Organizational and Interpersonal Coordination in the Hospital:

Team Communication During Nursing Handovers

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Coordination organisationnelle et interpersonnelle à l'hôpital : la communication dans les équipes de soins infirmiers durant les réunions de relève de poste

Organizational and interpersonal coordination at the hospital : Team communication during nursing handover meetings

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To Jorge Suárez Díaz**,**

“Knowledge is an unending adventure at the edge of uncertainty.”

Jacob Bronowski

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Abstract

This dissertation examines patterns of organizational and interpersonal coordination during nursing shift handovers. It investigates the management of uncertainty and unexpectedness during the performance of this organizational routine and relates this to the current drive to handover standardization. More specifically, I am interested in testing the impact of task uncertainty on duration, functions, contents and structure of handovers (Studies 1 and 2). I also investigate how nurses reduce uncertainty about non-routine clinical situations using narratives and reporting on past talk (Study 3), and how they deal with unexpected perturbations in order to preserve the interactional territory of the handover (Study 4). For handover standardization to work effectively, the course of handovers should be predictable (no unexpected events over its duration); clinical situations should be comparable (no non-routine situation); and the level of uncertainty across units should be similar (no contextual variation). Using a variety of conceptual and analytical approaches, I have shown that none of these presuppositions holds, and that uncertainty and unexpectedness matter during handovers: In Study 1, I explored the effects of task uncertainty on duration and reported contents and functions of communication during nursing handover. I found that mean handover duration per patient increased with increasing task uncertainty whereas the frequency of some topics of communication systematically decreased. This converges with another finding of this study: the content variety of handovers (measured by the number of types of contents discussed) was lower for unit types facing high uncertainty, as hypothesized. In Study 2, I examined handover flexibility, operationalized as the sequential variety of topics of communication during nursing handover, in different care units varying in uncertainty. It was found that handovers are more flexible in care units that are high in uncertainty than in care units that are lower in uncertainty, thus confirming our hypothesis. I suggest that flexible communication might be adaptive in uncertain settings, for instance settings demanding urgent action with rapidly changing states in the system. It follows that standardization of handovers might not be appropriate in every context. In Study 3, I have shown that participants have recourse to narratives (storytelling) in recounting non-routine care situations. Narratives are collaboratively performed and allow participants to construct a shared meaning of these situations. By recourse to direct reported speech in narratives, nurses justify professional conduct, report on deviant patient conduct and rationalize non-conformity to clinical procedures. Occurrences of direct reported speech are sequentially positioned after a description of the situation and actions undertaken. In Study 4, I have shown that participants face unexpected perturbations by actively and collectively managing the boundaries of their interactional territory during handovers meetings. They tend to limit the impact of the perturbations that continuously occur during these meetings, and do so exploiting both bodily and verbal resources. I have also shown that there are many parallel activities before the handover, and that even during handover meetings parallel activities (perturbations) solicit participants' attention. (approx. 63000 words, including reference section)

Keywords : contingency theory, storytelling, interactional territoriality, handover
Mots-clés: théorie de la contingence, storytelling, territorialité interactionnelle, relève de poste

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Chapter 1 - Introduction

Worldwide, hospitals have to ensure continuity of care every day at all times. The nursing shift handover is a routine that aims at protecting care continuity. The performance of this routine is not flawless and "an estimated 80 percent of serious medical errors involve miscommunication between caregivers when patients are transferred or handed-off" (Joint Commission Center for Transforming Healthcare, 2011, para. 1). It is therefore extremely important to study the discourse processes during handovers in hospitals.

In its verbal traditional form (conversational), members of the departing shift inform their colleagues of the arriving shift about the patients and their treatment and arriving team members react to what is said and ask questions when necessary. This is the most frequent form of handover and the focus of this dissertation. Whereas the shift handover has been studied for decades in case studies, it is not known what influences both the content and organization of handovers. The methods people use to reduce uncertainty by coordinating with one another during handovers have not received much attention either. Research has nevertheless proposed improvements with insufficient understanding of handover communication (Van Eaton, 2010).

In two studies of this dissertation, I examine the relationship between uncertainty and content of communication and discourse patterns during handovers. The focus of these studies is to investigate how adaptive communication naturally occurs during handovers: In contrast with theories describing absolute 'best ways' to organize work (e.g.: bureaucracy theory, or Taylorism and Fordism), scholars in contingency theory have shown that coordination in organizations should be related to their environment and is less efficient when it is not (e.g., Argote, 1982). But research in this field has traditionally been limited to the study of organization in a *macro perspective*, i.e., examining the impact of uncertainty on the frequency of use of types of coordination devices.

Here I adopt a *meso perspective* where the performance of a single coordination device is examined at the unit level (Studies 1 and 2), and a *micro perspective* where the way participants accomplish coordination is examined in detail at the level of the interaction (Studies 3 and 4).

Scholars have recently started considering routines as flexible and dynamic (e.g., Feldman, 2000). Flexibility has been shown to be necessary to adapt the routine to the circumstances of its situated performance (Howard-Grenville, 2005). The steps that compose the routine can be organized differently at each iteration of the routine (Pentland & Reuter,

1994). Pentland (2003) proposed to distinguish between routines' content (or lexical) variety - the actions which compose a routine, and sequential variety - the amount of variation in the ordering of these actions. This notion is related to the flexibility of work and can be assessed statistically. Flexibility in routines can be understood as the opposite of standardized.

It is noteworthy that the recent drive to standardization of handovers (e.g., Clancy, 2006) supposes that handing over patients can be performed in the same way for all patients in all settings, which is quite contrary to what contingency theory predicts, i.e., higher efficiency when coordination mechanisms are adapted to the level of uncertainty. I will examine naturally occurring handover communication and test whether contents and functions, as well as the structure, of handovers vary in relation to uncertainty in the work environment.

In two other studies composing this dissertation, I examine interpersonal processes of coordination during handovers (under a micro perspective). These processes aim at the reduction of uncertainty in interaction: Handovers, like conversation, require partners to coordinate on content and process (Clark & Brennan, 1991). And there is uncertainty in these both aspects.

On the 'content' side, participants in handovers have to coordinate knowledge about the state of their patients, in order to ensure common ground (Clark, 1996) and hence provide care appropriately. Uncertainty is a component of all interactions and people reduce it by transferring information. The amount of uncertainty is of course higher in non-routine situations (Grote, 2009), where the status of a system clearly differs from expectations (what is customary in a particular setting). When non-routine situations occur in nursing units, recourse to narratives (stories) about patients allows nurses to quickly understand what is different in a particular care situation compared to typical patient trajectories (Patterson & Wears, 2010). I will examine these questions by exploring how nurses use narratives and reported speech to depict care situations during handover. I will show that making sense of non-routine situations is a team activity that can be accomplished by recourse to narratives during handovers.

On the 'process side', people have to coordinate the beginning and the end of their interaction (Clark, 1996; Schegloff & Sacks, 1973). They also have to coordinate the transition between phases and sub-phases, and between sub-phases of their encounter (Bangerter & Clark, 2003). Participants also have to collaboratively coordinate the handling of perturbations (e.g., interruptions; Chevalley & Bangerter, 2010) that frequently occur during handovers. I will study how nurses coordinate the beginning and end of handovers and deal with perturbation of their environment (e.g., interruptions). All of these aspects entail uncertainty, which is absorbed by means of communication.

This dissertation is organized as follows: in Chapter 2, I will present previous research regarding the diversity of forms of handovers, their functions and contents, and the current drive to standardization. I will also introduce the contingency theory of organizations, different views on organizational routines and how this relates to the study of handovers. I will show how the drive to handover standardization is limited in the sense that it doesn't take into account the differences in uncertainty in nursing units. This chapter reproduces the text of a theoretical paper published in the journal *Studies in Communication Sciences* (Mayor, 2011). It also includes the presentation of two studies drawing upon contingency theory. In Chapters 3 and 4, I will present these 2 studies: Chapter 3 (Study 1) examines the relation between uncertainty and the reports of handover contents, functions and duration (accepted for publication – Mayor, Bangerter & Aribot, in press). Chapter 4 (Study 2) examines the impact of uncertainty on the frequency of contents and their sequential organization during handovers (in preparation, Mayor & Bangerter, 2011a).

Chapter 5 will examine coordination at the level of the interaction. I will present the contribution of approaches like ethnomethodology and conversation analysis, workplace studies and Clark's theory of language use. This chapter will also describe how these approaches can be used to study verbal coordination routines like nursing handovers, and will examine the role multimodal action in communication. It also introduces the final two studies of this dissertation which focus on the resolution of uncertainty at the level of the interaction. In Chapter 6, I report on Study 3 which examines the recourse to narratives and direct reported speech when discussing non routine situations during handovers (published in *Discourse Processes* - Bangerter, Mayor & Pekarek Doehler, 2011). Chapter 7 reports on Study 4 (in preparation, Mayor & Bangerter, 2011b) in which I examine how nurses deal with unexpected perturbations during handover, and how they manage transitions during the handover considered as a joint activity (Clark, 1996). I show that this is accomplished by the management of the interactional territory of the handover. Finally, I present a general discussion and my conclusion in Chapter 8.

Chapter 2 – Handovers, Contingency Theory and Flexible Routines

In this chapter, I first reproduce a literature review on handovers, contingency theory and organizational routines (published as Mayor, 2011). I then present summaries of Studies 1 (accepted for publication, Mayor, Bangerter & Aribot, in press) and 2 (in preparation, Mayor & Bangerter, 2011a) which test predictions originating in contingency theory.

ADAPTABILITY OF NURSING SHIFT HANDOVERS: THEORETICAL INSIGHT FROM ORGANIZATION SCIENCE [1]

Abstract

Nursing shift handovers are institutional routines aimed at the transfer of patient information and responsibility among teams of caregivers at the change of shift. They are essential to patient safety and a priority concern for regulatory institutions. Standardization of information transfer during nursing shift handovers is now mandatory in many hospitals. But to date, no study has shown that standardized handover protocols actually improve patient condition. In organization science, research on contingency theory has shown that standardization is efficient only when uncertainty is low. This paper examines how the research on handovers and practical design of handovers could be informed by approaches stemming from contingency theory. The following aspects of adaptability are proposed for more thorough investigation in relation to uncertainty in the unit: adaptability of functions, adaptability of contents, and adaptability of structure.

Introduction

Patient-related communication between healthcare providers is an essential process in health communication as the role of caregivers is not only to provide treatment and care but also to coordinate these activities and inform the patient. This is achieved in a context where regulatory institutions can frame the communication process: governments and institutions have the power to make policies that impact how communication is carried out. The nursing shift handover is an example of how originally ad hoc communication is increasingly constrained by standards.

[1] Mayor, E. (2011). Adaptability of nursing shift handovers: theoretical insight from organization science. *Studies in Communication Sciences, 11,* 173.194.

Nursing shift handovers are institutional routines aimed at the transfer of patient information and responsibility among teams of caregivers at the change of shift. The issue of the appropriateness of the standardization of information during handovers is under debate. Several initiatives to standardize handovers have been proposed (e.g., Arora & Johnson, 2006; Haig, Sutton & Whittington, 2006) under the assumption that standardized communication would reduce communication errors. But to date no study has shown that standardized handover protocols actually improve patient condition (Cohen & Hilligoss, 2009). Standardized protocols have even been found to deteriorate the quality of information transfer during handovers (Boucheix & Coiron, 2008). This might be because handovers require adaptability to the environment (e.g., Cohen & Hilligoss, 2010). In this paper, we discuss how approaches stemming from organization theory, which examines the necessity for adaptive coordination, are to be considered in research related to the debate on the standardization of handover information transfer: handovers, like organizational coordination in general, require adaptability to the environment. Standardization precludes adaptability by imposing rigid rules to the system.

Surprisingly, studies of handovers have not drawn on organization theory. Most authors have instead relied on common sense, managerial will and outdated propositions of bureaucracy theory (however this is changing, e.g., Patterson, Roth, Woods, Chow & Gomes, 2004; Wears, Perry, Shapiro, Beach, Croskerry & Behara, 2003). In the next sections, we provide a review of the variety of practices, content and function of handovers and proceed to review research on handover standardization. Next, we introduce organization theory by presenting the concepts of bureaucracy, different views of routines, and contingency theory for organizing. We then present studies which examine the impact of uncertainty on organizing more thoroughly. This literature review will illustrate that the environment of units crucially impacts the choice of coordination mechanisms and that adaptability in the individual instances of routines is necessary in order to perform activities efficiently. We then propose to study handovers under a contingency theory framework.

