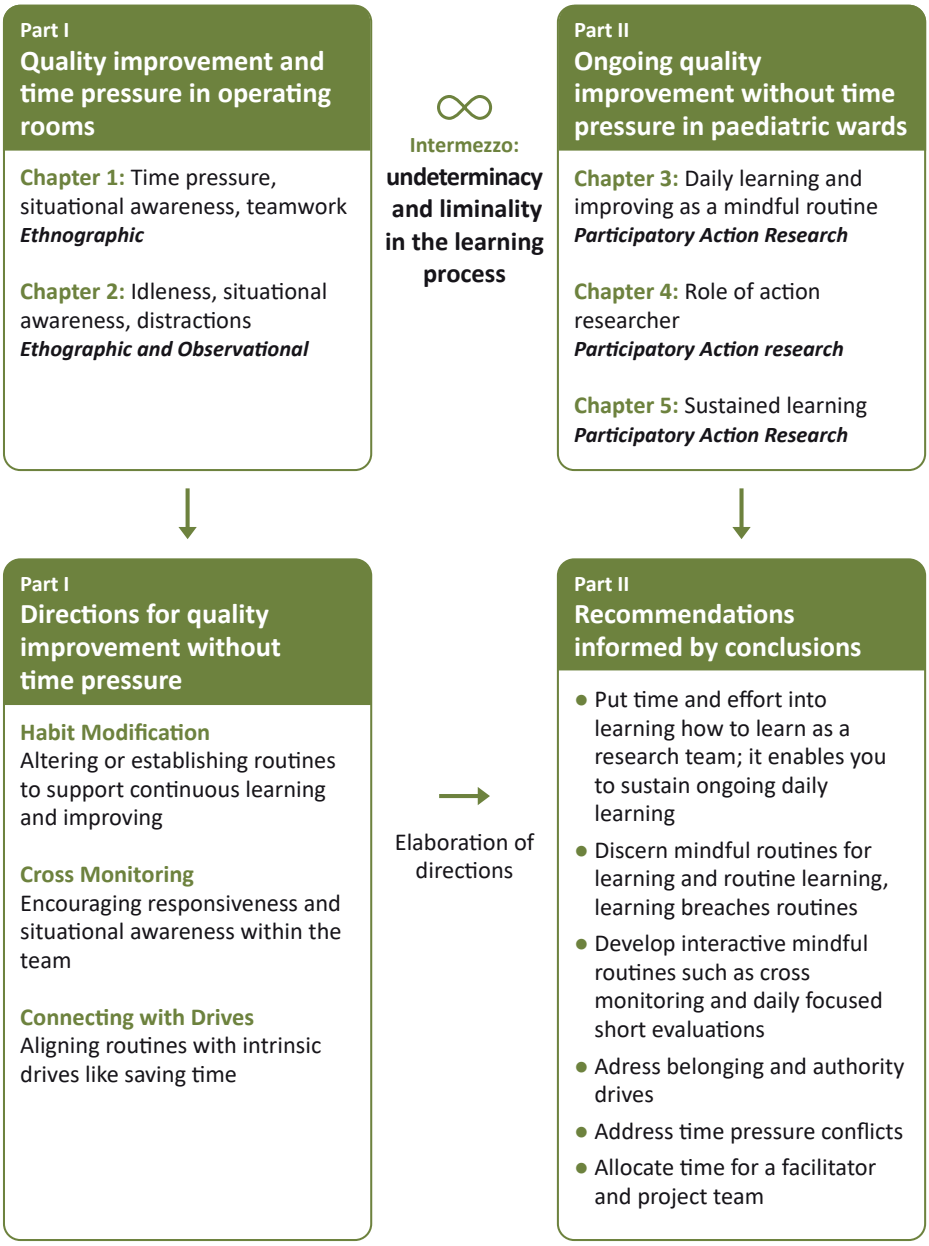
In response to this, hospitals have implemented programmes aimed at fostering effective collaboration in complex socio-technical environments, such as Crew Resource Management (CRM), which usually includes several hours or days of training for all team members. This was also the case in the hospitals where the studies were conducted.

During the first sub-study of the research, in which a team sought to implement elements of CRM, time pressure emerged as a frequently cited factor inhibiting improvements in collaboration. This led to the two main research questions:

1. What is time pressure, and how does it relate to quality improvement within a team?
2. How can teams contribute to ongoing quality improvement with less time investment and without experiencing time pressure?

To address these questions, we employed various methods (see figure 1). In the first exploratory phase we performed a naturalistic case study (Chapter 2) and an observational study in surgical teams in an academic hospital (Chapter 3). In the second phase we conducted participatory action research (Chapter 4, 5 and 6) at a paediatric ward of an education hospital. For all sub-studies, we employed thinking with theory (Jackson & Mazzei, 2022), placing emphasis on re-reading the data and deliberately selecting one or more theories to interpret, code, and thematise the data. By involving multiple authors with different backgrounds, we reduced the risk of unconscious theoretical biases influencing the interpretation. We drew on theories of mindful organising, habit formation, Safety II, desires, social complex adaptive systems, and workplace learning. Additionally, we adhered to a social constructivist epistemology, which posits that experience and knowledge of reality are (partially) constructed within social processes, influenced by the society in which we live.

Figure 1: outline of the research questions, settings, applied methods and results of the five studies.



This research spans a ten-year period. Over the course of the study, the issue of time pressure became increasingly pertinent in light of growing staff shortages, protests over workload, and rising burnout rates. This study does not offer a managerial solution to

staffing shortages, instead it offers insights into how healthcare teams manage experienced time pressure and how it can impact team collaboration and situational awareness and as such quality and safety.

Over these ten years, new theories and insights on quality and safety and the relevance of teamwork have emerged. In the Netherlands for instance, Safety-II, a safety approach that views hospitals as complex systems. This is evident in the "Time for Connection" programme (2020–2024), initiated by the Ministry of Health, Welfare and Sport, and the funding rounds focused on Safety-II and safety ergonomics by the Dutch Council for Medical and Health Research (ZonMw). Although these insights are already there in the background of the articles in part I, they became more prominent in part II.

In this chapter we return to the main questions and highlight some main findings and focus on insights that emerge from the study as a whole. Subsequently, we reflect on the strengths and limitations and implications for practice and further research.

7.2 MAIN FINDINGS

We summarise the main findings in four categories. The first two categories are related to the research question about understanding time pressure and quality improvement. The last two categories are related to the research question about ongoing quality improvement without time pressure. Daily (habitual) learning and improving was seen as key to change without time pressure. Transformative learning came to the front as a relevant concept for sustained change in the last study.

We present little findings on the patients and their parents although they participated in the research at the ward (Chapter 4, 5 and 6). They are included (implicitly) in many of the findings but overall, most sustained learning was realised by the professionals. However, their feedback had substantial impact on the measures taken and their involvement was indispensable.

Understanding time pressure as co-created in the team:

- Time pressure was not the consequence of a workload imposed on the team but co-created by pursuing conflicting priorities while avoiding conflict (2,4).
- The preoccupation with time pressure can provide the motivation for creating team situational awareness (SA) since SA reduces experienced time pressure (chapter 2).
- Having to wait for someone increases a sense of time pressure in the one to wait as well as the one to be waited for (chapter 2, 3).
- Cross monitoring increases team SA and teamwork and reduces time pressure (chapter 2, 3).

Understanding the role of habits and routines in time pressure and quality improvement

- Habitual cross monitoring is possible (chapter 2).
- Established habits and routines are performed under all circumstances and without causing the feeling of time pressure. Whereas new routines are easily compromised under time pressure (chapter 2).
- The surgical team introduced a new interprofessional briefing routine to optimise SA and save time (chapter 2).
- The ward team (including parents) adjusted the existing medical visit routine to improve their team SA and efficiency through standardisation and (daily) interprofessional interaction about the work (chapter 4).

Steering transformation through addressing desires (underlying time pressure)

- In both the OR team and the ward team the motivation for changes in teamwork were mainly grounded in semi-conscious desires, which were different from the formal goals (chapter 2, 4, 5).
- In both settings, issues of time -having to wait for someone, timely decisions, timely endings, finishing the program, speed- were connected to their desires for belonging and authority or professional pride (chapter 2, 4, 5).
- The action research team realised interventions that resonated among their colleagues, because they addressed their conflicting priorities and desires (chapter 4, 5, 6). Parents responded positively to clear information on the medical visit, visible mutual help, and the nurse giving her presentation before the parents.

Generating transformative learning and sustained daily learning trough action research:

- Through interaction perspective taking changed and daily learning grew (chapter 4).
- The interaction in the workplace was stimulated by the action research team in which all stakeholders participated (chapter 4, 6).
- Often the interaction, leading to a breach in assumptions, prompted immediate action, to fulfil expectations (chapter 4, 6), and as such prompted experiential learning in the team of the day, over time resulting in transformation in the unit (chapter 4, 5, 6).
- Transformative learning in the action research team was not a (mindful) routine, as it required disrupting habits of thinking and acting. Therefore, it often demanded conscious attention and overcoming reluctance (Chapter 6). The action research team:
  * developed insights into what was needed for learning in their colleagues and in themselves;
  * reconceptualised progress and change, which motivated ongoing effort;

    * became aware that reflection on the assumptions underlying their own collaboration was relevant to the continuity of their role;
    * developed mindful routines on the ward to sustain realised changes, and to elicit daily interaction and learning.
- An external facilitator or action researcher appeared necessary to transfer skills, address tensions, and to be the pusher (big stick in reserve) at times of low motivation (chapter 6).

7.3 DISCUSSION OF CONCEPTUAL RELATIONS BETWEEN THE OUTCOMES OF ALL STUDIES

“To conclude this study, we revisit the research questions addressed in the sub-studies by integrating the findings presented across the chapters, as outlined in Figure 1, and by incorporating additional insights. This integration allows us to build a cohesive narrative around time pressure, ongoing improvement efforts, and transformative learning in teams.

We begin by exploring how teams experience and respond to time pressure and how this connects to their improvement efforts. Drawing on the findings in Chapters 5 and 6, we introduce the concepts of Kairos—the opportune moment—and temporal shifts to enrich our understanding of how teams navigate time constraints while striving for improvement. These concepts shed light on the nuanced dynamics of time pressure in the context of organizational change.

Next, we examine the potential of creating mindful routines or habits as a strategy to sustain good practices, support ongoing improvement and adaptation, and mitigate the negative effects of time pressure. These routines serve as anchors for teams, ensuring that awareness and shared situational understanding remain embedded in daily operations.

Building on this, we explore what drives the (improvement) behaviours and the development of mindful routines. Here, we introduce the concepts of liminality and not-knowing as essential phases in transformative learning for both the organisation and the facilitator.

We then delve into the relevance of transformative learning within the action research team itself and its implications for establishing mindful routines and sustaining daily learning in the ward. To illustrate this, we present the additional concepts of play and game. These concepts highlight the necessary oscillation between adhering to established rules and experimenting with them, which creates liminal spaces where transformative learning can occur.

Finally, we discuss Participatory Action Research (PAR) as a methodology for driving change within socially complex adaptive systems. We emphasize its role in facilitating

transformative learning within the research team and enabling workplace transformation. This approach altered the perception of time in hindsight, demonstrating its potential to support long-term organizational growth.

In the conclusion, we will summarise what the discussions mean for our answers to the main research questions.

