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

Harten, A. van

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

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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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