The Importance of Nursing Handovers

Hospitals are complex organizations that must ensure the continuity of their tasks on a 24-hour basis. Hospital nurses thus work in shifts, generally of 8 or 12 hours each. A shift is composed of a team of nurses and assistants who take care of patients, giving them the treatment and care they need, but also coordinating other activities, such as the admission and discharge of patients, intra-organizational patient transfer, sending samples and receiving lab

results. These tasks require coordination among caregivers of different shifts and hence information transfer. Information transfer focuses on all these aspects and inappropriate transfer can lead to gaps in the continuity of care. Gaps in the continuity of care can delay treatment and hence negatively impact patient status. The shift handover is an organizational communicative routine aimed at the transfer of patient information between succeeding shifts, thus ensuring coordination between teams. It also serves the transfer of responsibility in order to allow care continuity (Ekman & Segesten, 1995; Miller, 1998; Patterson & Wears, 2010). And it is not rare that errors are discovered in the process of handing patients over from one healthcare professional to the next (e.g., Cooper, Long, Newbower & Philip, 1982; Wears, Perry, Shapiro et al, 2003). During handovers, nurses also collectively make sense of complex situations and this common understanding then drives consecutive action (Grosjean & Lacoste, 1999; Patterson & Wears, 2010). Moreover, each transition between caregivers is a potential 'point of failure' (Behara, Wears, Perry, Eisenberg, Murphy, Vanderhoef, Shapiro, Beach, Croskerry & Cosby, 2005, p. 309) in the continuity of care.

Thus, shift handovers are essential to patient safety. Nurses play a critical role in the transmission of patient-related information which ensures appropriate care and treatment (Antony & Preuss, 2002). The type of information discussed during handovers has an impact on care planning. Transmission of schema-consistent information leads to better planning whereas schema-inconsistent information impedes it (Downing, 2001). In an investigation of medical errors, Arora and colleagues show that errors in communication during handovers can cause health professionals to encounter frequent incidents (Arora, Johnson, Lovinger, Humphrey, and Meltzer, 2005).

The building of shared knowledge plays a critical role in the reduction of uncertainty. 'Shared functional representations' (Grusenmeyer, 1995, p. 163) are developed during handovers through interactive conversation. A shared functional representation is a model of the situation (e.g., what is happening, what to do next) that is common to two or more individuals, which allows the coordination of the tasks. For these representations to be built, two kinds of information are necessary: information regarding the general situation and secondary information (Grusenmeyer, 1995). Information regarding the general situation allows participants with little knowledge of the context to rapidly adapt their understanding to the current status. In the setting of the handover, one example is the diagnosis and the reason of the patient's admission. Secondary information deals with the specificity of the situation. This allows members to develop a more precise view of the current situation when necessary. An example might be an adverse reaction to medication, or the narration of an unexpected event during an intervention (see Bangerter, Mayor & Pekarek Doehler, 2011).

Information transfer is important in coordinating activities between succeeding shifts of professionals. Hence, the shift handover is essential in the understanding of the status of the system, i.e., the interrelated activities in the unit and relevant activities outside of the unit. Appropriate information, the type and structure of information as well as interactivity are crucial in the process of assuring task continuity.

In the next section, we discuss variety in different aspects of handovers: what are the types, contents and functions of handovers. We will conclude the section by discussing the debate on standardization, which will foster our point in relation to the necessity of adaptability of communication to the environment.

Variability of Handovers: Types, Contents and Functions

In this section, we discuss the variability of handovers in relation to their type, functions and contents. We also examine the advantages and drawbacks of the standardization of communication during handovers.

The Types of Handovers and Their Advantages and Drawbacks Regarding Information Transfer.

Four types of handovers are frequently discussed in the literature: the verbal (or traditional) handover, the bedside handover, the recorded handover and the written handover (Miller, 1998). Another form of handover is the computer-based handover (e.g., Baldwin, & McGinnis, 1994; Strople & Ottani, 2006). Miller (1998) describes the main types of handovers: In the verbal handover, patient-related information is transferred verbally from the departing shift to the arriving shift. This can be done in at least two ways. One is that the head nurse or another nurse “in charge” (p. 25) of the process transfers patient information and assigns each patient to a nurse. Another way is that patient responsibility for the next shift is pre-assigned (for instance one incoming nurse takes care of all patients of an outgoing nurse) and the handover consists of the outgoing nurse transmitting information to the whole team. In the case of the bedside handover, patient information is verbally transferred at the bedside of the patient from an outgoing nurse to her incoming counterpart. In the case of the recorded handover, the outgoing nurse records the information that she thinks the incoming nurse will need for providing optimal care to her patient. The incoming nurse then listens to the recording and consults written documentation for additional information. The form of the recording can be a tape, or as more recently used, a digital file stored on a computer. In the case of the written handover, all patient information is written by the outgoing nurse; the incoming nurse then

reads the information. In the case of the computer-based handover, it is recommended to enter patient information while performing care, for instance using a wireless handheld device (Strople & Ottani, 2006). Incoming nurses can then retrieve the information regarding their patients on a computer.

Miller (1998) discussed advantages and drawbacks of handover types: The verbal handover is interactive: it allows for asking questions and providing precisions. It has been criticized for its duration and purported inaccuracy. The advantages of the bedside handover are that the patient is present and thus can provide supplementary information. The incoming nurse can also crosscheck the information provided by the outgoing nurse and examine the state of the patients during the report (see McMurray, Chaboyer, Wallis & Fetherston, 2010). A drawback of the bedside handover is that it raises confidentiality issues, as patients sharing a room can hear all the reports. The recorded handover is more cost effective than the bedside and the verbal report but allows no interactivity (such as asking questions or providing additional information) by other team members; features that are considered essential to patient safety (Patterson, Roth, Woods, et al., 2004). The written handover is characterized by similar advantages and drawbacks as the recorded handover: its non-interactive nature doesn't allow for mutual adjustments between nurses of successive shifts. The computer-based handover allows for entering information at the time the changes are noticed and the care is given (Strople & Ottani, 2006). This process is believed to reduce errors regarding the state of patients, but it has also been pointed out that information technology can paradoxically lead to information transfer errors (Ash, Berg & Coiera, 2004).

As we have shown above, there is a lot of variability in the types of handovers that are employed in nursing units. Behara and colleagues suggest that differences in types of handovers are in fact adaptive (Behara, Wears, Perry, et al, 2005). Our paper stresses the question of the adaptability of functions and contents of handovers. This will be further discussed after the following review of variability in these aspects of handover communication, which standardization will impact.

Functions of Handovers.

The main function of handover is information transmission, but a variety of functions have been documented in the literature. Behara and colleagues state that handovers are opportunities for "asking for clarification, or pointing out omissions, contradictions, and inconsistencies" (Behara, Wears, Perry, et al, 2005). There is also variation between hospitals and units.

On the basis of observational data of natural handovers, Grosjean and Lacoste (1999) developed a typology of functions of handovers and compared three units (gastroenteric, surgery and pediatric) on the frequency of the functions. The authors first recognize two generic functions which are a) *organizational and meta-operational functions* and b) *social and psychological functions*. The generic functions are further divided into sub-functions. For space reasons, the sub-functions are only listed here. *Organizational and meta-operational functions* include: *Information, Interpretation, Confrontation, Evaluation, Decision-making, Day planning and anticipation,* and *Education*. The *Social and psychological functions* include*: Justification and control, Team and self-recognition,* and *Emotional expression.*

Kerr (2002) interviewed nursing personnel about the functions of handovers in order to discover 'key issues' (p. 127). She then developed a typology consisting of *Informational, Social, Organizational, Educational functions* and used it to code actual handover communication. The *Informational function* covers the *Patient report,* the *Patient update* and *Discussions of family problems*. The *Social function* includes *Social support* and *Socializing*. The *Organizational function* includes the *Organization of the shift* and *Mutual adjustments* in the team as a function of circumstances. The *Educational function* includes *Teaching* and *Socialization*.

Patterson and Wears (2010) conducted a literature review of 400 papers, identifying 7 main types of functions of handovers and suggested improvements. These functions and improvements are described in Table 1.

It is striking that standardization only aims at improving one of these functions: information processing. Other functions are not taken into account. It is probable that these functions might be suppressed in the process of standardization. Because standardization imposes a rigid way of transferring information and limits discussions during handover to the transfer of information, it strongly reduces possibilities for other functions of handover. For instance, less helpful behavior is manifested by healthcare teams when the work is standardized compared to when it's not (Zala-Mezö, Wacker, Künzle, Brüesch & Grote, 2009). The functions of handover are variable between units. These are essential for patient safety as they provide the establishment of a common direction in patient care, for instance by collectively making sense of situations, and sharing this knowledge between participants to the handover and, after the handover, with other professionals.

Table 1.

Function of Handovers and Suggested Improvements (adapted from Patterson & Wears, 2010)

Function	Description	Suggested improvement
Information processing	Outgoing nurses transfer necessary information regarding patients' care and treatment to incoming colleagues overcoming noise in communication.	Standardized procedures as a way to improving this function (only) of handovers.
Stereotypical narratives	Provide much information in a compact form, efficient way to communicate during handovers, relies on shared knowledge.	Summarize each patient's narrative and derive plan from this.
Resilience	Ability of the team to overcome problems and fix errors collaboratively, through discussion and sensemaking.	Questioning of assumptions by the incoming nurses as a means to detect errors.
Accountability	Patient responsibility is transferred at the end of the handover.	Explicit mention of what the incoming caregiver has to do during the shift.
Social interaction	Collaborative construction of the meaning of the situation during interaction between caregivers.	Focus on the acceptance of diverging perspectives on patient treatment.
Distributed cognition	Inject information in the pluridisciplinary network in order to improve coordination.	Make information available to the extended professional arena in charge of the patients, for instance by means of shared artifacts.
Cultural norms	Customs, values and norms are communicated and shared during the handover.	Act on these norms and change them in a way that improves patient safety

Contents of Handovers.

Case studies have also dealt with the contents of handovers. Again, different contents have been reported between hospitals and care units, as the examples below illustrate. In an ethnographic case study, Lamond (2000) has compared the content of handovers (n = 20) and care plans in four units (five handovers per unit, two general medical wards and two general surgery wards). Handovers were recorded in two institutions. Table 2 presents the typology, adapted from previous research (Crow, Chase and Lamond, 1996), examples of contents for each category and the frequency of coded contents by category.

Table 2.

Types of Contents and Relative Frequency in Handovers and Notes (adapted from Lamond, 2000)

Type of information	Example	% handovers	% care plans
General information	name, age	32.1%	27.5%
Physical information	respiratory function, consciousness	8.9%	21.8%
Physical measures	pulse, blood pressure	11.0%	13.4%
Functional info.	sleeping, continence	7.4%	7.4%
Psychological info.	mood, confusion	3.8%	3.2%
Social info.	occupation, marital status	3.1%	10.8%
Family related info.	understanding, ability to visit	0.9%	0.2%
Nursing interventions	patient care needs, plans for care	7.0%	3.6%
Medical treatment	medications, investigations	18.7%	10.5%
Global judgement	about patient condition, about care	6.2%	1.6%
Management issues	admissions, discharges	0.9%	0.0%

The four most frequent categories of content discussed during handovers are: *General information, Medical treatment, Physical information* and *Physical measures*. The four most frequent categories of content found in care plans are: *General information, Physical information, Physical measures* and *Social information*. This suggests that the content of handovers and care plans overlap in their important aspects. But care plans feature three times more information than handovers do. Lamond concluded that more information is present in care plans than during the handover because nurses frequently present conclusions rather than raw information during handover. This aspect is necessary to reduce uncertainty. As March and Simon (1958) point out, "Uncertainty absorption takes place when inferences are drawn from a body of evidence and the inferences, instead of the evidence itself, are then communicated" (p. 186). It is noteworthy that such inferences might be lost in standardized handovers.

In another ethnographical study, Liukkonen (1993) analyzes the content of 58 handovers which were transcribed and segmented into statements. The typology, adapted from previous research (Liukkonen, 1990), consists of main content categories described as activity classes. These include: *Obligatory activities* (e.g., moving and helping moving, giving and taking drugs; 33% of statements), *Activities necessitated by obligatory activities* (sitting,

waiting; 1%), *Voluntary activities* (happenings, small matters; 3%), *Activities which take the characteristics of the patient into account* (physical problems, disturbing behavior; 28%) and *Other activities* (medical treatment, physical environment; 35%). *Obligatory activities*, *Activities which take the patient into account* and *Other activities* account together for 96% of the statements, whereas *Activities necessitated by obligatory activities* and *Voluntary activities* are anecdotic in their frequency.