Understanding Time Pressure in the Context of Improving Care

The results show that time pressure did not result from an imposed workload on the team, but rather from handling conflicting priorities within the team. We did not measure clock time (Chronos) however we received no signal that the research affected ending times or number of patients per day. However, the teams could reduce the experienced time pressure, by resolving their conflicting priorities and therefore improve the right time for actions (Kairos). Nurses in the OR knew timely which additional materials were missing which enabled them to anticipate (Chapter 2 and 3), and nurses in the medical visit could present their nursing information before the parents spoke, which enabled them to do it more structured and without repeating the parents and which enabled the parents to focus on their experiential knowledge (Chapter 4, 5 and 6). Furthermore, instead of "having to wait until the medical visit is finished" the nurses were contributing to the medical visit. It also affected the residents that felt less rushed after the ward round by the nurses who were waiting for treatment decisions. The measures changed the experience of time: it reduced time pressure and it nurtured the agency the nurses. It gave them more control over the course of events.

The examples illustrate that Kairos is less a concept of time and more an expression of what human action can achieve when faced with its counterpart, Tuchè or Fortuna (Lamers, 2021) Kairos involves recognizing and seizing the right moment to actualize a possibility inherent in a given situation. This, however, requires the ability to perceive the opportunity, which depends on a particular kind of attentiveness and intelligence. This kind of attentiveness and intelligence in the team, inherent in Kairos, links the concept to several key concepts of the studies: situational awareness (Chapter 2, (Kaber & Endsley, 2004), mindfulness (Chapter 2, (Weick & Sutcliffe, 2007) and embodied knowledge (Chapter 5, (Varela, 1999)), all of which enable what Davis & Sumara (2005) describe as occasioning (Chapter 5). It is grounded in a fundamental understanding of reality as an ambiguous, unpredictable, and thus uncontrollable complex whole. Within this framework, the unforeseeable—the realm of Fortuna—creates the space for successful human intervention.

In part II of the research, we chose to learn on the job, instead of initiating training sessions as was done at the OR; this required less clock time of participants. Yet, the participants still sighed over the effort required of them for the sake of the action research (Chapter 4). Also, the research team at the ward experienced the research, and especially the research

team meetings, as very time consuming. The simultaneity of tasks and finding a moment in all different schedules contributes to the experience of time pressure. Reducing these meetings in length (max 1 hour) and number in the second research, did not change the feeling of time pressure (Chapter 6). Especially the physician still felt reluctance to prioritise the meetings over patient care or other obligations that render directly visible results. When muddling through without seeing the progress, time spent felt as time lost and therefore it was difficult to maintain motivation during setbacks in the process. Thus, reducing time spent (Chronos) on the improvement efforts, did not reduce the experience of time pressure.

However, at the end of both studies at the ward (Chapter 4 and 6), when they experienced the rewards in the present, participants looked at the time spent in the past in a different way. Xu et. al. (2023) state that having a near future perspective generates more time pressure, and a more utilitarian mode than a long term future perspective. This highlights the importance of a (research) team capable of making the temporal shift from the present to looking further back into the past and projecting further into the future. Otherwise, one does not see the (incremental small) results accomplished leading to larger progress. This capability is not self-evident in a team of professionals that from the nature of their profession must attend to the present almost all day.

In Chapters 2, 4, and 6 we observed the value of situational awareness (SA)[1] for reducing time pressure in the present. From chapter 6 we can conclude that a longer-term oversight, and thus a temporal shift, reduced the experience of time pressure in the action research team and was relevant to sustain ongoing learning and improving.

Notwithstanding the conclusion that also shorter research team meetings generate time pressure, it remains relevant to find ways in which professionals can combine the primary task of patient care with learning and adapting care to changing circumstances and insights, short term and long term. In that light, it is relevant to conclude that with a relatively small investment (compared to training) an entanglement of improvements could be realised (Chapter 4, 5 and 6). In the following paragraphs, we will delve deeper into the learning process and the connection between the daily, small happenstance learnings of individuals and the broader learning movement of the ward as a whole.

Using or Creating Mindful Routines for Time Pressure Free Development?

The main findings about habits and routines in part I led us to conclude that installing new mindful routines or modifying existing routines offer a chance for sustained learning and improving no matter the time pressure.

1 the process of perceiving and interpreting the situation at hand and anticipating at what comes next.

There is consensus that habits and routines are necessary for survival because this way we save our conscious thinking mind for the issues that need conscious attention. Our bandwidth for conscious thought or slow thinking (Kahneman, 2011; Mullainathan & Shafir, 2013) is limited. In theory, habits can be cued to come into operation, but in practice it is not always easy to create a cue. The second mechanism for habituation is repetition. There is no conclusive research on how often over which period something must be repeated to become a habit in an individual and how to measure it. Lally et.al. (2010) state that it can take 18-254 days. To our knowledge there is no specific literature on installing habits in interprofessional teams. Lally and others (Dewey, 1922; Duhigg, 2012; Neal et al., 2012), depart from a more or less behaviouristic stance, seeing a habitual performance as a sort of Pavlov reaction to a stimulus. McCaw (2023) however argues that habits are not just the product of cueing and repeating, but just as much the product of learning. Reflecting on habit in interpretative and performing professions, he discerns three different types of habits. Fixed habits, being a rigid stimulus response; bad habits, being a generalised reaction that would be deployed across a wide variety of different situations; good habits, which are informed by a continuing process of learning that creates a background library. While acting there is an unconscious process selecting the best match out of the background library fitting the actual situation. The notion of good habits resembles the concept of mindful routines (Vogus & Hilligoss, 2016; Weick & Roberts, 1993; Weick et al., 1999), embodied knowing (Varela, 1999), situational awareness (Kaber & Endsley, 2004), and tacit knowledge (Polanyi, 2009). It requires experience (a background library) and sensitivity to perceive the small differences in patients, teams and surroundings. In sum, good habits, or mindful routines, are the result of a learning process, just as much as the result of cueing and repeating.

In chapter 2 we sketched an example of a good habit in the experienced fast surgeon, collecting information continuously by watching, listening, and asking updates from team members. Yet, we also described that this surgeon was unwilling to change his habits, nor did he alter his habits of thinking about what constitutes safe and good care. Simply stated, he stayed with his conviction that the main factor for good health outcomes was a good surgeon. Therefore, as an educator he focused more on showing and transferring technical skills and being a decisive leader, than on transferring teamwork skills. No one took his skill of connecting with the team as an example. Kahneman (2011), points to the risks of habits of thinking in terms of cognitive biases (misreading the situation because we see what we expect to see). In this case the surgeon saw confirmation of his conviction every day. Thus, even good habits, can have their limitations, resulting in limited adaptability and transformation in the larger system. They can become “bad habits” in terms of McCAw (2023). These bad habits are often acquired in a long process of education and socialising into a profession (Lingard et al., 2002; Witman et al., 2010). Precisely this interactive social

aspect of acquiring bad habits, offers at the same time the opportunity for acquiring new good habits as a team.

We saw in Chapter 4 and 6 how the team learning of new good habits, or mindful routines, evolved in an interactive process. The daily happenstance experiential learning on the job was often combined with a change in assumptions. When participants discovered that other participants appreciated help, because they were still struggling to acquire some skills, they rejected their assumption that they will be offended by help. When nurses experienced the appreciation of parents when they used the poster in preparing them for the visit, they rejected their assumption that just telling them without visual support is enough. And when nurses and ward physicians shared their time management considerations, nurses rejected their assumption that ward physicians take too much time for the medical visits and accepted late treatment plans. Many of these small incremental improvements and learnings over a larger group of participants, led in the end to transforming their ward round practice into new good habits or mindful routines.

Yet, we also concluded in chapter 6 that, although it is possible to develop mindful routines and organise the opportunities for learning, learning itself can never become a routine, since we defined it as "the on-going and relational adapting through the enactment of small and large perturbations in which both agent(s) and environment change and co-evolve towards enlargement of the space for possible action" (Snoeren et al., 2013). We conclude that having learned something is usually appreciated, but the learning itself requires the effort of a perturbation and breaching with a habit. As creatures of habit (Dewey, 1922; Duhigg, 2012), it seems unavoidable that in most participants, including the action researcher, there is reluctance to learn and change.

Thus, from the findings in Part II we must firstly conclude that *adjusting* an existing routine requires more or less the same effort as *installing* a new routine or *unlearning* an old routine. It is all experienced as a breach of habit and thus a serious time-consuming effort. Mindful routines are not only a matter of cueing and repetition, but also of learning. Secondly, we conclude that it is possible to establish small incremental learnings and develop mindful routines as a ward, that foster sustained good practice, but it is not possible to learn and develop habitually.

The Drives Behind the Creation of Mindful Routines

In part I we concluded that time (priorities) was often at the centre of tensions between the professions at the OR. This was not different at the paediatric ward and also noted in other studies (Espin & Lingard, 2001). We also noted in both settings that these issues of time were connected to desires for belonging and authority or professional pride (Chapter 2, 4, 6). For example, we concluded that speed was part of the surgical professional pride and to motivate surgeons for the briefing it helped to connect the briefing with saving

time. We also concluded that having to wait a lot for the physicians and parents made them feel more like carers than nurses and they were motivated for a different method and order of the medical visit because it generated nursing professional pride and more nursing leadership. Therefore, we concluded: connect the strive for mindful routines to preoccupations, desires or drives, then one enlarges the chance that it becomes prioritised. We used the word desires or drives to discern them from motivations or goals. Drives are usually unconscious or semi-conscious, they drive us whether we like it or not (Jackson & Mazzei, 2022; Verhaeghe, 2011).

We discerned two basic main drives: belonging and authority (Chapter 5). These drives are inherent to us being group animals. Yet, other scholars discerned other more or less primordial drives which we can recognise in the results as well. Graves discerns eight drives (Ferreira, 2023; Graves, 1970); four drives which are oriented at "we": traditional customs, structures and order, community and care, holistic life system (spiritual) and four oriented at "I": survival, power and energy, results and success, synergy and learning and experimentation.

We recognise the community and care drive of nurses and the results and success drive of the physicians in Chapters 2, 4 and 6.

- OR nurses, being careful not to breach the relation.
- Surgeons saying, "They walk the extra mile for you if they like you."
- Ward nurses saying, "If we stick our head above the parapet, they [our colleague nurses] cut it off."
- Paediatrician saying, "And then it's something that takes everybody's time, while we don't see that concrete improvement."
- Paediatrician speaking of "this project at the cost of my project" while nurses speak about "our project."

These findings are in line with the literature (Makary et al., 2006; Sexton et al., 2006) in which "nurses often describe good collaboration as having their input respected whereas physicians often described good collaboration as having nurses who anticipate their needs and follow instructions." (Sexton et al., 2006, p. p881). We might say, that nurses have to show different behaviour to realise belonging and authority in their own peer group than physicians. Nurses must invest in relations where physicians must invest in results.

Given the dominant drive for individual results and success, we can understand that in the culture of physicians there is a focus on patient outcome and physician's skills when speaking about quality and safety. They see teamwork and good relations as a means, whereas for nurses it is a goal in itself. From these drives we can also understand their preference for research and clinical excellence instead of interprofessional quality improvement. The latter usually contributes little to their professional pride and status.

This focus was seen in chapters 2, 3, 4 and 6 but also in several other studies analysing why physicians are usually less inclined to participate in -interprofessional- quality and safety initiatives (Sexton et al., 2006; Taitz et al., 2012; Travaglia et al., 2012).

Participants in the workplace are usually not aware of drives nor of the differences in drives, and we saw most clearly in chapter 4 and 6 how this led to mismatching assumptions and expectations. The nurses, feeling that the physicians were not any longer with them on the project, felt not recognised and appreciated. They named this feeling as a threat for continuation after closure of the research.