According to Van Eaton (2010) content of handovers is quite variable between units. The studies presented above also show that differences exist regarding types of content and their frequency. But reasons for variation remain unknown. Here I argue that variations in handover practices might be needed as they might reflect adaptation of the handover to the environment. Such variations are threatened by standardization, which is currently (overwhelmingly) advocated in nursing science. Scherlock (1995), for instance, described the content of handovers as "frequently imprecise" (p. 35) and "unstructured" (p. 36), with labeling of patients (e.g., "lazy", p. 33) and concluded that handovers require standardization. The next section discusses the debate on standardization.

Standardization of Handovers.

Standardization has recently, but extensively, entered the handover literature (e.g., Sexton, Chan, Elliott, Stuart, Jayasuriya and Crookes, 2004). But as Cohen and Hilligoss (2010) point out in an extensive literature review of 545 papers, what is meant by standardization is not clearly defined. This is illustrated by the numerous standardization systems that are reported in the literature : Cohen and Hilligoss (2009) « have identified nineteen such proposed systems of handoff standards : SBAR (including the variants I-SBAR I-SBARQ and I-SBAR-R), SIGNOUT, I PASS the BATON, FIVE-Ps, PACE, ANTICipate, HANDOFF, Data TRIANGLE, HANDS, Essence of Care, DeMIST, CUBAN, BSAP, SEAM, PEDIATRIC, PSYCHIATRY, STICC, and the Great Ormond Street Protocol. » (p. 30; references to papers omitted here). These standards mostly provide a mnemonic device for the information to be transferred. For instance, SBAR stands for Situation Background Assessment Recommendation. But usually, no clear definition is given for what to put under a letter, except for the word that it stands for (Cohen and Hilligoss, 2009), moreover the description of the information to be transferred does not overlap between standards. The variety in standardization approaches (at least 19 different systems) doesn't speak in favor of standardization: if standardization is a solution to the handover, why are the standardization

approaches *not* standardized? It may be that this variety is in fact adaptive. In addition, in their literature review of 400 papers, Patterson and Wears (2010) stated that "our review and classification of the handoff literature do not enable us to make recommendations for the use of any particular standardized tool" (p. 59). This suggests that none of the existing standards are able to capture the complexity of patient updates during handover.

Proponents of standardization argue that it is necessary to increase patient safety and reduce costs (e.g., Clancy, 2006; Hughes & Clancy, 2007). But improvements in patient safety as a result of standardization have not been demonstrated and authors have even argued that an excess in handover standardization could be detrimental for patient safety. In a case study, Boucheix and Coiron (2008) report that the focus charting technique (Lampe, 1985) is not an adequate tool to support high-quality information transfer during handovers. This method requires information to be structured in 3 categories: Data (a description of the situation requiring an intervention), Action (the intervention undertaken) and Result (the outcome of the intervention). The authors report difficulties for nurses to fit care situations to this framework. They also point out that it does not provide sufficient information for accurate patient information transfer, and that necessary information is often forgotten as a result.

Patterson (2008) argues that whereas the standardization of handover allows for a reduction in coordination effort and an improvement in efficacy and efficiency, it doesn't allow for the prioritization of most important information and isn't flexible enough to account for unexpected situations. This view is shared by Merrick, Iedema, and Sorenson (2008) who point out that "while such standardization suits routine work contexts (…), staff working in complex or uncertain environments hesitate to adopt structured procedures like 'SBAR' because they are insufficiently sensitive to process complexity, or emerging and uncertain contingencies." (p. 5).

It follows that research is needed in order to give indirect or direct evidence of the implications of handover standardization: in human systems, adaptability is the ability to learn from the environment (Berkes, 2007), and standardized routines could preclude this capacity by imposing rigid rules where flexibility should apply (Merrick, Iedema, & Sorenson, 2008). It is also notable that previous research on handovers has mostly been composed of case studies without theoretical foundations in organization theory. This is surprising because organization theory has been dealing for decades with issues such as the standardization of routines. This issue is addressed in the following sections.

The Need for Adaptability in Routine Performance

In this section, we will first discuss bureaucracy theory which proposed that standardization and control are the solution to the organizational problem of coordination. This is related to the different views of routines. We hence present classic research on routines as determined patterns of action and new conceptions of routines as adaptive accomplishments. We show that the outdated view of routines as rigid and predetermined does not hold because actors have to perform them in a situated manner.

The notion of standardization is a pillar of bureaucracy theory (Weber, 1947) for which coordination is largely reliant on a strong hierarchy and rigid sets of routines for coordinating and performing activities. In a bureaucracy, the leeway of individuals is limited by management as well as their competence in order to restrain their control (Mintzberg, 1979). As Merton (1940) points out, a bureaucracy is a formal organizational structure that constrains individual action by strict routines, controls conformity, and applies sanctions if rules are breached. In a bureaucracy, no discussions are allowed regarding the routines as they are considered natural because they enact the norms of the organization. By stressing the importance of conformity to routines as they are devised, bureaucracies paradoxically obscure the reason of their existence. Routines are hence applied blindly and sometimes at the expense of a higher organizational goals. This point is exemplified by Crozier (1964) who critiqued "(...) the slowness, the ponderousness, the routine, the complication of procedures, and the maladapted responses of the bureaucratic organization to the needs which they should satisfy" (p. 3).

Routines are at the core of organizations (March & Simon, 1958; Perrow, 1972), but the conception of routines has evolved since the seminal book *Organizations* was released (March & Simon, 1958). Routines have been considered as standardized succession of actions that are necessary to complete a task (March and Simon, 1958; Nelson and Winter, 1982), and as standard operating procedures that reduce the need for coordination and problem solving (Cyert & March, 1964). This view contrasts with recent research which shows that adaptability is a requirement in the performance of routines. Pentland and Rueter (1994) suggested that even when various instances of a routine are perceived as different, they still can share a common basis in terms of content (the repertoire of the routine), which is organized following what they call 'a grammar for action' (p. 489). The enactment of the grammar for action is dependent on the setting, which constrains the combinations of the elements. Gersick and

Hackman (1990) are interested in communication routines. They show that these routines change as a function of the new understanding (learning) of members of a task performing group, and through their interactions. Feldman (2000) develops a similar idea and describes how routines change as they are enacted by the individuals. She describes routines as emergent accomplishments because they are adapted by the individuals: as the situations they are confronted with vary, individuals tend to select the appropriate solution from an existing repertoire, but also extend their repertoire in case no ready-made solution is found.

Contingency Theory and the Impact of Uncertainty

The question of the standardization of work processes has also been discussed for decades in the field of contingency theory (e.g., Galbraith, 1973). This literature has radically challenged the views of bureaucracy theory and has consistently empirically shown that standardization and formalization are efficient only under low uncertainty conditions (e.g., Donaldson, 2001; Grote, 2009; Perrow, 1967; Van de Ven, Delbecq and Koenig, 1976). Contingency theory postulates that there is no "one best way" to organize and that what counts in terms of efficiency is the fit between the organization and contingencies in the environment (Donaldson, 2001). Most contingencies in organizations can be considered cases of uncertainty, and interdependence (Donaldson, 2001). The remainder of this paper is concerned with uncertainty.

Uncertainty is a major contingency in organizations (Donaldson, 2001). Galbraith (1973) defined uncertainty as "the difference between the amount of information required to perform the task and the amount of information already possessed by the organization." (p. 5). Different typologies of sources of uncertainty have been proposed in the literature. For instance, Milliken (1987) defines uncertainty as the unpredictability of the environment and divides it into three types of environmental contingencies: state uncertainty, effect uncertainty and response uncertainty. State uncertainty, is related to the ill-understanding of the underlying causes of changes in the environment. Effect uncertainty is the difficulty in apprehending whether and how changes in the environment will impact the organization. Finally, response uncertainty is related to difficulty in finding what actions to perform and anticipating their consequences. These three types of uncertainty are relevant in the case handovers and nursing care. The impact of uncertainty is described in the following section.

The Impact of Uncertainty.

At the organization level, the view proposed by contingency theory is that the way organizations coordinate should be related to their environment: for instance, the more predictable the environment, the more rigid the coordination in organizations (a mechanistic system); the more uncertain the environment, the more flexible the coordination (an organic system; Burns & Stalker, 1961). The level of uncertainty is positively linked to the efficiency of standardized routines, standardized routines have a low capacity for transmitting high amounts of information (Daft & Lengel, 1984): less information can be transferred in a given timeframe than when non standardized routines are in use. Unstandardized communication is the means through which to transfer the most information between parties and is hence the most efficient way to coordinate in high uncertainty conditions (Mintzberg, 1983; Van de Ven, Delbecq and Koenig, 1976). Lawrence and Lorsch (1967) show that more uncertainty leads to less formalization and use of coordination mechanisms with a higher capacity. This is supported by research in the air-traffic control setting: Morrow, Rodvold and Lee (1984) have shown that pilots depart from standardized protocols when encountering non-routine situations, using unstandardized language in order to overcome the rigidity of protocols. This relationship is also postulated at the work unit level (e.g., Argote, 1982). Units that evolve in a low uncertainty environment should use routine (or standardized) coordination mechanisms, and units in a high uncertainty environment should use non-routine (or unstandardized) coordination mechanisms (Perrow, 1967). The possibility to transfer high amounts of information is related to a decrease in uncertainty (Peterson & Pitz 1988). These findings also apply to coordination in hospitals. Argote (1982) investigated the moderating effect of uncertainty on the efficiency of programmed and non-programmed routines. She found that units facing low uncertainty were more efficient when they used standardized coordination mechanisms, whereas units facing high uncertainty were more efficient when they used unstandardized coordination mechanisms. Indeed, health care teams need to be flexible in their way of dealing with clinical situations in order to reduce uncertainty (West & Wallace, 1991). Nemeth and colleagues have shown that Intensive Care Units (ICUs) are surrounded by a high degree of informational uncertainty which results in a heightened requirement for information regarding the patients (Nemeth, Kowalsky, Brandwijk, Kahana, Klock & Cook, 2008). Uncertainty increases the risk of information gaps (Antony & Preuss, 2002). Uncertainty regarding the state of the patient and care to be provided is also related to an increase in errors and in the number of tests undertaken (Arora, Johnson, Lovinger et al, 2005). Finally, there is a "need for flexible routines" (Grote, Weichbrodt, Günter, Zala-Mezö, & Künzle, 2009, p. 17) in

order to face uncertainty in high reliability organizations like hospitals. In the next section, we propose that recourse to contingency theory is necessary in order to determine when to standardize handovers and when not to.

Recommendations for Future Research

To summarize, handovers in nursing care units are organizational communication routines that happen at shift changes. Their aim is to ensure the safety of patients when one shift leaves the unit and hands the patients over to the next (Perry, 2004) and transfer responsibility in order to maintain care continuity (e.g., Patterson & Wears, 2010). Handovers are composed of interactions between the outgoing and incoming teams. The handover routine aims at the resolution of uncertainty which is created by the reciprocal interdependence in the actions performed by each team (Thompson, 1967). Handovers have been explored in case studies since the seminal studies of Lelan (1973), but studies of handovers have never examined under which contexts the handovers are structured and under which contexts they are adaptable: it is known that contents and functions of handovers vary between units and hospitals (e.g., Lamond, 2000; Kerr, 2002) but the origins of these differences remain unidentified.

Relying on contingency theory, we are far from being able to recommend handover standardization unless uncertainty is very low. According to contingency theory, the appropriateness of coordination mechanisms is dependent upon the uncertainty of the context. In many industries, including hospitals, standardization has been shown to be efficient when uncertainty is low and adaptability a requirement when uncertainty is high. This concern on the flexibility of handovers is shared by researchers following an organizational resilience perspective. For instance, flexibility is necessary in critical situations (Smith, Patterson & Woods, 2007). Contingency theory hypothesizes that flexibility is needed in uncertain settings, as well as in normal situations. This hypothesis has not yet been tested on handover communication.

This knowledge gap could hinder the efficiency of attempts at handover standardization: standardization is likely to impact units differently, because their communication is not organized in a uniform way. The following aspects of adaptability could be investigated more thoroughly: adaptability of functions, adaptability of content, and adaptability of structure. The paragraphs below present some recommendations we can propose, considering the forty years of organizational research on organizing and standardization.

1) Future research on handovers should focus on linking naturally occurring variability in handover content and functions to environmental contingencies (Mayor, Bangerter, & Aribot, in press). The literature on contingency theory provides different insight about how to evaluate the level of uncertainty of units under investigation. For instance, Van de Ven & Delbecq (1974) proposed a typology of work units which they related to uncertainty. Others (e.g., Milliken, 1987) have argued in favor of measures of perceived uncertainty. Measures of perceived uncertainty in nursing units already exist (Allred, Hoffman, Fox & Michel, 1994) and can hence be used in handover research

2) Studies of handovers following a contingency theory framework should also directly study their structural adaptability and relate it to work-unit contingencies (Mayor & Bangerter, 2011a). Pentland (2003) distinguished between the content variety of the routine (the actions that compose the routine) and sequential variety (the flexibility in the ways the actions can be arranged to form the routine). Lag-sequential analyses (e.g., Gottman & Roy, 1990) are appropriate to assess sequential variety. These analyses examine the association between two contents of a routine, i.e., if a content is followed by another more frequently than expected by chance. The less number of significant associations, the more potential for adaptability. Comparing handovers facing different degrees of uncertainty using this approach would allow for the identification of differences in flexibility related to the environment.

3) Advocating best practices requires showing empirically that a given practice is more efficient than another. No study has shown that standardization of information during handovers is related to improvements in patient outcomes (Cohen & Hilligross, 2009), nor care continuity. This might be because coordination in hospitals, like in other organization, requires adaptability to the context (Argote, 1982), which standardization impedes. The contingency theory of organizations has positively linked flexibility to organizational outcomes. Further research on handovers should include measures of outcomes (e.g., continuity of care) in order to assess the (in)efficiency of the routines under study. One approach might be to compare handover procedures that focus on information standardization to handover procedures that allow sense-making between participants in settings differing in uncertainty.

Conclusion

We have shown that the question of handover standardization is not as straightforward as most nursing literature suggests. While nursing shift handovers have been discussed in this paper, it is believed that its content is also valid for other handovers in healthcare teams and other industries. Several disciplines have tackled the question of standardization. Outdated

bureaucracy theory has considered standardization to be the solution for enhancing efficiency. Contingency theory has shown that this is rarely the case. In this paper, we have argued in favor of an approach to the study of handovers that uses contingency as a theoretical framework. We also have proposed several ways in which research of handovers might be improved.

Standardization is by essence the limitation of diversity and hence adaptability. Proponents of standardization pursue the quest of outcome uniformity and are blind to the simple fact that while a given standardized procedure might be appropriate in certain circumstances it might not be when these circumstances change (Merrick, Iedema & Sorenson, 2008). It is necessary to acquire knowledge of the environments in which standardization is and is not appropriate.

STUDIES 1 AND 2: WORK-UNIT UNCERTAINTY AND HANDOVER COMMUNICATION

Drawing on research presented above, I investigated the impact of work-unit uncertainty on handover communication in two studies, which I will refer to as Study 1 and Study 2. These studies are summarized below. Chapters 3 and 4 then report on these studies in detail.

Summary of Study 1

In Study 1, I investigated the impact of uncertainty on the duration, contents and functions of handovers, hypothesizing relationships between work-unit uncertainty and these aspects of handover. We collected data in a sample of care units (N=80) by interviewing (structured interviews) the head nurses of the units (also called nurse unit managers). During the interview, we asked them what contents were discussed in handovers in their units, and what were the functions of handovers in their units. We asked them the duration of each daily handover. Additional interview questions were not used in this study, as well as questionnaires filled in by registered nurses of the units. Answers to questions regarding contents and functions of handovers were transcribed and coded on two typologies. The typology for contents emerged from the repeated reading of the answers, whereas the typology for functions was adapted from Grojean and Lacoste's (1999) typology. The variables regarding handover duration were averaged from the responses of the head nurse (mean handover duration and mean handover duration per patient). Finally, an expert coded the units on a clinical typology that was related to uncertainty: non acute care units featuring the less uncertainty, and Intensive

Care units (ICUs) the most. I tested the impact of unit type on the duration variables in multilevel regression analyses (hospital membership was entered as a clustering variable). As our sample size was too small for performing (multilevel) logistic regressions (Moineddin, Matheson, & Glazier, 2007; Peduzzi, Concato, Kemper, Holford & Feinstein, 1996) I simply computed chi-square tests to test the impact of unit type on content and functions of handover. Our results show that work-unit uncertainty impacts handover duration per patient, some contents of handover, and the function 'sharing emotions', thus partially confirming our hypotheses.

Summary of Study 2

In Study 2, I investigated the impact of work-unit uncertainty on actual handover communication, with the hypothesis that units featuring higher uncertainty would also show higher flexibility (Grote, 2009; Pentland, 2003) in the performance of handovers. I collected data in two hospitals, in one surgery unit (low uncertainty) and one ICU (high uncertainty) in each. I first contacted the nursing direction of the hospital. After securing the agreement of nursing directors, I contacted the head nurses and obtained their approbation as well. I videotaped all daily handovers in each of the units. I also interviewed nursing personnel about handovers, and shadowed members of the nursing personnel (data not analyzed in this dissertation). We transcribed the handover verbal content word for word. I segmented the transcriptions at the level of the utterance. I coded each utterance for content based on a typology modified from Study 1. I then computed topics from the contents, a topic being the uninterrupted succession of utterances coded in the same way. I computed descriptive statistics of the distribution of contents in each unit. I performed lag-sequential analyses (Gottman & Roy, 1991) on the topics in each of the care units. Descriptive statistics show that the content profiles are quite similar between units, and that differences are not accounted for by unit type. More interestingly, lag sequential analyses show that handovers in units featuring high uncertainty are more flexible than in units featuring low uncertainty, in both hospitals where I collected data. My hypothesis is therefore confirmed.

Chapter 3 – Task Uncertainty and Communication During Nursing Shift Handovers (Study 1) [2]

ABSTRACT

Aims

We explore variations in handover duration and communication in nursing units. We hypothesize that duration per patient is higher in units facing high task uncertainty. We expect both *topics* and *functions* of communication to vary depending on task uncertainty.

Background

Handovers are changing in modern healthcare organizations, where standardized procedures are increasingly advocated for efficiency and reliability reasons. But redesign of handover should take into account environmental contingencies of different clinical unit types. An important contingency in institutions is task uncertainty, which may affect how communicative routines like handover are accomplished.

Method

Nurse unit managers of 80 care units in 18 hospitals were interviewed in 2008 about topics and functions of handover communication and duration in their unit. Interviews were content-analyzed. Clinical units were classified into a theory-based typology (unit type) which gradually increases on task uncertainty. Quantitative analyses were performed.

Findings

Unit type affected resource allocation. Unit types facing higher uncertainty had a higher handover duration per patient. As expected, unit type also affected communication content. Clinical units facing higher uncertainty discussed fewer topics, discussing treatment and care and organization of work less frequently. Finally, unit type affected functions of handover: sharing emotions was less often mentioned in unit types facing higher uncertainty.

Conclusion

Task uncertainty and its relationship with functions and topics of handover should be taken into account in the design of handover procedures.

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[2] Note: This chapter has been accepted for publication in the Journal of Advanced Nursing. It complies with the publication guidelines of the journal.

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SUMMARY STATEMENT

What is already known.

- Nursing handover discussions feature various topics that vary across contexts.
- Nursing handovers fulfill a variety of functions.
- The drive to standardization of handovers aims to improve efficiency and reliability.

What this paper adds.

- Handover duration in units is related to task-contingent factors.
- Topics of handover are related to task-contingent factors.
- Whether emotions are shared during handover or not is related to task-contingent factors.

Implications for practice.

- Redesign of handover procedures should take task uncertainty into account.
- Redesign of handover procedures should take the variations in topics and functions of handover into account.
- Standardization of handover communication is limited to the extent that different unit types have different communication needs.

KEYWORDS

Nurse, Interview, Hospitals and Clinics, Research Report, Diverse Specialties, Handover

INTRODUCTION

Nursing shift handovers (or handoffs, signovers, sign outs and reports) are communicative routines designed to transfer patient-related information between successive shifts of caregivers in most nursing units around the world. Because of their widespread use, and because of their critical role for patient safety, it is important to understand their communicative properties (i.e., what are their topics and functions and what explains potential variations between units). Different aspects of handover communication have been described, mainly in case studies, including their functions, topics, participation structure and medium. Studies document substantial variation in practices. Moreover, the handover is changing in modern health-care organizations. Pressures to cut costs (Mitton & Donaldson 2004) and quality assurance approaches have led to initiatives to standardize handover communication. Standardization is advocated as a means to make more efficient use of resources and guarantee

reliability. But it is unclear how such initiatives affect communication and nursing outcomes. It is therefore crucial to understand the relationships between the task environment of a care unit and the topics and functions of handover communication in order to optimally design handover procedures. More specifically, how does the uncertainty of the task environment affect the topics and functions of communication? Research evidence is lacking here. It is also necessary to understand how resources are allocated to nursing units. What has not been undertaken before is a systematic comparative study of handover communication and duration in a large sample of different types of nursing units. There also has been no attempt to build theoretical propositions about the relationship between the task environment and handover communication. In this study, we interviewed nurse unit managers of a large sample of care units (N = 80), investigating whether unit types which differ in task uncertainty also show systematic differences in duration per patient and handover communication patterns.

BACKGROUND

Nursing shift handovers are institutional routines designed to coordinate care. They are performed, for example, when outgoing nurses are about to finish their shift and incoming nurses come on duty (Perry 2004). In the typical (verbal) form of handover, outgoing nurses inform their incoming colleagues about patients' current state during a face-to-face encounter. But there is much variety in handover practices as well as in the topics and functions of handover communication. Recent proposals advocate standardizing handover communication. Research on each of these issues is reviewed below.

Variety in Handover Practices

Studies have documented a large variety of handover practices. Four types of handovers are frequent: at the nursing station, at the bedside, tape-recorded and written handovers. Because handover procedures are continuously changing, no single method is universally used since they all have advantages and drawbacks (Miller 1998). Hence, reported trends in changes of handover types do not seem to follow a specific pattern, except departure from the nursing station form. Changes have been documented from tape-recorded handover to bedside (Anderson & Mangino 2006), from the nursing station to bedside (Kassean & Jagoo 2005) from the nursing station to written (Wallum 1995) and from bedside to written (Kennedy 1999). Transitions from the nursing station to computer-based handovers have also been documented (Baldwin & McGinnis 1994), as the use of information technology during

handover can increase patient safety (Strople & Ottani 2006). This assumption has been questioned (Arora et al. 2005): as information systems are often designed independently of users' needs, computerized communication can paradoxically result in increased error frequency and be detrimental to patient outcomes (Coiera 2000).

Topics and Functions of Handover Communication

There is variability in the *topics* of handovers. For instance, in some units, nurses discuss the case of each patient (Grosjean & Lacoste 1999), whereas in others they only discuss patients for whom an update is judged necessary (McCloughen et al. 2008), for instance patients whose condition has changed. Handovers can include discussion of personal characteristics of the patient such as behavioral aspects (Liukkonen 1993). Some handovers have a structure which allows for the identification of the patients, their pathology and changes (Lamond 2000), whereas some aspects might be put aside in other settings (McCloughen et al. 2008). The topics and structure of handover depends on the uncertainty of the situation of patients (Kowalsky et al. 2004) and topic omission during handover can cause serious harm particularly to medically unstable patients (Arora et al. 2005).

Research has also focused on overlap between topics discussed during handovers and written documentation. Much handover content duplicates written documentation (Sexton & al. 2004). However, during handover, outgoing nurses need to summarize many pieces of information found in written records in the form of "global judgments" (Lamond 2000, p. 802), enhancing the comprehension of what are the clinical priorities in the situation of a patient. Handovers also feature information based on intuitions (necessary tacit information, see Mueller et al. 2006) that do not fit into documentation standards and is made explicit during handover (Nonaka 1994).

Handover also fulfills a variety of *functions*. Transmission of patient-related information is the official function of handover, but many others have been identified. Handovers allow teams to improve resource management (Miller 1998), solve problems and improve collaboration (Strople & Ottani 2006), as well as develop cohesiveness, debrief, clarify and update information (Parker et al. 1992). Moreover, handovers enhance awareness of the transmission of responsibility (Lally 1999). This variety of functions is considered necessary to patient safety (Grosjean & Lacoste 1999) and attempts to standardize handover communication should take such variety into consideration.

Standardization and Interactivity

Research has of course focused on improving handovers. From a managerial perspective, the nursing station handover has been criticized for its duration and inaccuracy (McKenna 1997, Sexton et al. 2004). Advocated improvements include the reduction of handover subjectivity, duration and redundancy, partly through the use of standardized handover procedures (Clancy 2006, Hughes & Clancy 2007) like the Situation Background Assessment Recommendations framework (SBAR; see also Arora et al. 2005) or focus-charting (Lampe 1985). The SBAR framework is primarily used for optimal information transmission between nurses and physicians (see also Hamilton et al. 2006). Surprisingly, the drive to standardization is not supported by any evidence regarding its efficiency (Perry et al. 2008). Moreover, even the use of focus charting has been found to be unreliable during handovers (Boucheix & Coiron 2008).