Concluding that these differences in drives between physicians and nurses are widespread, it helps interprofessional teams to become aware of these differences because then participants can check whether (parts of) this general pattern applies to them as well, question their assumptions, change perspectives and address how to work together. This contributes to the persistence of their efforts

Since drives are unconscious, the facilitator or action researcher can fulfil a relevant role by bringing them into consciousness to support mutual understanding. To do so the action researcher needs awareness of their own desires and be able to sympathise with all different drives.

Transformative Learning in the Forerunners, Sparking Incremental Learning on the Job

Transformative learning is difficult to define, but all attempts to do so include the element of perspective change or changing one's assumptions (Newman, 2012; van Woezik et al., 2023) and they include an element of radical or impactful change. Mezirow introduces the start of transformative learning as an disorienting experience that in the end becomes reintegrated into one's life (Mezirow, 1997; Mezirow & Taylor, 2009)

We noted above that the small incremental learning on the job, often required revision of assumptions and led in the end to transformation. Examples were learning to cross monitor and offer mutual help, to structure information sharing, to prepare parents for the medical visit with a visual aid, etc. The examples concern quick learnings, or fast thinking (Kahneman, 2011), without much conscious reflection leading to immediate action and in the end the development of mindful routines. This pattern is aptly described in Snoeren's (2013) definition of workplace learning: "the on-going and relational adapting through the enactment of small and large perturbations in which both agent(s) and environment change and co-evolve towards enlargement of the space for possible action". More space for possible action means more individual agency. The small perturbations in one-to-one interactions, as well as the mindful routines within the larger team, were instigated by the action research team.

We compared daily workplace learning with the learning in the action research team, which demanded deliberate reflection, or "slow thinking" (Kahneman, 2011), leading to shifts in their habitual ways of thinking. Examples of such habitual thought patterns are the following:

- Nurses tended to believe that physicians undervalue their contributions and improvement efforts, leaving most of the work to them. Conversely, physicians typically assumed that the success of a ward round or surgical procedure depended primarily on the performance of a competent physician. Both assumptions began to shift over the course of the research.
- The action research team shifted their attention from the practical improvements to understanding how learning and change at the ward comes about – e.g. asking the right questions, interacting about the work– and they realised that if one knows how to learn on the job they can apply this knowledge or skill to many concrete improvement goals, without the need to install another project team.
- They also reconceptualised the relevance and impact of the changes, understanding that changes in norms (e.g.: we can engage in interprofessional education with each other) are less visible but not necessarily less impactful.
- And finally, they learned the relevance of addressing relational tensions and recognised the relevance of the action researcher for muddling through in difficult phases when they were occupied by workload and relational issues.

We consider the fast learning by slow thinking in the action research team as transformative, as opposed to the slow learning by fast thinking in the workplace. Both are necessary for transforming the practice in the workplace. Figure 2 pictures the differences between the learning in the larger team and the transformative learning in the action research team.

Figure. 2: The left side represents the daily learning in the larger team by fast thinking and acting. It requires repetition (many circular movements), small perturbations and slowly spreading the learnings in socialising processes. This learning is supported by the reflective learning loops (few circular movements) of the action research team, requiring slow thinking and generating fast learning in the action research team. This way an ongoing lemniscate oscillates passing the liminal square) of larger perturbations and periods of not knowing, each time a leap is made.

Learning in the larger team

- Fast thinking
- Developing slowly good habbits through small incremental changes on the job
- Daily happenstance, while acting
- Change of assumptions about others' experiences (in interaction with patients)
- Game
- First order

Transformative learning in the research team

- Slow thinking
- Developing fast by enduring the liminal phase of not knowing and by creating agency through addressing conflicting assumptions and priorities
- Reflecting on a longer timespan
- Change of assumptions about learning and improving
- Play
- Second order

We also saw in chapter 6, the relevance of the "outsider" when part of the team was preoccupied by team and group dynamics and workload and had little bandwidth left (Mullainathan & Shafir, 2013). They saw no relevance anymore in the goals they had formulated, stating that they already did very well on time management and feedback (projecting their own performance on their colleagues). However, a few weeks later, they could connect the goals again to the situation at the ward and their own preoccupations and saw the relevance of the goals again; reformulating feedback as giving compliments and mutual help. It was the outsider, introducing another perspective, stressing the

relevance of learning to learn on the job, and encouraging them to find a relevant goal, that seduced them to go on with the research and to put effort in it.

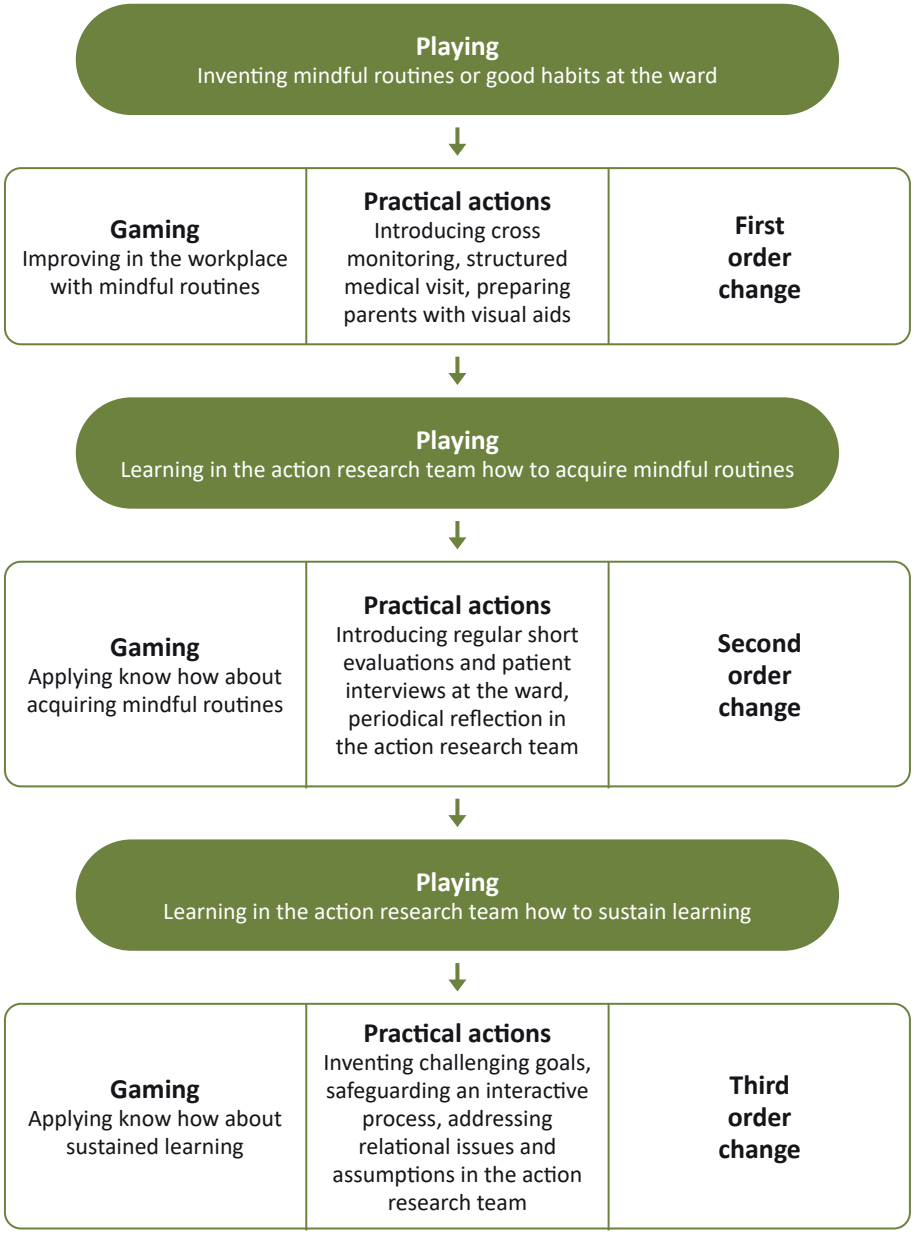
Most of the barriers the action research team had to overcome in their transformative learning are also recognised in other studies (Jeffs et al., 2013), including time constraints, difficulty engaging physicians in these projects, limited skills in managing conflicting priorities, hierarchical structures, and the absence of a coach or mentor to facilitate reflection and connect participants. Less recognised, however, is the transformative process in which participants in the action research team seek to avoid the liminal space of uncertainty yet inevitably enter it. The lemniscate process of transformative learning, in which one needs tolerance for uncertainty during the liminal phase, is described as alternating “game” and “play” by Abma (2000).

In "gaming," individuals work to improve themselves within the existing rules. In contrast, "playing" involves experimenting with and reshaping the rules until the game itself changes—a concept akin to first-order and second-order change (Argyris & Schon, 1974). First order change is defined as one that occurs within the existing framework, rules, and assumptions of a system. It involves adjustments or modifications to improve performance or address specific problems without questioning the underlying structure or values whereas second order change does question them and shifts the way problems are understood and addressed. In Figure 3 we sketched the subsequent phases of game and play and the next order learnings.

The phase of "play", in which the unwritten rules are challenged, is a liminal stage that induces a disorienting experience (Mezirow, 1997), drawing participants into a space of indeterminacy and not-knowing. For healthcare professionals, accustomed to making quick decisions and continuously evaluating outcomes, this phase can be particularly unsettling.

As demonstrated in Chapter 6, experiencing this transformative phase in the first study did not make it any easier in the second study. The team still had to navigate the discomfort of the liminal phase to achieve the next transformation, which felt just as challenging as before.

Figure 3. The process of transformative learning at the ward



What is also less recognised is the how the barrier to find time is linked to the underlying unconscious drives for authority and belonging and to group dynamics. We gained a deeper understanding of the drives and of the role of the action researcher addressing

the underlying drives. The action researcher is not in control but can influence the system like a starling in the swarm by seizing the occasion with their embodied knowledge, by connecting perspectives as a postillion d'amour and addressing the underlying drives.

These insights are relevant in the light of a disruptive changing environment that requires healthcare to adapt in a way that gains support of citizens and other stakeholders. This type of change requires playing with the rules of the game. In the next paragraph we will illuminate PAR as the process for transformation in teams, and, possibly in a next step, in organisations and networks of organisations.

PAR as a Structured Context for Transforming Beyond Quality and Safety of Care

The research of this thesis spanned a period of 10 years. During that time, new themes emerged, and new improvement initiatives were developed. Where initially the shock of avoidable harm in hospitals dominated the discourse, more attention is now being paid to staff shortages, overworked and undervalued personnel, health prevention (e.g. a large percentage of cancer cases can be prevented through healthy lifestyles), the environmental impact of healthcare (especially waste and medication in water), the influence of environmental quality (pesticides and air pollution), and the rise in healthcare demand and costs. These latter issues have increased more than expected from population ageing alone, driven by expensive medications and increased treatment options.

Most studies on the quality of care and patient safety, like this one, begin by highlighting the large numbers of avoidable harm. In light of the aforementioned developments, this rationale is no longer sufficient. If the relevance is the prevention of avoidable harm (approximately 1,000 deaths per year In the Netherlands, 0,03% of all hospital admissions), research should also focus on preventable diseases (an estimated 12,000 deaths per year, 0,07% of all inhabitants) due to air quality (Longfonds), 19,000 per year due to smoking (National Drugmonitor), preventable healthcare demand, and preventable overburdening of healthcare professionals (Allen & Mellor, 2002; Bakker et al., 2001; DeCaporale-Ryan et al., 2017). Bauman (2011) notes a decreasing acceptance of uncertainty, fate, chance, and risk. The more we have, the more afraid we are of losing it. We then seek safety within our own gated communities, where we belong, are valued, and life is predictable.

In the light of these larger developments, we see the value of this research just as much in its observed effects on job satisfaction and the reduction of time pressure than in the reduction of avoidable harm—however personally impactful avoidable harm may be for both patients and healthcare professionals.