As a result, scholars have recommended that handovers remain verbal and interactive (e.g., allowing question-asking and clarifying when necessary; Patterson et al. 2004). They have emphasized the necessarily conversational nature of handover in order to increase resilience against error (Patterson & Woods 2001), the inappropriateness of standardized communication during handovers in intensive care units (ICUs, Nemeth & al. 2008) and the necessity of narrative communication in order to do justice to the emergent character of non-routine events (Morrow & al. 1994, Grosjean 2004, Bangerter et al., 2011). Thus, it is not clear whether nor when standardization of communication is an appropriate strategy for improving the quality of handover.

A Task-Contingent Approach to Handovers

No systematic comparison of handover routines guided by theoretical considerations has been published. Thus, the circumstances under which units will benefit from redesign of handover procedures remain unclear. How to best design handover appeals to contingency theory in organization science. Indeed, contingency theory (e.g., Lawrence & Lorsh 1967) argues that the best way to organize depends on environmental contingencies like uncertainty. The uncertainty that a system faces is a prime contingency in organizations (Galbraight 1973). Organization theory has been critiqued for being decontextualized (Barley & Kunda 2001). Comparison of work contexts is hence necessary to understand similarities and differences in work practices. This can be done by examining the variety in the performance of a routine. Pentland (2003) distinguishes between topic variety (the elements composing the routine) and sequential variety (the ordering of the elements of the routine). A main source of variation between subunits of organizations like care units within hospitals is uncertainty (Tushman

1979). Task uncertainty is "the relative amount of information that must be acquired during task execution" (Galbraith 1973 p. 5). Uncertainty triggers adaptive responses to the solicitations of the context (Duncan 1972) and affects many aspects of the functioning of units, for instance, their communication structure (Tushman 1979) and information needs (Daft & Lengel 1986). Task uncertainty is defined by the variety (number of exceptions) and difficulty of the tasks (e.g., Tushman, 1979). Difficult or variable task assignments increase information requirements. Task uncertainty is therefore related to unit coordination patterns (Van de Ven & Delbecq 1974). Hospital units evolving in a predictable environment are more efficient when they use standardized procedures, while units facing an unpredictable environment are more efficient when they use unstandardized ones (Argote 1982). Thus, high uncertainty reduces the usefulness of standardized routines.

Increasing available information reduces uncertainty, whereas increasing possibilities of action augments uncertainty (Peterson & Pitz 1988). The more uncertain and important the choice of a course of action, the more information is required (Crawford 1974). In nursing units, the importance of choice of action is related to the acuity of patients, as seriously ill patients require more urgent and critical decisions and are prone to more medical complications compared to patients in less severe conditions (Needleman et al. 2001). As task uncertainty is related to the number of exceptions (e.g. complications) that occur in the performance of tasks, requirements for information are higher in care contexts presenting more departures from expectations. Nurses taking care of medically unstable patients thus evolve in a more uncertain environment than nurses caring for more stable patients. Communication about medically unstable patients during handovers, for instance in intensive care units, is therefore subject to a high degree of informational uncertainty which results in a heightened requirement for information (Nemeth et al. 2008).

Although research on handovers exists, much of it is based on case studies. Moreover, little attention has been given to the variations of topics and functions between units of different types (for exceptions see Lamond 2000 and Kerr 2002). Topics and functions of handover have never been compared across a large sample of clinical units which differ in task uncertainty. This is a significant omission, because what is appropriate or efficient in one care context might not be in another, because care contexts vary in uncertainty and uncertainty is reduced through communication. Uncertainty is a major factor in explaining the communicational and organizational structure of institutions as well as their efficiency (Tushman 1979). As coordination in organizations is dependent on task uncertainty, we hypothesize that uncertainty plays a major role in the way handovers are structured, i.e., their communication patterns.

THE STUDY

Aims and Hypotheses

Our study aims at exploring whether task uncertainty affects the naturally-occurring communicative practices of care units during handover (see Mayor, 2011). We examine whether uncertainty affects handover duration per patient and whether it is linked to differences in topics and communicative functions of handover. We operationalized task uncertainty by classifying units in a clinical typology of unit types in order of increasing task uncertainty. We make predictions on duration per patient and topics and functions of handover. Our hypotheses are presented below.

Uncertainty is reduced by means of information and communication (Peterson & Pitz 1988), especially spontaneous, informal communication. As such processes are time-consuming, handover duration per patient should be higher in unit types facing higher uncertainty. We hence propose Hypothesis 1: handover duration per patient is higher in unit types featuring more task uncertainty, compared to the unit type where it is lowest.

Following contingency theory, we expect to find differences in communication patterns between clinical unit types. In units facing higher uncertainty, patients are in a less stable state and more subject to rapid changes of condition. Hence, we propose that topic variety will vary across units. Priority will be given to changes of patient condition in units facing higher uncertainty, therefore reducing topic variety. We thus propose Hypothesis 2: Topic variety during handover (the number of different topics discussed) will be lower in units with more task uncertainty. We then test which topics vary across units by comparing their frequency and propose Hypothesis 3: There is a linear relationship between task uncertainty and various topics of handover.

We also compare the frequency of different functions of handover across the different types of units, proposing Hypothesis 4: There is a linear relationship between task uncertainty and functions of handover.

Participants

Nurse unit managers participated in this study as knowledgeable representatives of their care unit. Nurse unit managers in Swiss hospitals have managerial duties, although it is frequent that half of their time is devoted to clinical activities. The nurse unit manager is

usually present during all handovers during the day, and also at the evening handover in some units. Care units were sampled from 18 hospitals in the French-speaking region of Switzerland. Hospitals with more than 500 beds are few in this region. We thus selected the 4 hospitals of that capacity. Fourteen hospitals of smaller capacities were selected arbitrarily, i.e., following no specific criteria, except that we wanted a range of hospitals of different capacity. Our sample thus includes: 4 hospitals of more than 500 beds, 4 hospitals of 250 to 499 beds, 4 hospitals of 125 to 249 beds, 4 hospitals of 75 to 124 beds, and 2 hospitals of less than 75 beds. Nursing directors of the selected hospitals gave us lists of the nursing units. Two to eight units were selected within each hospital depending on hospital capacity – more units were selected in larger hospitals. Random sampling was used to select nursing units within hospitals. Eighty nurse unit managers from the selected units participated in a structured interview. Eighty-eight percent of interview participants were female, and the acceptance rate was 98%.

Data Collection

We collected data during a 6-month period starting in March 2008. This allowed us to minimize variations in patient profiles due to seasonality, but restricted the sample size to 80 interviews, which was considered the maximum manageable number because of the estimated time frame for decisions of nursing directors as well as the difficulty of scheduling interviews with busy hospital personnel. The nurse unit manager of each selected unit was contacted by phone. This was done as soon as the nursing directors gave their agreement to participate in the study. Once participation of the nurse unit manager was secured, a face-to-face meeting for the interview was arranged on their ward. This structured interview focused on the informational topics discussed during the handovers, the functions of handover and resource allocation in the unit. A description of activities in the unit and their timing were also produced together with the nurse unit manager to allow us to get familiarized with the work of each unit (not reported here). The interview grid was built from a review of the literature. Regarding the topics, we asked the nurse unit managers "what information is discussed during the handover?" for each reported handover. Regarding the functions, we asked the nurse unit managers "We have seen that handovers are very important for transmitting information regarding patients and ongoing treatment. What are the other functions of handover ?" The interview was audio-recorded and detailed notes were taken on the interview grid.

Ethical Considerations

We informed participants about the overall content of the interview before they participated and told them that the content of the interviews would be anonymized. Oral consent from participants was obtained. After analysis, they received a 30-page detailed report of the study results. Some nurse unit managers and nursing directors requested further information. We hence delivered presentations in several units. In most hospitals, this study didn't require an ethical review and was accepted by the nursing director. In one large hospital, formal ethical review was necessary, and the study passed the review process successfully.

Data Preparation and Variables

Unit Type.

Uncertainty of the task environment was operationalized as the independent ordinal-level variable Unit Type. It was coded from the transcribed descriptions of patient types provided by the nurse unit managers during the interview (the question asked was "what are the types of patients in your unit?") and the mission of the unit. After anonymization, a nursing director classified each unit into one of four types, which include (by increasing task uncertainty): non-acute care (e.g., rehabilitation units; n = 14), standard acute care (e.g., general surgery and medicine units; n = 50), continuous care units (n = 10), and ICUs (n = 6).

Duration Per Patient.

The dependent variable regarding handover duration (relevant for testing H1) is measured as mean handover duration per patient (it is thus ratio-level). It was computed from information collected during the interviews: we asked the nurse unit managers the duration of each daily handover and then averaged the data at the level of the unit.

Topics of Handover.

We asked the nurse unit managers "what information is discussed during the handover?" We transcribed their answers. We then coded for presence or absence of each of the following topics: (1) the medical state of patients (the state and evolution of the patients in the unit); (2) reason for admission (the reason why the patients are hospitalized, their background and antecedents); (3) treatment and care (preparation, administration and changes of treatment); and (4) organization of work (coordination, entry and discharge of patients).

As these raw contents were expressed by nurse unit managers in the form of a narrative without a clearly identifiable boundary between its parts, we coded for absence or presence of each topic category instead of coding first for boundaries and then for topics. Dependent variables regarding topics of handovers (relevant for testing H2) are thus dummy-coded. Number of different topics (our measure of topic variety, relevant for testing H3) is the number of different coded topics. This variable is an indicator of the topic variety of speech in handover communication.

Functions of Handover.

We asked the nurse unit managers "We have seen that handovers are very important for transmitting information regarding patients and ongoing treatment. What are the other functions of handover?" We transcribed their answers. We coded these on a modified typology of handover functions adapted from Grosjean and Lacoste (1999). Each variable (dummy-coded) represents a category (relevant for testing H4): (1) sharing emotions (sharing a moment with the team, speaking about emotional matters, talking about difficult situations); (2) group sense-making (solving problems, analyzing situations); (3) education (teaching and learning, reflecting on how activities are carried out); (4) team coordination (delegation of work, division of work); (5) recognition (recognition of merits of self and team); (6) institutional coordination (coordination of care with other professionals in the hospital); (7) vertical information transfer (team receives information from nurse unit manager about administrative matters, team gives information to nurse unit manager to be transferred to the nursing direction).

Inter-rater Agreement of Coding.

We computed interrater agreement for coding of nurse unit managers' answers regarding topics and functions of handover based on 20% of data that was coded by two independent coders. Cohen's kappa was computed as a measure of agreement (Fleiss et al. 2003). Kappa values ranged from .66 to .97 indicating acceptable to excellent inter-rater agreement.

Analysis

Duration Per Patient and Number of Topics.

We used multilevel regression analysis (see Gelman & Hill, 2007) to test the effect of unit type on handover duration per patient and number of topics. Multilevel analyses were used in order to disentangle the variance due to unit type (Level 1 predictor) and the variation due to the hospital (Level 2 clustering variable) which could have been confounded because of the non-independence of data. We used the software package MLwiN 2.10 using the iterated generalized least squares (IGLS) algorithm. The outcome variables were treated as normally distributed. The part of variance due to the hospitals was computed using the Intraclass Correlation (ICC) which expresses the part of variance in the dependent variable that is due to the hospital. As Level 2 variance was not significantly different from 0 for all outcome variables, all ICC values are considered to be 0 also. Hence, mean handover duration per patient of care units is not influenced by the hospital they belong to, nor is the number of topics discussed. To test our hypotheses, we entered hospital clustering in a random intercept model, unit type as a predictor and handover duration per patient as well as number of topics as criterion variables. Unit type was treated as a categorical variable. Non-acute care was treated as the reference category. The other unit types were tested against the reference category and the beta parameters represent the difference in means between the other categories and non-acute care. Differences are significant when zero is not included in the 95% confidence interval (CI; see Table 3). We assessed the fit of both models by testing the difference between the -2loglikelihood value of each model including the 3 predictors and the -2loglikelihood value of the null model (the model without predictor, but including hospital clustering). The values of the differences were 11.70 for number of contents and 65.42 for mean handover duration. They were significantly different from 0 (all $p<.01$). Thus, our model is significantly better than a model with no predictor.

Specific Topics of Communication During Handover.

For the dummy-coded topic variables, we computed chi-square tests to determine the significance of the association between nurse unit managers' mentions of each topic and unit type.

Functions of Communication During Handover.

As above, chi-square tests were performed to test relations between the dummy-coded function variables and the four-level unit type variable.

Results

Duration Per Patient.

Table 3 presents the impact of unit type on mean handover duration (in minutes) once Level 2 variance is removed from the analyses. Table 3 shows that continuous care units and ICUs have significantly higher mean handover duration per patient than non-acute care units. This is consistent with H1. H1 is hence supported. Unit types facing higher uncertainty (continuous care units and ICUs) allocate more handover time per patient than non-acute care units and standard acute care units.