We also see the value of our research in that it shows the value of PAR for influencing transformation in complex systems. The study found repeatedly that for transformation and adaptation it is important to facilitate equal interaction between participants from

different silos within the system as was noted in Chapter 4 and 6. Equal interaction (epistemic justice and emancipation) is inherent to PAR (Abma, 2020).

While participatory action research (PAR) does not necessarily imply a complexity perspective on reality, in part II we observed parallels between the theory of development in social complex adaptive systems (SCAS) and participatory action research, as outlined in the table below. A key difference is that SCAS is descriptive, whereas PAR is activist.

Table 1. Principles of transformation in Social Complex Adaptive Systems and Participatory Action Research

Development in SCAS	Investigating through change in PAR
Pluriformity	All stakeholders are involved
Neighbouring interaction	Bringing stakeholders into conversation
Decentralised control	Involved actors determine for themselves what is important, what to investigate, and what to improve.
Interactions are steered by sensemaking Seeking for belonging and authority determines with whom, how often and about what is interacted.	The facilitator seeks epistemic justice and emancipation (belonging and authority for all) A liminal space is created to search and learn without knowing the endpoints, thus acceptance of indeterminacy

The notion that interactions are largely driven by the basic motivations of belonging and hierarchy is our own addition, though supported by behavioural scientists (Jackson & Mazzei, 2022; Verhaeghe, 2011; Waal, 1989). This notion clarifies that it is not so easy to cross silos. it requires participants to make themselves visibly vulnerable to the risk of rejection or failure. Risk-taking in interrelating is inherent to crossing silos.

As we pictured in figure 2 additional efforts from the action research team and the facilitator were required to realise the capacity for transformation. They must endure periods of not knowing and the feeling of going nowhere. These are the periods of play, in which one is for example no longer satisfied by perfectioning the cross monitoring and preparing parents but aims for a larger challenging goal without knowing which goal and how to get there. Here the PAR offered a structured context for the action research team encouraging them to persist. For the facilitator this meant working with Fortuna, by attending mindfully and seizing the occasions to inter-vene. In this case the action research team realised the skill of transforming and adapting. A skill that can be directed at the ward round but just as much at any other subject.

The combined concepts of SCAS and PAR makes clear that transformation in complex systems always involves change at the first-person, second-person and third-person level (Chapter 5); the personal, the group and the larger system in which one partakes inevitably influence each other. PAR automatically provides the conditions for positive development in social complex systems, including tolerance for the liminal zone, necessary

for transgressing to the next stage as is shown in figure 3. Therefore, it should likely be a preferred methodology for many studies on change in complex systems. Knowing that systems do not transform from central control but decentralised control, projects with myriads of local action research projects or participative change projects, might be promising (Bradbury, 2024; Bradbury et al., 2019).

7.4 CONCLUSION

We conclude from all our sub-studies on quality improvement in hospitals that time pressure is co-created in the team and can endanger teamwork. However, the desire to prevent or mitigate time pressure often has side effects of fostering team work as well. Both require situational awareness. Furthermore, we conclude that issues of time are often related to issues of belonging and authority: Who dares to address the conflict? Who is the fastest? Who must wait for who?

We sought for ways in which reducing time pressure and improving teamwork, mediating quality and safety, could work to the benefit of both. We conclude that it is possible to ingrain daily mindful routines that, by definition, persist under pressure and do not create time pressure. Mindfulness ensures that these habits are not performed blindly but are executed with good situational awareness within the team, thereby contributing to teamwork, quality and safety and the reduction of time pressure. For example, teams developed the habit of cross-monitoring and gained more insight into how to manage time effectively and avoid frustrations related to it.

However, although the mindful routine is insensitive to time pressure, ingraining the mindful routine is not. We initially considered daily learning as a mindful routine that will not request time of participants, but this view became outdated in the final study where we saw that learning is always a breach of routine. Although daily learning and improving on the job to develop mindful routines do not take much clock time (Chronos), they do require attention and the right timing (Kairos). Furthermore "on-the-job" interprofessional learning requires stimulation from an interprofessional research team, project group, or committee—it does not develop informally and spontaneously by itself. Meeting interdisciplinary with colleagues remains a challenge.

Our conclusion is that daily learning on the job requires several participants, including the action researcher, to participate in an interprofessional committee, that continues organising the opportunities for interactive learning and improving to spark the incremental daily learning in the unit. The committee will engage in transformative learning and endure periods of indeterminacy and liminality. Here they have to walk on the many lingering paths or “cromme pade menich foude” leading through dark woods, sometimes entering

dead end paths, and only seeing in hindsight what they have achieved. These liminal phases, or periods of "play" are experienced as time consuming.

Action research appeared to be an approach that fosters transformative learning in teams, sustained adaptability and quality improvement in hospital teams, and more job satisfaction.

Sustained quality improvement in a team can be structured, requiring minimal clock time and producing many benefits for all, but the time and effort will still be perceived as significant.

7.5 STRENGTHS AND LIMITATIONS

Since the research question was formulated at team level, all studies of this research were conducted at team level and reach for improvement goals that laid within their circle of influence.

We suggested that PAR might prove to be the logical intervention for change in complex systems at a larger scale. Scholars departing from social complexity theory claim, that local action is the place to start large scale transitions (Homan, 2023; Rotmans & Verheijden, 2021). However as Dixon-Woods (Dixon-Woods & Martin, 2016) advocates, to change a sector, there is needed more than just local initiatives and more than just action research. Yet, PAR at a larger level can be part of the puzzle. Only when departments or organisations work together, they can solve problems of the overall system like waiting lists. Sharing knowledge and collaborative learning across local initiatives seems a fruitful approach to be further explored (Schuurman et al., 2024). 'Productive interactions' are key for knowledge infrastructures and policy transformations (Oortwijn et al., 2024).

A limitations of case studies is that they provide local contextual knowledge, which is not always easy to transfer to other settings. However, the strength lies in the possibility to develop deeper insights into the case. In naturalistic case studies, the emphasis is more on naturalistic or situated generalisation than on transferability (Flyvbjerg, 2006; Simons, 2015; Stake, 1995). In situated generalisation the reader, as an active agent, connects the findings—depicted through rich descriptions—to their own context and tacit, situated understanding thereby creating a vicarious experience (Abma & Stake, 2014). This way knowledge is developed that is valuable and practical for participants within systems.

Moreover, when findings pertain to deeply personal aspects, such as desires for belonging and hierarchy, they are often the most universal (Simons, 2014, 2015) because they are intrinsic to the human condition. Nonetheless, the specific manifestations of these desires will vary across different teams and contexts.

7.6 PRACTICAL IMPLICATIONS

In Chapter 6, we referenced the concerns of scholars in the field of quality improvement (Dixon-Woods & Martin, 2016; Hollnagel, 2014; Junghans, 2018; Lucas, 2016; Sujan, 2018; Vogus & Hilligoss, 2016). These scholars point out that the healthcare landscape is rapidly changing and becoming more complex, while the ability to adapt is not keeping pace. Dixon-Woods & Martin (2016) argue that this requires different types of interventions at different levels. At the sector level, things should be arranged and standardised, such as technical and ergonomic conventions—alarms, labelling conventions, dashboard layouts, etc. At the organisational level, there should be less focus on interventions and more on strengthening the organisation. They also advocate for broader testing and preparation programmes, as well as consolidating expertise and research and development.

From our research, we support the need for organisational strengthening at team level. The role of the facilitator fostering the transformational learning process emerged as a crucial condition. The specific roles the facilitator must fulfil will vary by team and change over the course of a project. However, having long-term support, combined with the transfer of knowledge and skills, is essential when a department or team wants to develop mindful routines, tolerance for ambiguity and the skill to address group dynamics. This requires organisations to set up this kind of support. After all, action research is not an intervention that can simply be scaled up. Action research is like dancing: it is learned through practice, not by watching or reading about it. Developing these skills is not automatic in every hospital, let alone on every ward. Imitation is successful since this enables students to observe and gather tacit knowledge.

This also demands something from the health / hospital sector as a whole. An initial exploration of training opportunities for this role in the Netherlands reveals that the sector has few to no such training programmes, and existing (master's) programmes that do develop similar skills primarily train policymakers, not facilitators or action researchers. It requires joint efforts from industry organisations, educational institutions, and hospitals to ensure that the right training is available and that enough people participate. Previous attempts have failed due to low enrolment.

7.7 FURTHER RESEARCH

In the introduction to Part II, we referenced researchers advocating for a different quality and safety paradigm: the complexity paradigm. In this study, we explored at the team level how insights from this paradigm could be integrated into our approach. We found that action research as a method of change fits well with a complexity perspective on complex organisations and a complexity perspective on learning and improvement. In our study, we saw that by increasing situational awareness (SA) in the interprofessional ward round

team, multiple themes could be addressed simultaneously: medication safety, parent participation, preparation for home care, efficiency, etc.

Recently, a Dutch hospital (Jeroen Bosch Ziekenhuis) initiative made the national news. Physicians from different disciplines met regularly to coordinate treatment plans for their geriatric complex patients. It was presented as a solution to an increasingly complex healthcare demand within a more complex system (greater specialisation and part-time work). Similar solutions have been applied in oncology care for some time. However, if we envision implementing such meetings for all categories of complex patients, the system will become gridlocked, like a traffic jam. The proposed solution may serve as an intermediate step toward solutions aligned with complexity theory.

We therefore advocate further research into the application of SCAS theory in cross-departmental care for complex patients. This approach centres on self-organisation and exchange. We may discover how to facilitate exchanges across silo boundaries without fixed structures, fixed times, or fixed content. The creation of a liminal space is key for transformative learning in guiding actors.

Furthermore, this study focused on improving quality and patient safety within the team's own sphere of influence. However, not all desirable improvements can be achieved at this level. It would be interesting to explore the applicability of insights from social complex adaptive systems, habit formation, and drives at the organisational level rather than at the team level.

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Illustration 10: The quest

Summary

Time Pressure and Teamwork, A Quest for Quality Improvement in Hospitals

RATIONALE

Since the publication of the report 'To err is human' (Kohn et al., 2000) many studies on teamwork in hospitals were performed. Research showed that hospitals with low avoidable mortality rates do not necessarily distinguish themselves by having fewer incidents, but rather by their ability to rescue patients in the event of an incident. Teamwork plays a crucial role in this. Research showed also that hospitals fail to realise enduring improvement of patient safety. Theorists plead for a different paradigm in which hospitals are seen as complex adaptive systems and quality improvement (including job satisfaction), learning, and patient involvement are inseparable. Teamwork is seen as a crucial component for adaptability and thus quality and safety. Time pressure is usually seen as one of the complicating factors in a complex system and as a barrier for realizing improvements. It is generally regarded as an unavoidable constraint.

This thesis questions the inevitability of time pressure and aims to gain a deeper understanding of the nature of time pressure and how it relates to improving quality and safety in hospital teams. Furthermore, it aims to find a way for ongoing improving quality and safety with less time investment and without experienced time pressure.

To realise the first aim, we conducted an ethnographic and an observational study in two surgical interprofessional teams in an academic hospital (Study 1 and 2). To realise the second aim, we conducted two participatory action research studies (PAR) at a paediatric ward of an education hospital (Study 3 and 5). To gain a deeper understanding of the role of the action researcher in the change process at the paediatric ward we performed first-person action research (Study 4).

FIRST STUDY: TIME PRESSURE IN SURGICAL TEAMS, A HELP OR A HINDRANCE TO PATIENT SAFETY?

Aim: Patient safety relies on the development of mindful routines in the operating room. Time pressure is often viewed as an unavoidable challenge to maintaining these routines, arising from the workload placed on teams. Our goal is to explore the nature of time pressure and its influence on the development of mindful routines.

Method: This naturalistic case study was conducted with a surgical team in a Dutch academic hospital, utilizing ethnographic methods such as participant observation, interviews, and field notes. Over the course of 103 hours, the researcher closely observed the team in action. The analysis combines insights from habit theory with principles of mindful organizing.

Results: The team culture reflected deference to speed, a strong preoccupation with productivity, a tendency to avoid conflict, and a high value placed on maintaining affective

relationships. Conflicting priorities emerged due to differing safety norms, concerns about time, and varying beliefs about what actions contribute to saving time. Addressing these conflicting priorities, however, was rarely done. Creating shared Situational Awareness[2] (SA) helped to prevent or mitigate time pressure, though it was not a consistently embedded routine. The newly introduced routine of a day start briefing in the interprofessional team was often compromised under time pressure. However, saving time later on that day was also mentioned as the motivation for performing the new routine. Established habits, such as the time out before incision or the morbidity and mortality meetings were insensitive to time constraints, even if participants did not value them highly.

Conclusion: Rather than being workload-driven, time pressure emerged as a co-constructed outcome of conflicting priorities and the preservation of affective relationships. The imperative to save time motivated the creation of shared SA and the formation of new mindful routines.

Further research: We hypothesized that improving an existing routine, such as mortality and morbidity meetings, by broadening stakeholder involvement and addressing prevailing concerns, is likely more feasible than creating a new routine. This is because established routines are inherently more resilient to time pressure. Additionally, we proposed that the motivation to save time could support the adoption of mindful routines, as long as shared SA is essential for achieving those time savings.

SECOND STUDY: AN OBSERVATIONAL STUDY OF DISTRACTIONS IN THE OPERATING THEATRE.

Aim: Several studies suggest a negative impact of interruptions and distractions on anaesthetic, surgical and team performance in the operating theatre. This study aimed to gain a deeper understanding of these events and why they remain part of everyday clinical practice.

Method: We used a mixed methods observational study design. We scored each distractor and interruption according to an established scheme during induction of anaesthesia and the surgical procedure for 58 general surgical cases requiring general anaesthesia. We made field notes of observations, small conversations and meetings.

Results: We observed 64 members of staff for 148 h and recorded 4594 events, giving a mean (SD) event rate of 32.8 (16.3) h^{-1}. The most frequent events observed during induction of anaesthesia were door movements, which accounted for 869 (63%) events, giving a mean (SD) event rate of 28.1 (14.5) h^{-1}. These, however, had little impact. The most

2 SA is the process of perceiving and interpreting the situation at hand and anticipating at what comes next.

common events observed during surgery were case-irrelevant verbal communication and smartphone usage, which accounted for 1020 (32%) events, giving a mean (SD) event rate of 9.0 (4.2) h^{-1}. These mostly occurred during periods of low workload in a sub-team. Participants varied in their experiences, ranging from seeing these as severe disruptions to viewing them as welcome distractions that helped keep healthcare professionals active during low workload periods, while also reinforcing social connections between colleagues. Mostly, team members showed no awareness of the need for silence amongst other sub-teams and did not vocalise the need for silence to others.

Conclusion: Case-irrelevant verbal communication and smartphone usage may serve a physical and psychological need. The extent to which healthcare professionals may feel disrupted depends on the situation and context. When a team member was disrupted, a resilient team response often lacked.

Further research: Minimizing disruptive social interactions could be an effective strategy for fostering habits of cross-monitoring and mutual support between surgical and anaesthetic sub-teams. Further research is necessary to explore ways to bridge cultural divides and develop resilient interprofessional behaviours.

THIRD STUDY: INTERPROFESSIONAL LEARNING AND IMPROVING AT THE PAEDIATRIC WARD

Aim: We aimed to understand how interprofessional workplace teams can learn and improve every day from practice variability.

Method: Participatory Action Research (PAR) at a paediatric ward in a Dutch educational hospital into improving shared SA in bedside ward rounds. Methods included 115 semi-structured interviews and participant observations of the interactions. The action research team consisted of a representation of all stakeholders and the first author, who introduced Safety-II concepts to reflect on their practice.

Results: The exchange of perspectives between parents, nurses and physicians, increased awareness of mutual expectations and experiences prompting individual learning. To foster collective learning at the ward, the research team introduced standards aligned with participants' concerns and encouraged daily discussions about the ward round. This approach facilitated daily mutual perspective taking, expectation alignment, and recognition of practice variability thereby enhancing unit-wide learning and improving. While aiming at increasing shared SA, multiple improvements emerged simultaneously and unexpectedly including time management, professional pride, and job satisfaction. However, participants also discovered that lessons learned did not automatically spread to newcomers.

Conclusion: Everyday learning in hospital units can be enhanced through daily interprofessional interactions about expectations and supported by procedural standards. Fostering daily interactions and initiating standards that met the concerns of participants, required the research team to spend considerable time on addressing conflicting priorities. PAR proved to be a valuable and adaptive approach for learning and improving engaging all stakeholders in a complex setting.

FOURTH STUDY: THE PARTICIPATORY ACTION RESEARCHER: A STARLING IN THE MURMURATION

Aim: We aimed to explore how a participatory action researcher supported transformation across first-, second-, and third-person inquiry levels, informed by social complex adaptive systems (SCAS) theory and theory on desires.

Method: All authors analysed the narratives as critical friends using the method of thinking with theory to deepen our understanding of the dynamics at play.

Results: We use the metaphor of a starling in a murmuration to describe the researcher's role: not in control but subtly influencing direction by alternately following and bending the existing interaction patterns. By initiating overlapping circles of interaction, she enabled the emergence of interference leading to improvements at the ward.

Conclusion: We conclude that the PAR researcher seized opportunities to act as a messenger for workplace issues related to belonging and authority. This way she paved the way for direct interaction between professional silos on the work floor and parents. Addressing these issues released the energy among nurses and physicians in the research team to engage in constructive conflict. From this conflict, initiatives emerged, interfered, and transformed ward practices.

By enduring the discomfort of participating in constructive conflict, alternating between yielding and confronting connection, PAR researchers can influence transformation without controlling it.

Our findings contribute to action research theory by demonstrating the usefulness of SCAS theory in revealing patterns and interconnectedness of first-, second- and third-person inquiry, and to SCAS theory by showing how desires for belonging and authority drive cross-professional interaction.

FIFTH STUDY: MAKING QUALITY IMPROVEMENT A HABIT AT THE PAEDIATRIC WARD

Aim: Retaining improvements and continuing daily learning and development after the conclusion of a project is reportedly uncommon. Therefore, our aim was to explore how interprofessional healthcare teams in hospitals can cultivate a habit of ongoing learning and improvement in their daily work.

Method: We decided to do follow up Participatory Action Research (PAR) in the paediatric ward. We collected data in meetings, field notes, interviews, and short interprofessional evaluations, emails and telephone conversations. The theory of social complex adaptive systems was used as a lens for analysing the data.

Results: The team retained daily learning because the research team developed the skills for organising periodical evaluative rounds and formulating changing challenging goals fitting the actuality. The skills and insights in the research team evolved in a process of transformative learning in which they changed their assumptions on the nature of learning, the length of time needed for successful change and the relevance of addressing relational tensions in the team. Finally, they recognised that the availability of a facilitator is crucial for developing skills and knowledge and thus capacity building.

Conclusions: To facilitate a reflective routine of regular interactive evaluations among colleagues and parents of patients, the participating research team needed to engage in transformative learning themselves. Experiencing the value of learning and progress motivated them for sustaining the interactive evaluative routine after closure of the research. However, to persist in the learning process, the team needed a facilitator who transferred missing skills and knowledge and addressed relational tensions. Improvements can become habitual, thereby eliminating time pressure, but learning—particularly transformative learning—cannot, as it requires a disruption of habitual ways of thinking and acting.

CONCLUSIONS ON IMPROVING QUALITY AND SAFETY WITHOUT TIME PRESSURE

The objective of the five studies was to gain a deeper understanding of the phenomenon of time pressure and then to explore whether a change strategy could facilitate sustainable and continuous improvement without a significant time investment and without time pressure.

We understand time pressure as a phenomenon collectively created within and by the team around conflicting priorities between participants such as: being fast and productive, avoidance of waiting, finishing on time, or timely decisions. These priorities often stem

from underlying and unconscious drives for belonging (inclusion) and position (authority). Time pressure can jeopardise team collaboration. But time pressure also often served as a catalyst for creating shared situational awareness (SA) within the team, since this reduces time pressure. Shared SA is crucial for effective team collaboration, quality of care and adaptability of care. We observed that daily mindful routines persist under time pressure and do not themselves create time pressure. We refer to routines as mindful when they are not performed mechanically but contribute to shared situational awareness within the team. Cross-monitoring, where team members observe each other's work and provide support, is an example of such a routine. However, while a routine may be resistant to time pressure, embedding or modifying a routine is not.

In developing a quality improvement strategy that minimises time pressure, the participatory action research team focussed on daily learning within interprofessional teams in the workplace. Interprofessional learning in the workplace does not develop informally or spontaneously; it requires the stimulus of an interprofessional research team, project group, or committee that progressively fosters sustainable learning and formulates objectives aligned with the concerns and aspirations of all stakeholders. The development of this role within the research team proved to be a process of transformative learning, alternating between unsettling liminal phases of uncertainty and consolidating phases in which results could be harvested. Participatory Action Research (PAR) proved to be a method well suited to sustainable learning and improvement in social complex adaptive systems (SCAS) because it shares the same principles of transformation: epistemic justice, interaction among all stakeholders, and decentralised control. The facilitator played an indispensable role in fostering these principles.

The facilitator stimulated exchange between different interaction circles and various stakeholders on the nursing ward, thereby creating opportunities for positive interferences that drive change throughout the system. Connecting the interaction circles required the facilitator at times to align and move along to build relationships (connecting), and at other times to confront (confronting) to ensure that the issues most relevant to those involved were addressed. Moving along sometimes also meant acknowledging hierarchical relationships. The issues at stake often related to the drives for inclusion and authority. This applies to both the professionals on the floor and the facilitator. Unconscious drivers and embodied knowledge can both influence the facilitator's actions in the moment. Therefore, the facilitator must reflect on when their own needs for inclusion and authority take precedence and when embodied knowledge, built over years of experience, comes into play—both of which always respond faster than conscious thought.

Although daily learning and improvement in the workplace required little clock time (Chronos) and provided greater benefits than initially expected, it did demand attention and appropriate timing (Kairos) and often began with a disruption of existing expectations

or assumptions. Because it required disruption, effort and focus, it was also experienced as a time burden. This was even more pronounced for the time invested by the research team. Therefore, while good habits can evolve into routines that do not impose time pressure, learning, by definition, never becomes a habit because it necessitates navigating through an uncertain liminal phase. Thus, we conclude that change does not necessarily require a significant amount of time from healthcare professionals, but it almost always imposes time pressure.

STRENGTHS AND LIMITATIONS

A limitation is that all sub studies were conducted at team level. We suggested that PAR might prove to be the logical intervention for change in social adaptive complex systems at a larger scale, however, to change a sector, there might be needed more than just local initiatives and more than just action research. A strength is that 'productive interactions' are key for knowledge infrastructures and policy transformations. We shed light on productive interactions. Sharing knowledge and collaborative learning across local initiatives seems a fruitful approach to be further explored

A limitation of case studies is that they provide local contextual knowledge, which is not always easy to transfer to other settings. However, the strength lies in the possibility to develop deeper insights into the case. In naturalistic case studies, the emphasis is more on naturalistic or situated generalisation than on transferability. In situated generalisation the reader, as an active agent, connects the findings—depicted through rich descriptions—to their own context and tacit, situated understanding thereby creating a vicarious experience.