Table 3.

Regression Coefficients of Multilevel Analysis of Handover Duration Per Patient in Minutes as a Function of Unit Type

	Handover Duration per Patient			
	Min	Max	Mean (SD)	Difference from non-acute care *B* (CI)
Non-Acute Care (*n* = 14)	.4	1.6	1.0 (.4)	
Standard Acute Care (*n* = 50)	.7	3.0	1.4 (.5)	0.3 (-0.3, 0.9)
Continuous Care (*n* = 10)	1	9.2	3.7 (2.4)	2.7 (1.9, 3.5)
ICU (*n* = 6)	2.1	6.4	4.4 (1.8)	3.4 (2.5, 4.4)

Topics of Communication During Handover.

The overall relative frequencies of topics mentioned by the nurse unit managers were: medical state of patients (mentioned as a topic of discussion in 97 % of the units), reason for admission (85%), treatment and care (78%) and organization of work (36%).

The number of different topics discussed in the average unit was 2.96 (*SD* = .78). The number of topics was related to unit type, as illustrated in Table 4. ICUs discussed fewer topics than the non-acute care unit reference category. This suggests that topic variety is lower in ICUs than in the other unit types. This is consistent with H2. The results below show which topics vary between unit types.

Discussions about patients' medical state were not significantly related to unit type. Unit type was related to mentions of reason for admission. Looking at Table 4, one can see that there is variation between unit types (*chi square* test), but that it is not linearly related to task uncertainty (percentages per unit type). This is not consistent with H3.

Table 4.
Topics Discussed During Handovers as a Function of Unit Type

	Number of mentioned topics				Percentage of mentions of each topic			
	Min	Max	Mean number (SD)	Difference from non-acute care *B* (CI)	Medical state	Reason of admission	Treatment & Care	Organization of work
Non-acute Care (n = 14)	2	4	3.2 (.6)		14 (100%)	9 (64%)	13 (93%)	9 (64%)
Standard Acute Care (n = 50)	2	4	3.0 (.7)	-0.2 (-0.6, 0.2)	48 (96%)	46 (92%)	39 (78%)	18 (36%)
Continuous Care (n = 10)	1	4	2.9 (.9)	-0.3 (-0.9, 03)	10 (100%)	9 (90%)	8 (80%)	2 (20%)
ICU (n = 6)	1	3	2.0 (.9)	-1.2 (-1.9, -0.5)	6 (100%)	4 (67%)	2 (33%)	0 (0%)
χ^2					1.23 (.75)	8.41 (.04)	8.65 (.03)	9.32 (.03)

Table 5.
Functions of Handovers as a Function of Unit Type

	Percentage of mentions of each function						
	Sharing emotions	Group sense-making	Education	Team coordination	Recognition	Institutional coordination	Vertical information transfer
Non-acute Care (n = 14)	10 (71%)	5 (36%)	3 (21%)	7 (50%)	3 (21%)	3 (21%)	6 (43%)
Standard Acute Care (n = 48)	34 (71%)	16 (33%)	12 (25%)	19 (40%)	4 (8%)	7 (8%)	8 (17%)
Continuous Care (n = 10)	5 (50%)	2 (20%)	2 (20%)	5 (50%)	1 (10%)	1 (10%)	4 (40%)
ICU (n = 6)	1 (17%)	1 (17%)	1 (17%)	5 (83%)	0 (0%)	1 (0%)	2 (33%)
χ^2	8.00 (.04)	1.11 (.77)	.22 (.97)	4.81 (.19)	2.83 (.42)	.57 (.90)	6.26 (.10)

DISCUSSION

In this study, we explored the effects of task uncertainty (operationalized as unit type) on duration per patient and reported topics and functions of communication during nurse handover. We found that mean handover duration per patient increased with increasing task uncertainty. This finding might be relevant for work planning in nursing units. It appears necessary that hospital administrators provide nursing units with resources for handover, i. e., sufficient working time overlap between outgoing and incoming teams. Some topics of communication (treatment and care, organization of work) systematically decreased with increasing task uncertainty. This converges with the finding that the topic variety of handovers (measured by the number of types of topics discussed) was lower for unit types facing high uncertainty. This is probably because nurses in such units have to focus on changes of patients' state, which are more frequent than in less uncertain contexts, explaining why they talk less about treatment and care and organization of work. In general, unit type did not affect reported functions of handover. It is hard to explain this result, although it may be that our sample size was insufficient to detect potential differences between unit types. Only sharing emotions varied with task uncertainty. The lowest frequency of sharing emotions was found among ICUs. It may be that nurses in ICUs do not discuss emotional aspects of work, or that they discuss such emotional aspects of their work at moments other than during handover (e.g., during breaks). Social functions are important for maintaining group cohesion, which in turn affects organizational resilience against error in high-reliability organizations like hospitals (Weick & Roberts 1993). We also note that handovers indeed feature a wide range of functions. As standardized procedures regarding handover cannot easily accommodate such social functions, it is important to explore how important these functions are and how they can be fulfilled appropriately. This could be done by incorporating weekly team meetings focusing on emotional and social matters. The priorities of hospital administrators are likely related to the most efficient use of resources and cutting costs they assume to be unnecessary. Communicating with hospital administrators about the importance of social functions of handovers for the good functioning of nursing units might be appropriate to avoid reductions in handover duration which might impact patient safety.

This study contributes two important findings. First, we have presented evidence for the theoretical proposition derived from contingency theory that communicative practices in nursing teams such as handovers vary systematically as a function of task uncertainty. We thereby have shown that standardization processes are not as straightforward as might seem: it

is through consideration of the needs of specific nursing work contexts that appropriate solutions can be found (Argote 1982). Indeed, nurses have to deal with protocols that vary between units and reflect differences in patients' condition. A single handover procedure cannot capture such diversity in patients and protocols. Second, we have shown that unit types facing higher uncertainty (especially ICUs) have a narrowed scope of communication topics and functions during handover than units facing less uncertainty. These findings further our theoretical understanding of what drives variations in handover communication between different unit types.

This study has some limitations. Data for this study were derived from interviews of nurse unit managers which were conducted as a proxy for actually observing communication processes during handover, which was not feasible with such a large sample. Our data are thus self-report data, and may be biased by what nurse unit managers are able to recall or report. Although Ericsson and Simon (1984) have pointed out that verbal reports are a valid data collection method, even higher validity could be gained through direct observation of communication during handover in different units varying in task uncertainty.

CONCLUSION

Qualitative and quantitative analyses should be undertaken in order to better understand how communication during handover is impacted by task uncertainty, thereby contributing to a more theory-driven understanding of how handover communication practices vary between different nursing care units. This could be done by closely examining the verbal topics of handovers in relation to a theoretical framework (e.g., contingency theory) which may lead to additional insights for the redesign of handover procedures.

Task uncertainty is a prime contingency in organizations and impacts their communication structures (Tushman 1979). Awareness of the impact of task uncertainty on the variation of topics and functions of handover should trigger concern about the redesign of handover procedures. Standardization of handovers should be carried out with consideration of the relationship between task uncertainty and communication dynamics: our results strongly suggest that units differing in uncertainty have different communication needs. Handover protocols should hence be adapted with regard to the level of uncertainty of the units. Standardization has benefits in immediate cost control. But short-term reduction of costs and resources, like decreased handover duration, can lead to less efficiency in the long run (Baumann et al. 2001).

Chapter 4 - Managing Uncertainty Through Flexible Performance of Routines: The Case of Nursing Handovers (Study 2)[3]

ABSTRACT

Studies under a contingency theory approach have shown the impact of uncertainty on the effectiveness and frequency of use of different coordination devices. This study investigates differences in the enactment of a single coordination device, a communicative routine, used in contexts varying in uncertainty. We investigated organization of topic transitions in a communicative routine in the hospital setting, the nursing shift handover. The shift handover is used to coordinate work in most nursing units, irrespective of the degree of uncertainty they face. Data from a multiple case study design showed that topic transition patterns in handover communication are more flexible when uncertainty is high than when it is low. Units thus exhibit natural adaptation of the communicative routine to variations in uncertainty. Our findings extend contingency theory to the flexibility of work processes in the performance of routine coordination devices.

INTRODUCTION

Recently, repeated calls have been made for more studies in organization science investigating work as it is performed (Barley and Kunda, 2001; Pentland, 2003; Sinha & Van de Ven, 2005). This is a particularly pressing need given the lack of connection between contingency approaches of organizing and detailed analyses of work processes (Barley & Kunda, 2001). Consider a well-known proposition of contingency theory, namely that uncertainty (Galbraith, 1973), is a key determinant of organizational fit via the use of adequate coordination devices (e.g., Van de Ven, Delbecq & König, 1976). Previous research has shown that uncertainty moderates the use and effectiveness of impersonal, personal, and group coordination modes (Van de Ven, Delbecq & König, 1976), centralized and decentralized communication patterns (Tushman, 1979) and programmed and unprogrammed coordination devices (Argote, 1982). But these studies focused on relating the frequency of

[3] Mayor, E., & Bangerter, A. (2011a). *Managing uncertainty through flexible performance of routines: the case of nursing handovers.* Manuscript in preparation.

use of broad categories of coordination devices to uncertainty and effectiveness, without examining work processes in detail. These studies hence lack the granularity that is necessary to examine how specific coordination devices are *adaptively* (i.e., differently) *enacted* in relation to varying degrees of uncertainty.

Examining work processes in detail allows us to answer an unprecedented research question: *how do people deal with varying degrees of uncertainty within a single routinized coordination device used across contexts?* We propose that when the same coordination device is used to coordinate activities in different contexts, higher uncertainty will lead to more flexibility (Grote, 2004, 2009), measured as variety in the sequential performance (Pentland, 2003) of the device. We focus on communicative routines (Gersick & Hackman, 1990) and study the nursing shift handover as a typical example. It is a routine that is recurrently performed several times a day in most hospitals around the world irrespective of the degree of uncertainty.

Routines are learned activities performed when triggered by an event, with some degree of internal regularity (March & Simon, 1958; Pentland, 2003), and allow to reduce coordination costs (Nelson & Winter, 1982). Once seen as automatized reiterations of the same sequence of actions (March & Simon, 1958; Cyert & March, 1963), routines are now increasingly considered as 'situated' (Howard-Grenville, 2005, p. 620) 'effortful' (Pentland & Rueter, 1994; p. 488) and 'emergent accomplishments' (Feldman, 2000; p. 613) performed by agents to achieve specific goals under specific circumstances. Hence, the term 'routine' does not refer only to coordination by standardization (Thompson, 1967), in spite of early conceptions (March & Simon, 1958; Thompson, 1967): Routines are adaptable and tend to change considerably on the basis of situational factors (e.g., Feldman & Pentland, 2003; Grote, Weichbrodt, Günter, Zala-Mezö & Künzle, 2009; Howard-Grenville, 2005; Nelson & Winter, 1982; Pentland, 2003) and are in use throughout organizations.

Flexibility in the performance of routines is enabled by their modular structure (Pentland, 1995). Routines are composed of different actions (or 'moves', Pentland, 1992) that are iteratively combined from an organizational repertoire in order to face situational needs (Nelson & Winter, 1982; Pentland & Rueter, 1994) and thus leading to specific configurations. Some routine configurations are encouraged and others discouraged by management (Pentland, 1995) as it seeks to control how activities are carried on (the ostensive aspect of routines; Feldman & Pentland, 2003). But routines are also under the influence of the individuals performing the routine (the performative aspect), which leads to *routine*

flexibility: Individuals are faced with the diversity of the situations and exceptions to what is expected and change routines accordingly (Feldman & Pentland, 2003; Howard-Grenville, 2005). Routines hence vary in standardization and prescriptivism, because flexibility is important in making sense of the unexpected and acting accordingly (Grote, 2009; Weick, Sutcliffe & Obsfeld, 2005). A recent approach (Pentland, 2003) is to study the flexibility of the routines as the variation in the sequence of elements composing its repertoire. We will use this approach to study the internal flexibility of nursing handovers in relation to task situations varying in uncertainty.

THIS STUDY

The nursing shift handover is a routinized coordination device which most often involves interactive, face-to-face communication. It serves to transfer patient-related information between successive shifts of caregivers by reporting changes in medication and treatment (Lamond, 2000) and narrating recent clinical events (Bangerter, Mayor & Pekarek Doehler, 2011). What is intriguing is that this coordination device is used in most hospitals around the world, in nursing units with widely varying degrees of task uncertainty. It follows that organizational fit (Van de Ven & Drazin, 1985) can only be reached by adaptively varying the degree of flexibility in its performance. We argue that there is a systematic relation between flexibility of routine accomplishment and the degree of uncertainty the unit faces (e.g., Grote, 2009). The study of the shift handover hence allows examining how a specific coordination device adapts to varying levels of uncertainty. In order to show this, we will focus on the flexibility in the actual performance of shift handovers by analyzing the sequential variety (Pentland, 2003) of transitions between different topics discussed during handover and by relating this variety to differences in task uncertainty of the work-unit.