Moreover, when findings pertain to deeply personal aspects, such as desires for belonging and hierarchy, they are often the most universal because they are intrinsic to the human condition. Nonetheless, the specific manifestations of these desires will vary across different teams and contexts.

PRACTICAL IMPLICATIONS AND FURTHER RESEARCH

Our research suggests the need for organisational strengthening at team level. The role of the facilitator fostering the transformational learning process by connecting different perspectives emerged as a crucial condition. Having long-term support, combined with the transfer of knowledge and skills, is essential when a department or team wants to develop mindful routines, tolerance for ambiguity and the skill to address group dynamics. This requires organisations to set up this kind of support.

Organisational strengthening also demands something from the health / hospital sector as a whole. An initial exploration of training opportunities for this role in the Netherlands reveals that the sector has few training programmes or existing (master's) programmes that do develop facilitator skills. Available programmes primarily focus on educating policymakers rather than facilitators or action researchers. Ensuring the availability of appropriate training and sufficient participation requires joint efforts from educational institutions and hospitals. Previous attempts have failed due to low enrolment.

A common solution to create situational awareness across disciplinary boundaries, necessary for patients with comorbidity, is to organise meetings. However, if we imagine implementing such meetings for all categories of complex patients, the system will get stuck. We therefore advocate for further research into the application of SCAS theory to cross-departmental care for complex patients. This approach centres on self-organisation and exchange. We may discover how to facilitate exchanges across silo boundaries without fixed structures, fixed times, or fixed content. This requires the creation of a liminal space for transformative learning in guiding actors.

Furthermore, this study focused on improving quality and patient safety within the team's own sphere of influence. However, not all desirable improvements can be achieved at this level. It would be interesting to explore the applicability of insights from social complex adaptive systems, habit formation, and drives at the organisational level rather than at the team level.

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Illustration 10: The quest

Samenvatting

Tijdsdruk en Teamwork, een Ontdekkingstocht naar Kwaliteitsverbetering in Ziekenhuizen

INLEIDING

Sinds de publicatie van het rapport 'To err is human' (Kohn et al., 2000) zijn er vele studies uitgevoerd naar teamwerk in ziekenhuizen. Onderzoek toonde aan dat ziekenhuizen met lage vermijdbare sterftecijfers zich niet zozeer onderscheiden door minder incidenten maar door het vermogen om, in het geval van een incident, de patiënten toch te redden. Hierin speelt team samenwerking een belangrijke rol. Onderzoek toonde ook aan dat de meeste ziekenhuizen er niet in slagen om duurzame verbeteringen in patiëntveiligheid te realiseren. Theoretici pleiten voor een ander paradigma waarin ziekenhuizen worden gezien als complexe adaptieve systemen en kwaliteitsverbetering (inclusief werkplezier), leren en patiëntbetrokkenheid onlosmakelijk met elkaar verbonden zijn. Team samenwerking wordt gezien als cruciaal voor adaptiviteit en dus voor kwaliteit en veiligheid. Tijdsdruk wordt meestal gezien als een onvermijdelijke complicerende factor in het complexe systeem en als een barrière voor het realiseren van verbeteringen.

Dit proefschrift stelt de onvermijdelijkheid van tijdsdruk ter discussie en streeft ernaar een dieper inzicht te krijgen in de aard van tijdsdruk en hoe deze verband houdt met het verbeteren van kwaliteit en veiligheid in ziekenhuisteams. Daarnaast beoogt het een weg te vinden naar voortdurende kwaliteits- en veiligheidsverbeteringen zonder grote tijdinvestering en zonder ervaren tijdsdruk.

Om het eerste doel te realiseren, hebben we een etnografisch en een observationeel onderzoek uitgevoerd in twee interprofessionele heelkundige teams in een academisch ziekenhuis (Studie 1 en 2). Om het tweede doel te realiseren, hebben we twee participatieve actieonderzoeken (PAR) uitgevoerd op een kinderafdeling van een opleidingsziekenhuis (Studie 3 en 5). Om een dieper inzicht te krijgen in de rol van de actieonderzoeker in het veranderingsproces op de kinderafdeling, hebben we een eerste-persoons actieonderzoek uitgevoerd (Studie 4).

EERSTE STUDIE: TIJDSDRUK IN CHIRURGISCHE TEAMS, HULP OF HINDER?

Doel: Voor patiëntveiligheid is de ontwikkeling van mindful routines in de operatiekamer cruciaal. Tijdsdruk wordt vaak gezien als een gevolg van de hoeveelheid werk en als een onvermijdelijke barrière voor de consequente uitvoering van mindful routines. Ons doel is om de aard van tijdsdruk te onderzoeken en de invloed ervan op de ontwikkeling van mindful routines.

Methode: Deze naturalistische case study werd uitgevoerd met een heelkundig team in een Nederlands academisch ziekenhuis, op basis van etnografische methoden zoals participerend observeren, dagelijks reflecteren en interviewen. Gedurende 103 uur,

observeerde de onderzoeker het team in actie. De analyse combineert inzichten uit de gewoontetheorie en mindful organising.

Resultaten: De teamcultuur kenmerkte zich door ontzag voor snelheid, een preoccupatie met productiviteit, de neiging om conflicten te vermijden en het onderhouden van affectieve relaties binnen het team. Conflicterende prioriteiten ontstaan als gevolg verschillende veiligheidsnormen, zorgen over tijd en verschillende overtuigingen over welke acties tijd besparen. Deze conflicterende prioriteiten werden echter zelden geadresseerd. Het creëren van gedeeld situatiebewustzijn (SA[3]) hielp om tijdsdruk te voorkomen of te verminderen, maar dit was geen consistent routine. Tijdsdruk werd vaak als reden aangevoerd om de nieuw ingevoerde dagstart briefing niet of incompleet uit te voeren. Tegelijkertijd werd de tijdsbesparing die de briefing later op de dag opleverde, genoemd als motivatie voor het wel goed uitvoeren van de nieuwe routine. Vaste gewoonten, zoals de time-out voor incisie of de complicatiebesprekingen, waren ongevoelig voor tijdsdruk, zelfs als de deelnemers deze gewoontes niet erg waardeerden.

Conclusie: Tijdsdruk bleek niet het gevolg van de hoeveelheid werk maar bleek het resultaat van ene proces van co-creatie waarin actoren conflicterende prioriteiten hadden maar omwille van de affectieve relaties het conflict uit de weg gingen. De drang om tijd te besparen motiveerde het team om gedeelde SA en nieuwe mindful routines te creëren.

Verder onderzoek: Omdat bestaande routines bestand zijn tegen tijdsdruk, veronderstellen we dat het verbeteren van een bestaande routine, zoals de complicatiebespreking, waarschijnlijk haalbaarder is dan het creëren van een nieuwe routine. De verbetering zou kunnen bestaan uit het betrekken van meer stakeholders en het bespreken van preoccupaties die betrokkenen bezighouden. Daarnaast veronderstellen we dat de adoptie van mindful routines ondersteund wordt door het streven naar tijdswinst, mits gedeelde SA essentieel is voor het realiseren van die tijdwinst. Deze veronderstellingen vragen nader onderzoek.

TWEEDE STUDIE: EEN OBSERVATIESTUDIE NAAR VERSTORINGEN OP DE OPERATIEKAMERS

Doel: Verschillende studies suggereren een negatieve invloed van onderbrekingen en afleidingen op de prestaties van het team in de operatiekamer. Dit onderzoek streefde ernaar te begrijpen waarom deze gebeurtenissen desondanks deel blijven uitmaken van de dagelijkse klinische praktijk.

3 Situatiebewustzijn (Situational Awareness) is het proces van het percipiëren en interpreteren van de situatie die voorligt en het anticiperen op wat kort daarop zal volgen.

Methode: We gebruikten een observationeel onderzoeksontwerp met gemengde methoden. We telden elke afleiding en onderbreking volgens een vastgesteld schema tijdens de inleiding van anesthesie en de heelkundige procedure voor 58 algemene heelkundige operaties die algemene anesthesie vereisten. We maakten veldaantekeningen van observaties, kleine gesprekken en vergaderingen.

Resultaten: We observeerden 64 medewerkers gedurende 148 uur en registreerden 4594 gebeurtenissen, wat resulteerde in een gemiddelde gebeurtenisfrequentie van 32,8 (SD 16,3) per uur. De meest voorkomende gebeurtenissen tijdens de inleiding van anesthesie waren deurbewegingen, die 869 (63%) gebeurtenissen vertegenwoordigden, met een gemiddelde frequentie van 28,1 (SD 14,5) per uur. Deze hadden echter weinig impact. De meest voorkomende gebeurtenissen tijdens de operatie waren casus irrelevante mondelinge communicatie en smartphonegebruik, die 1020 (32%) gebeurtenissen vertegenwoordigden, met een gemiddelde frequentie van 9,0 (SD 4,2) per uur. Deze vonden meestal plaats tijdens perioden van lage werkdruk in een subteam. Deelnemers ervoeren de afleidingen verschillend variërend van ernstige verstoring tot welkome afleiding. De afleidingen hadden soms de functie om zorgprofessionals actief te houden in periodes van lage werkdruk, en om de sociale banden tussen collega's versterkten. Meestal toonden teamleden geen bewustzijn van de behoefte aan stilte in andere subteams en de behoefte aan stilte werd niet uitgesproken.

Conclusie: casus irrelevante mondelinge communicatie en smartphonegebruik kunnen een fysieke en psychologische behoefte dienen. De mate waarin zorgprofessionals zich verstoord voelen, hangt af van de specifieke situatie op dat moment. Wanneer een teamlid verstoord werd, ontbrak het vaak aan een veerkrachtige reactie van het team.

Verder onderzoek: Het minimaliseren van verstorende sociale interacties kan een effectieve strategie zijn om gewoontes van cross-monitoring en onderlinge hulp tussen heelkundige en anesthesiologische subteams te bevorderen. Verder onderzoek is nodig om te verkennen hoe culturele verschillen te overbruggen en veerkrachtige interprofessionele gedragingen te ontwikkelen.

DERDE STUDIE: INTERPROFESSIONEEL LEREN EN VERBETEREN OP DE KINDERAFDELING

Doel: We streefden ernaar te begrijpen hoe interprofessionele teams elke dag kunnen leren en verbeteren van praktijkvariabiliteit.

Methode: Participatief Actieonderzoek (PAR) op een kinderafdeling in een Nederlands opleidingsziekenhuis gericht op het verbeteren van gedeelde SA tijdens de medische visite aan bed. Er zijn 115 semigestructureerde interviews gehouden en

participerende observaties van de interacties. Het actieonderzoeksteam bestond uit een vertegenwoordiging van alle belanghebbenden en de eerste auteur, die Safety-II concepten introduceerde om op hun praktijk te reflecteren.

Resultaten: De uitwisseling van perspectieven tussen ouders, verpleegkundigen en artsen verhoogde het bewustzijn van wederzijdse verwachtingen en ervaringen, wat individueel leren stimuleerde. Om ook het collectief leren op de afdeling te bevorderen, introduceerde het onderzoeksteam standaarden die aansloten bij de zorgen van de deelnemers en moedigde zij dagelijks gesprek over de visite aan. Deze aanpak bevorderde dagelijkse wederzijdse perspectiefwissel, afstemming van verwachtingen en herkenning van praktijkvariabiliteit. Dit bevorderde het afdelingsbreed leren en verbeteren. Hoewel het doel was om gedeelde SA te vergroten, ontstonden er tegelijkertijd en onverwacht meerdere verbeteringen, waaronder timemanagement, beroepstrots en werkplezier. De deelnemers ontdekten echter ook dat geleerde lessen niet automatisch werden overgedragen aan nieuwkomers.