Feldman and Pentland (2003) have shown that flexibility is an inherent part of routines which accounts for their adaptability to changing circumstances, but they did not relate flexibility to uncertainty. Hence, it is still unknown whether the variety (Pentland, 2003) in the performance of a routinized coordination device is impacted by uncertainty, although the work of Grote (Grote, 2009; Grote, Weichbrodt, Günter, Zala-Mezö & Künzle, 2009) points to that direction.

In this study, we compare the flexibility of handover accomplishment under conditions of low and high task uncertainty. We will test whether flexibility is impacted by uncertainty in the work unit. Case studies have previously shown that handovers indeed feature variations in terms of topics discussed in relation to the context of the work unit (e.g., Kerr, 2002; Lamond,

2000). The frequency of contents of handovers is impacted by uncertainty, operationalized as the type of nursing unit (Mayor, Bangerter & Aribot, in press). But studies did not inspect whether variations in uncertainty are related to variations in the structure (the flexibility) of handovers, as operationalized by the transitions between topics of discussion. Particularly, the influence of management (the ostensive aspect; Feldman & Pentland, 2003) of the handover routine is likely to be reduced in the case of high uncertainty, as this might trigger a higher need for performative flexibility in order to maintain fit (Van de Ven & Drazin, 1985) at the level of the unit.

Here, we compare two types of units that are clearly different in relation to uncertainty. We draw on Van de Ven and Delbecq's (1974) classification of unit types corresponding to different degrees of uncertainty. Following their classification, we consider intensive care units (ICUs) as high in uncertainty and surgery units as lower in uncertainty. ICU personnel are indeed known to face a high level of uncertainty (Nemeth, Kowalski, Brandwijk, Kahana, Klock & Cook, 2008), because the state of their patients is more severe, leading to more frequent complications and exceptions in care (Needleman, Buerhaus, Mattke, Stewart & Zelevinsky, 2001). As a result of frequent complications, it is also more difficult to predict whether and when the treatment and care provided will lead to the desired output (improvement of patient condition), which is also a source of uncertainty (Lawrence & Lorsch, 1967).

To sum up, contingency theory posits that efficient work performance reflects a fit (Donaldson, 1987; Van de Ven & Drazin, 1985) between coordination devices and the level of uncertainty (e.g., Thompson, 1967). Yet, it does not predict whether and how uncertainty can be dealt with when the coordination device remains the same in contexts differing in uncertainty. Drawing on the work of Howard-Grenville (2005) and Grote (2009), we propose that in this case, adaptations to contexts varying in uncertainty lead to natural variations in the flexibility of the coordination device (see also Mayor, 2011). More specifically, we hypothesize that task uncertainty in nursing units is positively related to the flexibility of face-to-face interactions during nursing handovers: units higher in task uncertainty should exhibit more flexibility.

Flexibility is operationalized as the sequential variety of the work processes (Pentland, 2003). This is measurable by lag sequential analyses (Gottman & Roy, 1990). Lag sequential analyses test the associations between steps forming a sequence. Significant associations between two steps indicate structure. Thus, a lower amount of significant transitions between steps is indicative of less structure and more flexibility. In the case of our study, the steps are the topics discussed during handover.

We tested this hypothesis is a multiple case study design (Eisenhardt, 1989). We selected four nursing units, two ICUs and two surgery units. Each pair of units was embedded in a different hospital (one private and one public hospital). We selected a public and a private hospital because they differ in resources, and this could impact the performance of handovers. This distinction allows us to test whether our hypothesis holds in two very different contexts, following the logic of theoretical sampling in case study design (Eisenhardt, 1989).

METHOD

Participating Units

One surgery unit and one ICU participated in each of two French-speaking Swiss hospitals: a public district hospital with a capacity of approximately 500 beds and a private hospital with a capacity of approximately 150 beds. The units were selected from units that had participated in a previous study (Mayor, Bangerter & Aribot, in press). We first contacted the nursing directors of both hospitals to explain the research goals and the implications for the hospitals. Once acceptance was secured, we contacted the head nurses of each unit to secure their agreement for the units in question. We then put a poster presenting the study in detail and our contact information at the disposal of the head nurses. The poster was placed in the team rooms. We collected data during the periods indicated on the poster.

Data Collection

In each unit, we video-recorded each handover meeting during 5 consecutive days. Units typically had 2-3 handovers scheduled per day. During the week of observation, there were 10 handovers in the ICU of the private hospital, the surgery unit of the private hospital and the ICU of the public hospital. There were 15 handovers in the surgery unit of the public hospital. Due to technical problems, 2 recordings could not be transcribed. The data we present here is thus based on 43 handovers. In ICUs, handovers consisted of a whole-team meeting (i.e., with all the nurses of the unit) followed by a discussion in pairs (one outgoing nurse transferring information to an incoming nurse). As we wanted to compare group handovers, only the group and subgroup meetings (involving more than 2 people) were analyzed. This is justified insofar as group handovers can be assumed to have analogous functions in both units. In the surgery unit of the private hospital, evening handovers consisted of two separate group handovers: The team split into two subgroups, each with outgoing and incoming nurses, based on pre-attributed responsibility for patients. The handover of only one group each evening were analyzed. Morning handovers for that unit were analyzed fully.

Data Preparation

We transcribed the handovers verbatim (including overlapping speech, disfluencies, fillers (*uh*, *um*), and acknowledgment tokens like *okay*, *uh-huh* or *yeah*; Bangerter & Clark, 2003) and anonymized all proper names. We segmented the transcripts into utterances. We coded each utterance into one of seven content categories: *Identification*, *Reason of presence*, *State and evolution*, *Care and treatment*, *Organization*, *Off-task*, *Interaction management*, and a non-content category, *Other/Uncodable*. Table 6 provides a description of each category and example utterances. In order to test interrater agreement for coding, we computed Cohen's kappa on 200 utterances double-coded by two different coders. Interrater agreement was high (Kappa = .73).

Analysis

Our hypothesis only concerns the content categories. The non-content category was included in the analysis to avoid non-existent transitions occurring from deletion of non-content topics, but results for this category are not presented here. The flexibility of transitions between topics (Pentland, 2003) was assessed using lag sequential analyses at lag 1 (see Gottman & Roy, 1990). Lag sequential analyses yield probabilities of transition from each event to every other event and give significance values for each cell of cross-tabulated transitions. The unit for lag sequential analyses was the topic. A topic was defined as a series of adjacent utterances coded in the same content category. For instance, the sequence of contents ABBBCCCC leads to the sequence of topics ABC. Thus, a topic is a succession of contents which belong in a same category. We are interested in the succession of topics (the transitions): In performing these analyses, we ask whether there exists a structure that entirely organizes the successions of topics (completely predetermined organization), or if on the contrary there is no rule regarding the arrangement of these transitions (completely emergent organization). The results are very likely to lie in between these extremes. The question is whether the results lie on the structured (high number of significant transitions) or on the flexible side (low number of significant transitions), and whether the flexibility of topic transitions varies according to unit type.

Table 6.

Coding Categories, Descriptions and Examples

Category	Description	Examples
Identification	Information allowing identification of the current patient, e.g., date of birth, name, gender, room number.	*then Mr Smith*; *then 209*; *a woman born in 1923*
Reason of presence	Description of why the patient is in the unit, e.g., the pathology the planned intervention, or antecedents.	*he came with abdominal pain*; *was admitted the 5th for a prostate*; *regarding her antecedents she had a hiatal hernia in 85*
State and evolution	Description of the patient's condition or changes in patient condition; e.g., pulse, temperature, symptoms, test results.	*she urinated 300 milliliters*; *everything went fine*; *she isn't in pain*
Care and treatment	What care and treatment has been done or what is to be done, e.g., medication, dressing wounds.	*I took out the cannula*; *I gave her a perfalgan a little bit systematically*; *I gave her an aerosol*
Organization	A description of coordination and organization activities within or outside the hospital, e.g., patient entry exit or transfer, sending samples to the lab.	*she is leaving today*; *we had an admission*; *she went to cardiology*
Off-task	Utterances unrelated to the handover task, e.g., gossip.	*she loves to go to the mountains*; *there has been a show about that palliative care unit there*; *her husband is on holiday*
Interaction management	Utterances aiming at the management of the handover interaction, e.g., backchannels	*that's all for her*; *yes*; *mhm*
Other/Uncodable	Inaudible or incomplete utterances, Utterances that do not fit in the above categories.	

There were 3974 transitions in the surgery unit of the public hospital, 839 in the ICU of the public hospital, 3702 in the surgery unit of the private hospital, and 507 in the intensive care unit of the private hospital. Differences between ICUs and general surgery units are due to the fact that we only included group handovers (more than two participants) in the analysis. In the ICUs, the handovers were composed of two parts: the group handover and the dyadic (two participants) handover. Group handovers were shorter and were followed by the dyadic report. It is necessary to ensure that the indices resulting from our analyses follow a *z* distribution in order to compute significance levels (Bakeman & Gottman, 1986). We hence computed the minimal number of transition for reaching a *z*-score distribution. We used

Bakeman & Gottman's (1986) formula "$Ns=9m^2/(m-1)$, where $m=k(k-1)^{L-1}.(\ldots)$ L indicates the length of the sequence and k the number of the codes used." (Kauffeld & Meyers, 2008, p. 15). With L=2 and k=8 (7 content categories + 1 non content category), the resulting value from this formula is 503. This value is lower than the number of events of any of our sequences; we therefore can be assured that a z distribution is respected in our data. We will test our hypothesis on four 7 * 7 matrices representing the associations between topics (one matrix for each unit), treating diagonals as structural zeros because each topic cannot be followed by itself (Bakeman & Gottman, 1986). We hence perform 42 tests (49 minus 7). A z value of 3.04 is significant at an alpha level of .05 for a two-tailed hypothesis with Bonferroni correction for 42 comparisons.

Examining actual interactions closely is helpful in the process of theorizing (Suchman, 1987). Building on the lag sequential analyses, we will therefore also analyze an excerpt of handovers qualitatively to exemplify how patterned sequences of topics are enacted during the meeting, focusing on typical transitions common to all units.

RESULTS

In this section we first present the distribution of contents across units. We show that there are few differences between units, and that the frequencies of contents are not related to unit type. We then present the results from lag sequential analyses and show that our hypothesis regarding the higher flexibility of handover holds in both the private and public hospital. Finally, we will discuss excerpts that illustrate recurrent patterns in the sequential arrangement of topics.

Profiles of Content Categories

A preliminary and descriptive investigation in the contents of handovers shows that there are not many differences between units. Figure 1 presents the proportions of contents in each unit. State and evolution accounts for approximately 30% of the contents in all units except the ICU of the private hospital where it is slightly more than 45%. Treatment and care accounts for approximately 25% of the contents, except in the ICU of the public hospital where it accounts for a little more than 15% of the contents. Interaction management accounts for 13 to 18% of the coded content of handovers, except in the ICU of the private hospital where it is 10%. Organization accounts for 10% of the content except in the ICU of the public hospital where it is 18%. Finally, Identification, Reason of presence, and Off-task each account for approximately 5% of the overall coded content in each unit.

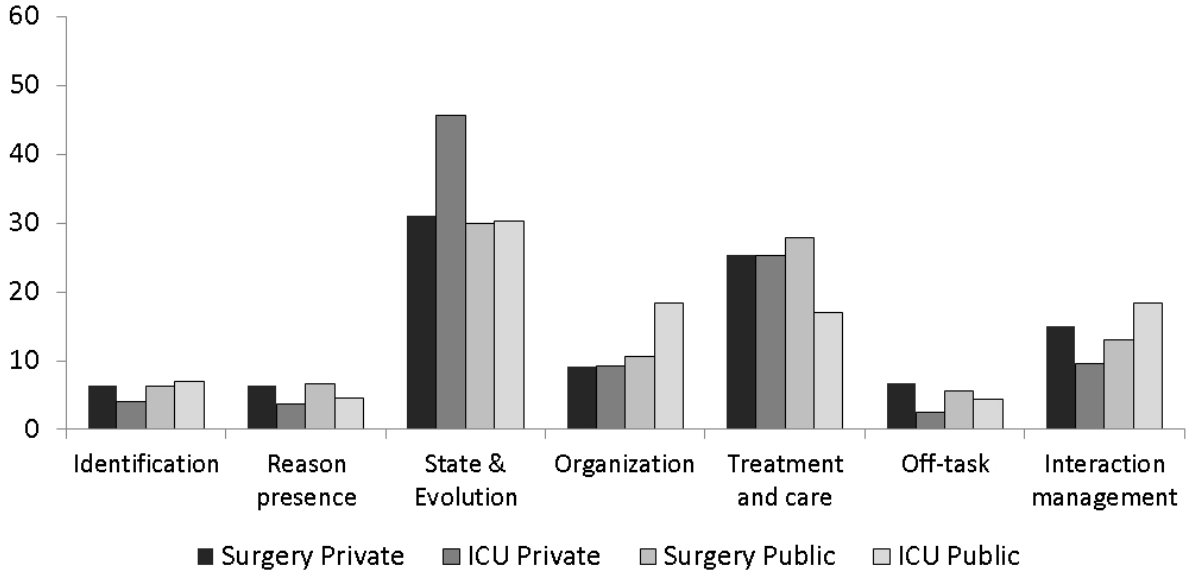


Figure 1. Proportions of utterances classified into various topic categories in each unit (Same-colored bars total 100% in each unit).