Conclusie: Dagelijks leren in ziekenhuisafdelingen kan worden versterkt door dagelijkse interprofessionele interacties over verwachtingen, ondersteund door procedurele standaarden. Het bevorderen van dagelijkse interacties en het initiëren van standaarden die aansloten bij de zorgen van de deelnemers, vereiste van het onderzoeksteam een aanzienlijke hoeveelheid tijd te besteden aan het adresseren van conflicterende prioriteiten. PAR bleek een waardevolle en adaptieve aanpak voor leren en verbeteren waarbij alle belanghebbenden uit ene complexe setting betrokken worden.

VIERDE STUDIE: DE PARTICIPATIEVE ACTIEONDERZOEKER: EEN SPREEUW IN DE ZWERM

Doel: We beogen te exploreren hoe de participerende actieonderzoeker kan bijdragen aan transformatie op het niveau van eerste-, tweede- en derde-persoon actieonderzoek, met behulp van theorie over sociale complexe adaptieve systemen (SCAS) en theorie over verlangens.

Methode: Als kritische vrienden analyseerden de auteurs de belevenissen van de onderzoeker met behulp van de methode “denken met theorie” om het begrip van de onderliggende dynamieken te verdiepen.

Resultaten: We gebruiken de metafoor van een spreeuw in een zwerm om de rol van de onderzoeker te beschrijven: niet sturend, maar met subtiele invloed op de richting door afwisselend bestaande interactiepatronen te volgen en om te buigen. Door overlappende interactiecirkels te initiëren, maakte zij interferentie mogelijk waarbij kleine veranderingen leidden tot een spiraal van verbeteringen op de afdeling.

Conclusie: We concluderen dat de PAR-onderzoeker kansen greep om praktische kwesties te bespreken die verbonden waren met gevoelens van erbij horen en beroepseer en positie. Door als boodschapper op te treden, effende zij het pad voor directe interactie tussen de professionele silo's en met ouders op de werkvloer. Het adresseren van deze kwesties maakte de energie vrij onder verpleegkundigen en artsen in het onderzoeksteam om het constructief conflict aan te gaan. Uit dit conflict ontstonden initiatieven die met elkaar interfereerden en het werk op de afdeling ten goede veranderde.

Door het ongemak van deelname aan constructief conflict te verdragen, en af te wisselen tussen meebewegen en confronteren, kunnen PAR-onderzoekers invloed uitoefenen op transformatie zonder dat zij deze beheersen.

Onze bevindingen dragen bij aan de theorie over actieonderzoek door het nut van SCAS-theorie te tonen bij het zichtbaar maken van patronen en de verwevenheid van eerste-, tweede- en derdepersoonsonderzoek. Het draagt bij aan SCAS-theorie door te laten zien hoe verlangens naar erbij horen en beroepseer, of positie, drijvende krachten zijn achter interprofessionele interactie.

VIJFDE STUDIE: KWALITEITSVERBETERING TOT GEWOONTE MAKEN OP DE KINDERAFDELING

Doel: Het in stand houden van verbeteringen en het voortzetten van dagelijks leren en ontwikkelen na afloop van een project lukt vaak niet. Daarom was ons doel om te onderzoeken hoe interprofessionele zorgteams in ziekenhuizen een gewoonte van voortdurend leren en verbeteren in hun dagelijkse werk kunnen ontwikkelen.

Methode: We besloten om een vervolgonderzoek - Participatieve Actieonderzoek- uit te voeren op de kinderafdeling. We verzamelden data tijdens vergaderingen, interviews, korte interprofessionele evaluaties, e-mails en telefoongesprekken en noteerden reflecties en observaties in veldaantekeningen. De data werden geanalyseerd met behulp van theorie over sociale complexe adaptieve systemen.

Resultaten: Het team kon dagelijks leren continueren omdat het onderzoeksteam de vaardigheden ontwikkelde voor het organiseren van periodieke evaluatierondes en het formuleren van veranderende uitdagende doelen die aansloten bij de actualiteit. De vaardigheden en inzichten in het onderzoeksteam ontwikkelden zich in een proces van transformatief leren, waarin ze hun aannames veranderden over de aard van leren, de tijd die nodig is voor succesvolle verandering en de relevantie van het oplossen van relationele spanningen in het team. Ten slotte erkenden ze dat de beschikbaarheid van een facilitator cruciaal is voor het ontwikkelen van vaardigheden en kennis en dus voor het versterken van de verandervaardigheid.

Conclusies: Om een reflectieve routine van regelmatige evaluaties tussen collega's en ouders van patiënten te bevorderen, moesten de onderzoekers zelf transformatief leren ondergaan. Het ervaren van de waarde van leren en vooruitgang motiveerde hen om de interactieve evaluatieroutine na afloop van het onderzoek in stand te houden. Echter, om het leerproces voort te zetten, had het team een facilitator nodig die ontbrekende vaardigheden en kennis overdroeg en relationele spanningen bespreekbaar maakte. Verbeteringen kunnen een gewoonte worden waardoor tijdsdruk wordt geëlimineerd, maar leren, met name transformatief leren, kan geen gewoonte worden, omdat het een verstoring van gewoontegetrouwe manieren van denken en handelen vereist.

CONCLUSIES OVER HET VERBETEREN VAN KWALITEIT EN VEILIGHEID ZONDER TIJDSDRUK

Het doel van de vijf studies was om het verschijnsel tijdsdruk te begrijpen om vervolgens te ontdekken of er een veranderstrategie is die kan helpen om zonder veel tijdsbesteding of tijdsdruk duurzame en doorgaande verbetering te realiseren.

We begrijpen tijdsdruk als een fenomeen dat in gezamenlijkheid gecreëerd wordt in en door het team rondom conflicterende prioriteiten tussen de deelnemers zoals: snel en productief zijn, niet wachten, op tijd eindigen, of op tijd beslissen. Deze prioriteiten spruiten vaak voort uit onderliggende en vaak onbewuste drijfveren naar erbij horen (inclusie) en positie verwerven (autoriteit). Tijdsdruk kan teamsamenwerking in gevaar brengen. Tegelijkertijd was tijdsdruk vaak juist een reden om gedeelde SA in het team te creëren, aangezien dit tijdsdruk voorkomt of vermindert. Gedeelde SA in het team is een kernelement van goede teamsamenwerking en cruciaal voor de kwaliteit en adaptiviteit van de zorg. We observeerden dat dagelijkse mindful routines onder tijdsdruk blijven bestaan en geen tijdsdruk creëren. We noemen routines mindful als ze niet blindelings worden uitgevoerd, maar bijdragen aan gedeeld SA binnen het team. Cross-monitoring, waarbij teamleden op elkaars werk letten en elkaar aanvullen, is een voorbeeld van zo'n routine. Echter, hoewel een routine ongevoelig is voor tijdsdruk, is het inbedden of veranderen van een routine dat niet.

Bij het ontwikkelen van een veranderstrategie die weinig tijdsdruk zou opleveren is er ingezet op dagelijks leren in en van de dagelijkse praktijk in een interprofessioneel team. Dit interprofessioneel leren op de werkplek ontwikkelt zich niet informeel en spontaan. Het vereist de stimulans van een interprofessioneel onderzoeksteam, projectgroep of commissie dat gaandeweg duurzaam leren ontwikkelt en doelen formuleert die aansluiten bij de preoccupaties en verlangens van alle stakeholders op de werkvloer. Het ontwikkelen van die rol in het onderzoeksteam bleek een proces van transformatief leren te zijn, waarbij men afwisselend vertoefde in een onrustige liminale fase van niet-weten en in een

consoliderende fase waarin de resultaten geoogst kunnen worden. PAR bleek een methode die past bij duurzaam leren en verbeteren in sociale complexe adaptieve systemen (SCAS) omdat ze dezelfde drie uitgangspunten voor transformatie delen: epistemische rechtvaardigheid, interactie tussen alle stakeholders en decentrale sturing. De rol van de facilitator was onmisbaar bij het bevorderen van deze uitgangspunten.

De facilitator stimuleerde de uitwisseling tussen de verschillende interactiecirkels en verschillende stakeholders op de verpleegafdeling. Zo creëerde deze de kans op positieve interferenties waardoor het systeem als geheel gaat bewegen en veranderen. Het verbinden van de interactiecirkels vraagt van de facilitator dat deze soms meebeweegt omwille van de relatie (connecting) en soms bruskeert (confronting) om ervoor te zorgen dat hetgeen ertoe doet voor betrokkenen ook op tafel komt. Meebewegen betekent soms ook het volgen van de hiërarchische verhoudingen. Dat wat ertoe doet, raakt veelal aan de drijfveren van erbij horen en positie hebben. Dit geldt zowel voor de professionals op de vloer als voor de facilitator. Zowel de eigen onbewuste drijfveren als de embodied knowledge kunnen het handelen in het moment van de facilitator sturen. Daarom is het belangrijk dat de facilitator reflecteert op wanneer de eigen verlangens naar inclusie en autoriteit de boventoon voerden en wanneer de in de loop der jaren opgebouwde embodied knowledge. Beiden reageren altijd sneller dan het bewuste denken.

Hoewel dagelijks leren en verbeteren op de werkvloer weinig kloktijd (Chronos) vroeg en meer voordelen opleverde dan iedereen vooraf verwachtte, vroeg het wel aandacht en de juiste timing (Kairos) en begon het vaak met een breuk in verwachtingen of aannames. Omdat het inspanning, aandacht en het verdragen van verstoring vroeg, werd het ook als een tijdslast ervaren. Dit gold nog meer voor de tijd die het onderzoeksteam eraan besteedde. Dus goede gewoontes kunnen een routine worden die geen tijdsdruk opleveren, maar leren wordt per definitie nooit een gewoonte, want het vraagt het doorlopen van een onzekere liminale fase waarin assumpties en verwachtingen herzien moeten worden. Daarom concluderen wij dat leren en veranderen niet veel tijd hoeft te kosten van zorgprofessionals, maar meestal wel tijdsdruk oplevert.

STERKTES EN BEPERKINGEN

Een beperking is dat alle deelstudies op teamniveau zijn uitgevoerd. We suggereerden dat PAR de logische interventie voor verandering in sociale adaptieve complexe systemen op grotere schaal zou kunnen zijn, maar om een sector te veranderen, is mogelijk meer nodig dan alleen lokale initiatieven en meer dan alleen actieonderzoek. Een sterkte is dat ‘productieve interacties’ sleutel zijn voor kennisinfrastructuren en beleidstransformaties. We hebben licht geworpen op productieve interacties. Het delen van kennis en

samenwerkend leren over lokale initiatieven lijkt een vruchtbare aanpak die verder verkend kan worden.

Een beperking van casestudies is dat ze lokale contextuele kennis bieden, die niet altijd eenvoudig naar andere situaties is over te dragen. Echter, de sterkte ligt in de mogelijkheid om diepgaandere inzichten in de casus te ontwikkelen. In naturalistische casestudies ligt de nadruk meer op naturalistische of gesitueerde generalisatie dan op overdraagbaarheid. Bij gesitueerde generalisatie verbindt de lezer, als actieve agent, de bevindingen—die door rijke beschrijvingen worden afgebeeld—aan hun eigen context en impliciete, gesitueerde begrip, waardoor een plaatsvervangende ervaring (vicarious experience) wordt gecreëerd.

Bovendien, wanneer bevindingen betrekking hebben op diep persoonlijke aspecten, zoals verlangens naar behoren en hiërarchie, zijn ze vaak tegelijkertijd de meest universele omdat ze inherent zijn aan de menselijke conditie. Niettemin zullen de specifieke manifestaties van deze verlangens variëren tussen verschillende teams en contexten.

PRAKTISCHE IMPLICATIES EN VERDER ONDERZOEK

Ons onderzoek suggereert de noodzaak van organisatorische versterking op teamniveau. De rol van de facilitator die het transformatieproces van leren bevordert door verschillende perspectieven te verbinden, bleek een cruciale voorwaarde. Langdurige ondersteuning, gecombineerd met de overdracht van kennis en vaardigheden, is essentieel wanneer een afdeling of team mindful routines, tolerantie voor ambiguïteit en de vaardigheid om groepsdynamiek te bespreken wil ontwikkelen. Dit vereist van organisaties om deze vorm van ondersteuning op te zetten.

Organisatorische versterking vereist ook iets van de gezondheids-/ziekenhuissector als geheel. Een eerste verkennende studie naar opleidingsmogelijkheden voor deze rol in Nederland toont aan dat de sector weinig opleidingsprogramma's of bestaande (master) programma's heeft die facilitator vaardigheden ontwikkelt. De programma’s die er zijn richten zich voornamelijk op beleidsmakers, niet op facilitators of actieonderzoekers. Het vergt gezamenlijke inspanningen van onderwijsinstellingen en ziekenhuizen om ervoor te zorgen dat de juiste opleiding beschikbaar is en dat voldoende mensen deelnemen. Eerdere pogingen zijn mislukt vanwege te weinig inschrijvingen.

Een veelvoorkomende oplossing om situatiebewustzijn over disciplinaire grenzen heen te creëren, noodzakelijk voor patiënten met comorbiditeit, is het organiseren van multidisciplinaire vergaderingen. Echter, als we ons voorstellen dat we dergelijke vergaderingen voor alle categorieën van complexe patiënten zouden implementeren, zou het systeem vastlopen. Daarom pleiten we voor verder onderzoek naar de toepassing van SCAS-theorie op afdeling overstijgende zorg voor complexe patiënten. SCAS theorie

richt zich op zelforganisatie en uitwisseling. We kunnen ontdekken hoe uitwisselingen over silogrenzen heen kunnen worden bevorderd zonder vaste structuren, vaste tijden of vaste inhoud. Dit vraagt van de leidende actoren dat zij liminale fases verdragen waarin nog niet helder is wat de aanpak op gaat leveren.

Tot slot richtte dit onderzoek zich op het verbeteren van kwaliteit en patiëntveiligheid binnen de eigen invloedssfeer van het team. Echter, niet alle wenselijke verbeteringen kunnen op dit niveau worden bereikt. Het zou interessant zijn om te onderzoeken of de inzichten over sociale complexe adaptieve systemen, gewoontevorming en drijfveren ook toepasbaar zijn op organisatieniveau.

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Appendices

LIST OF PUBLICATIONS

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CURRICULUM VITAE

Annet van Harten was born on December 23rd, 1962, in Breukelen, the Netherlands. After completing her gymnasium education in Utrecht, she obtained a bachelor's degree in Dutch Language and Literature in Utrecht in 1984. She then earned a master's degree in Psychology in Utrecht and a master's in Science of Business Administration in Rotterdam in 1988. She worked as a change consultant and policy researcher for national and local governments, as well as for educational institutions, until 2009. From then on, she worked as a change consultant for healthcare institutions such as hospitals, elderly care homes, and district nursing organisations. A central topic during this period was interprofessional collaboration and patient participation.

During her tenure at an academic hospital, she developed and implemented a Crew Resource Management programme for all acute departments. This programme provided the opportunity to start her PhD research in 2015 alongside her full-time occupation. She continued her research at another hospital when she changed positions.

Annet conducted her PHD trajectory under guidance of her promotor, Prof. dr. T.A. Abma of the Leyden Academy on Vitality and Aging, part of the LUMC.

She was a member of the steering committee of the Caring for Teamwork platform from 2014 to 2022, organising an annual conference to share examples and provide inspiration on interprofessional teamwork to a group of 18 hospitals. The platform also launched a publicly available e-learning programme and collaborated with the NFU (Dutch Federation of University Hospitals) to produce a white paper on teamwork.

She is currently working for the Dutch Association for Nursing and Care Professionals as a senior consultant, leading a programme on transitions in district nursing.

PORTFOLIO

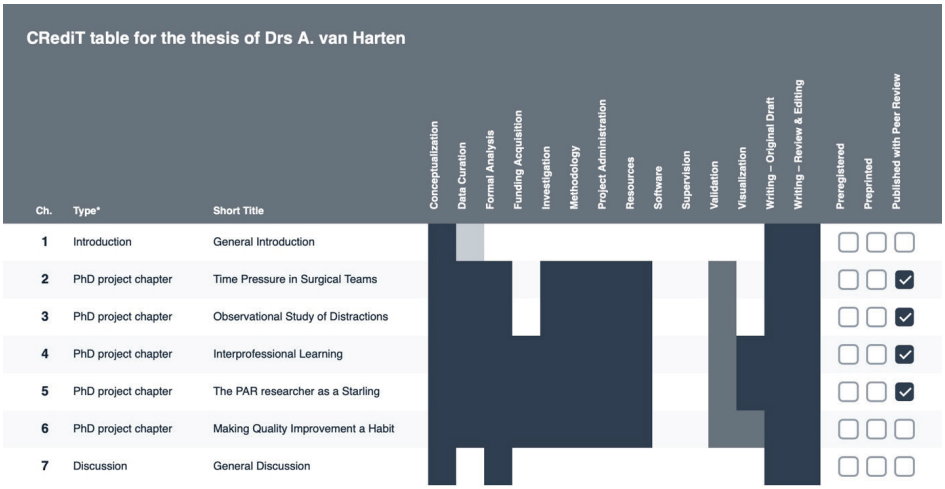
The PhD trajectory – an overview

During her PhD, A. van Harten developed a nuanced understanding of the dynamics underlying change processes in hospital settings. She demonstrated a capacity to select and apply methodological approaches tailored to both the research question and the contextual demands of the field. Initially, she employed ethnographic and observational methods to explore themes such as time pressure and teamwork. Subsequently, she adopted a participatory action research approach to apply and extend the insights generated in these exploratory studies. She showcased her ability for rigorous self-reflection in her critical methodological reflections on the role of the action researcher.

Van Harten disseminated her findings to diverse audiences, presenting her research at academic conferences as well as to practitioners and policymakers in healthcare. Throughout her doctoral trajectory, she collaborated effectively with practitioners and co-researchers, fostering productive partnerships. She designed and executed her research independently, taking the lead in securing ethical approval and authoring successful grant proposals. Her research evolved from small-scale case studies to a multi-site investigation conducted across three hospitals.

In addition to her primary research, she contributed to the academic community by reviewing research proposals and a peer-reviewed article. She also organised conferences and workshops focused on teamwork in hospital environments.

CRediT Statement for the Chapters in this thesis



*PhD project chapters are the direct result of the PhD project of the PhD candidate.
Some theses also include Collaboration Chapters, to which the PhD candidate has contributed but fall outside the PhD project.

Overview of completed courses and other training

Completed courses and other training		
Mandatory activities		
Month/year	Title	
12/10/2022	Leiden University Onboarding Programme Inform & Connect	
Scientific courses, workshops and other training activities		
Month/year	Title	
06/12/2022 - 14/04/2023	Autoethnographic Research Approaches in the Social Sciences	
20/06/2022	Arts and Health	
14/02/2017 - 25/05/2017	Statistics for the social sciences	
2016 – 2018	Attending congresses on Safety II, HRO, risk and resilience	
Transferable skills courses, workshops and other training activities		
Month/year	Title	
12/09/2016 - 31/01/2018	Advanced academic writing	
05/02/2015 - 12/02/2015	Participatory Action Research course	
04/04/2016 - 15/07/2019	PHD learning group Radboudumc	
Other scientific activities related to this thesis		
Month/year	Title	Linked to chapter(s)

05/01/2015 - 27/05/2019	Giving Crew Resource Management Training	Chapter 2
19/04/2018	Presenting at the BSAS conference (Behavioral Sciences Applied to Acute Care Teams and Surgery)	Chapter 3
08/02/2018 and 07/02/2019	Presenting at the conference on high reliability organising	Chapter 2 Chapter 3
05/11/2021 13/05/2022	Presenting at congress Landelijk platform zorgen voor teamwork Presenting at congress Isala	Chapter 2
18/11/2021 17/01/2024	Presenting at the conference Tijd voor Verbinding	Chapter 4 Chapter 6
13/03/2025	Giving a course on Safety II for quality advisors in health care	Chapter 5

DANKWOORD

Hein Gooszen en **Lia van der Fluit**, jullie stonden aan de wieg van dit proefschrift. Hein, als gerenommeerd chirurg en hoofd van de afdeling operatiekamers, was jij meteen een groot voorstander van een onderzoek naar teamsamenwerking. Voor jou als medicus was etnografisch en participatief actieonderzoek een onbekend terrein, maar je had er het volste vertrouwen in dat het wetenschappelijk verantwoorde en relevante kennis op zou leveren voor de werkenden op de operatiekamers. Dank dat je in mijn onderzoek bleef geloven.

Lia, Ik weet nog goed dat we in de "catacomben" van het Radboudumc liepen. Ik was wat somber over de mogelijkheden om financiering te vinden voor het onderzoek, en ik wilde alleen een promotieonderzoek wilde doen als er ook budget was. Jij sprak echter de fameuze zin: "Joh, ik zou gewoon alvast beginnen." Dank daarvoor, zonder dat was ik niet begonnen.

Daniel van den Hurk, ik had me geen betere afstudeerstudent kunnen wensen om verstoringen te observeren op de operatiekamers. Zo enthousiast als een springerige puppy wist je iedereen voor je in te nemen. De zorgprofessionals namen jou makkelijk in vertrouwen en jij durfde alles te vragen. Ik genoot van je waarnemingen, verbazingen, veranderende inzichten en van jouw lef. Toen in een team niemand de debriefing op zich wilde nemen na afloop van de operatie, pakte jij de debriefingkaart en zei: "zal ik de vragen stellen?" Iedereen was verrast over de meerwaarde van de debriefing. Dank voor je bijdrage.

Simone Schellekens van ZonMw, jij zei: "Bel zo vaak als je wilt, daar zijn we voor". Ik hoop dat je daar geen spijt van hebt gekregen. Ik heb jou alleen maar enthousiast en geïnteresseerd gezien in de uitkomsten mijn onderzoeken en dat van anderen. Dat steunde me te blijven geloven in de relevantie van wat ik aan het doen was. Zoals de meeste promovendi dacht ik af en toe: "En wie gaat hier wat mee doen?"

Ada van den Bos-Boon, In 2013 ontmoetten we elkaar over de invoering van Crew Resource Management (teamsamenwerking). In 2025 promoveren we hier beiden op. Jij wees me op de Safety II subsidie van ZonMw en in de laatste fase hielpen we elkaar met gezamenlijke schrijfdagen. Jij introduceerde me ook in het schrijverscluppie. Dank voor het samen optrekken.

Gerda de Kruijf, toen het einde van het traject in zicht kwam zei jij spontaan: "Ik word dan wel je paranimf he?!" "Natuurlijk!" zei ik. Op mijn trouwdag heb je 's ochtends een verwenontbijt gemaakt, mijn haren gevlochten en was je mijn getuige. Nu ben je mijn "getuige" bij de afronding van dit tienjarige project dat voor een leersprong in mijn ontwikkeling heeft gezorgd. Dank, dat je er weer bent en dat je al zo lang in mijn leven bent.

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