There is only limited variation in contents of handovers. Apparently, the group handover routine in all units requires discussing similar issues in approximately the same relative amount of utterances in each unit, suggesting that it fulfills similar functions across units. As discussed above, we are interested in whether the flexibility of topic organization varies between units, i.e., if there is more flexibility in high uncertainty units than in low uncertainty ones.

Lag-Sequential Analysis of Topic Transitions

The significance of the transitional probabilities can be seen in Table 7. In both hospitals, the number of significant transition types is higher in the surgery unit. In the private hospital, there were 10 significant transitions in the surgery unit and 4 in the ICU. Similarly, in the public hospital there were 18 significant transitions in the surgery unit and 10 in the ICU. Hence, our hypothesis is supported: Communication is more flexible in ICUs than in surgery units. We also note that communication is more flexible in the private than in the public hospital.

Table 7.

Significant Transitions in the 4 Units

Surgery Private	**1**	**2**	**3**	**4**	**5**	**6**	**7**
1		**22.11**	**-5.36**	1.38	**-5.50**	2.16	-2.28
2	2.00		-0.23	0.85	-1.28	0.28	-0.84
3	-2.65	**-5.17**		-1.59	**6.02**	-1.81	0.36
4	-1.33	0.85	-1.47		-2.28	-1.19	1.91
5	**-4.68**	**-7.10**	**8.67**	-2.53		-2.63	2.00
6	2.21	0.80	-2.78	1.09	**-3.11**		1.81
7	**5.57**	-0.66	-2.31	0.40	0.30	2.33	

ICU Private	**1**	**2**	**3**	**4**	**5**	**6**	**7**
1		**5.90**	-1.74	0.05	-2.18	0.56	-0.85
2	-1.10		0.37	1.84	0.00	2.35	-0.68
3	-1.74	-2.71		-0.73	**3.10**	0.12	-0.54
4	0.54	0.09	-0.52		-1.51	-0.82	1.89
5	-1.62	0.63	**4.89**	-2.47		-1.38	-0.85
6	0.56	**3.88**	0.81	-0.03	-1.38		-0.59
7	1.45	-2.20	-2.49	1.18	0.99	1.49	

Surgery Public	**1**	**2**	**3**	**4**	**5**	**6**	**7**
1		**15.66**	-0.93	**6.02**	**-6.30**	-0.14	**-3.26**
2	2.96		0.46	2.41	0.62	0.06	**-3.24**
3	**-4.86**	-1.53		-0.61	**10.42**	-2.60	-1.34
4	**3.44**	1.29	0.40		-2.08	0.98	-2.50
5	**-6.61**	**-3.14**	**6.67**	**-3.90**		**-4.02**	1.24
6	-0.14	-1.15	**-3.91**	2.62	**-4.29**		**5.63**
7	**5.13**	-2.83	-2.53	-0.97	-2.31	**4.18**	

ICU Public	**1**	**2**	**3**	**4**	**5**	**6**	**7**
1		**6.96**	-2.92	2.26	**-3.32**	2.19	2.20
2	1.32		-2.01	1.85	0.97	1.09	-0.56
3	**-3.30**	-1.58		-1.08	**4.76**	-0.09	-0.72
4	-0.11	1.87	0.90		**-3.35**	-1.24	1.69
5	**-3.72**	-1.33	**5.77**	-2.42		-0.06	-1.81
6	0.74	1.09	0.46	-0.35	-1.81		0.23
7	**6.56**	-1.83	**-3.59**	**3.34**	-1.55	0.23	

Note: Numbers in rows and columns refer to topics of handover communication: 1. Identification; 2. Reason of presence; 3. State and evolution; 4. Organization; 5. Treatment and care; 6. Off task; 7. Interaction management.

Qualitative Analysis: Shared Patterns Among All Units

The significant positive transitions can be understood as encouraged configurations of the routine and the negative significant transitions as discouraged configurations. What is of particular interest is to examine the structure that is shared among units, and thus can be considered as a requirement for coordination, irrespective of uncertainty. We will present these patterns below, with qualitative analysis of examples, focusing only on encouraged aspects (positive significant transitions). The following transitions were more probable than randomly expected in all 4 units, and thus refer to the shared structure of the routine: from Identification to Reason of presence, from State and evolution to Treatment and care and from Treatment and care to State and evolution.

The example below (an outgoing nurse speaking) will illustrate some of the sequences presented above. In this example, the nurse first provides information permitting to identify the patient. She then provides background information in the form of an explanation of the reason of presence of the patient is in the unit. Next, she informs her colleagues about the volume of liquid that the catheter returned and how much liquid the patient has urinated. After this she provides information regarding the activities she has undertaken on the patient during the previous shift, i.e., she has performed a therapeutic window, which means she has stopped the current treatment (probably because of the patient's intolerance to it). The sequence in this example shows that nurses identify the patient, then the patient's problem, then explain her or his state and the actions performed or to be performed. This shares similarities with problem solving (Newell, & Simon, 1972).

Example 1 (surgery unit public hospital):

1	Outgoing nurse	then Mister Patient3 (Identification)
2	Outgoing nurse	for a radical vasectomy (Reason of presence)
3	Outgoing nurse	regarding his catheter it returned thirty (State and evolution)
4	Outgoing nurse	regarding his diuresis he has five hundred fifty (State and evolution)
5	Outgoing nurse	I performed his window this morning (Treatment and care)

DISCUSSION AND CONCLUSION

This study examined the sequential variety of communication during nursing handover as a measure of its flexibility in different care units varying in uncertainty. It was found that handovers are more flexible in care units that are high in uncertainty than in care units that are lower in uncertainty. Using a recent research approach in organization science, we departed "from organization structure to process" (Becker, 2005, p. 822) as suggested by Pentland (2003), in our study of the routinized aspect of coordination devices, and used this approach to examine how uncertainty is dealt with when the same coordination device is used in contexts varying in uncertainty. We show that uncertainty is managed through higher flexibility of the shift handover when uncertainty is high and more structure when it is low. We hence also addressed issues concerning the increase in standardization of routines and processes in medical organizations (e.g., Athwal, Fields & Wagnell, 2009). As others who have found that flexible behavior might be more efficient than standardization during crises (Stachowski, Kaplan & Waller, 2009), we show that flexible communication might be adaptive in uncertain settings, for instance settings demanding urgent action with rapidly changing states in the system. It follows that standardization might not be appropriate in every context.

These results confirm our hypothesis and the validity of our extension of propositions from contingency theory to flexibility in the performance of coordination devices. In both hospitals, units featuring higher uncertainty had more flexible handovers than units with low uncertainty. We also show that this flexibility of work processes in uncertain settings doesn't mean that patterns are absent. Task relevant patterns are still found in high uncertainty units, but these are fewer than in low uncertainty units.

Our results indicate that personnel of all units collectively follow a problem solving approach (Newell, & Simon, 1972) as exemplified by significant transitions from the *Identification* of the patient to the *Reason for presence* as well as transitions from descriptions of the problem (discussion of the patients' *State and evolution*) to (and from) solutions to the problem (discussion of *Treatment and care*).

Limitations

There are some limitations to this study. It could have been interesting, although costly, to collect data for a longer period of time, and compare content variety (Pentland, 2003) and transitions *within* units also, for instance from week to week.

The results of our study are informed by previous research on contingency theory, showing that flexible coordination in nursing units during the handover allows the units to be at fit (Van de Ven & Drazin, 1985) with environmental contingencies. Yet, future studies could also investigate the relation between the impact of uncertainty on routine flexibility and outcomes in terms of efficiency, personnel satisfaction and other measures that have been reported in previous research.

Implications

Research has not previously examined the work processes composing a single routinized coordination device under varying degrees of uncertainty. We did so in our study of the nursing shift handover. While handovers have been extensively studied in nursing science, this has been done without taking into account insights from organization science. We hope to have shown that both disciplines can benefit from integrated studies. On the one hand, our investigation of handover communication in nursing teams is informed by insights from organization science research, contingency theory (Lawrence and Lorsch, 1967; Thompson, 1967; Tushman, 1979) in particular. This study leads to implications for improving handover design and thus efficiency, i.e., the standardization of handover is likely to fail under high levels of uncertainty, or worse, high uncertainty work-units will not be at fit when performing standardized handovers. On the other hand, our study leads organization science to new insights about coordinating when the same device is used across contexts. Drawing on recent views of routine flexibility (Grote, 2009; Howard-Grenville, 2005; Pentland, 2003) we have shown that sequences of the actual performance of work processes during the nursing shift handover are impacted by uncertainty: Handovers in units facing high uncertainty are more flexible, whereas the performance of this coordination device in units lower in uncertainty is more stable. Thus, when the same coordination device is used across contexts, flexibility in its actual performance allows the adaptation to various degrees of uncertainty. The study of the shift handover also gives us the possibility to bridge the long-lasting research tradition on contingency theory and the emerging field of the detailed study of routines, and thereby proposes an innovative methodological perspective for future contingency theory research.

Chapter 5 – Handovers as Collaborative Activities

In this chapter, I will introduce approaches to the study of collaborative activities that originate in the psychology and sociology of interaction. These approaches allow to study coordination at the micro-level. I then introduce and describe Studies 3 and 4, in which I consider handover as collaborative activities.

The approaches I wish to present below are ethnomethodology, conversation analysis, workplace studies, and Clark's theory of language use. I will also discuss the role of multimodal action in communication.

COLLABORATIVE APPROCHES TO HUMAN ACTIVITIES

Ethnomethodology

The study of routines is closely related to ethnomethodology and conversation analysis. Ethnomethodology was founded by Garfinkel as an alternative to mainstream "top-down" deterministic sociology (Garfinkel, 2002). Ethnomethodology started with Garfinkel's "breaching experiments" (Garfinkel, 1967). In such experiments, Garfinkel and his students forcefully violated interpersonal expectations in order to discover underlying social routines (Garfinkel, 1967). Breeching experiments were later abandoned, and ethnomethodology instead relied on observation and analysis of people performing their daily activities (see Garfinkel, 1991). For the ethnomethodologist, the social order is 'endogenously produced' (Hester & Francis, 2007, p. 3), i.e., created and reproduced at the level of the interaction by the coparticipants. Ethnomethodology focuses on the study of routines (which are called methods) that ordinary people (non-scholars) use to make sense of the situations they are in and deal with them in an accountable manner (Hester & Francis, 2007). *Accountable* in the literature of ethnomethodology means intelligible or explicable (Ten Have, 2004). In this view, people's motives and understanding are constantly accounted for by their actions or words (Attewell, 1974), thus allowing them to collaboratively reduce uncertainty in their daily activities. Any situation can hence be described accurately by the inspection of routines (the methods of people for doing and understanding), without recourse to high order theories, although it is possible to consequently relate observations to theory in a bottom/up way (Garfinkel, 1967). Ethnomethodology is concerned with the study of "the properties of common sense activities as a practical organizational accomplishment" (Garfinkel, 1967, p. viii), or the ways people make sense of the situations they are involved in, and coordinate

everyday activities, in an orderly manner (Heritage, 1984). Its goal is to describe the methods that people use to understand the situations they are in and to act accordingly. These methods include the negotiation of this understanding which in turn affects the situation as it is lived (Attewell, 1974). It follows that the meaning of a situation is never given, but always actively and collectively constructed by members as a part of their process of understanding and acting upon the meaning they give to the situation, in a recursive manner (Zimmermann & Pollner, 1970). This is not to say that there are no regularities. On the contrary, regularities are present in the routines (methods) members use to understand and enact those understandings (Garfinkel, 1967) and in the context they are embedded in (Heritage, 1984). Because members negotiate their understanding, and act in an accountable manner, the ethnomethodologist can study the way members routinely organize their actions by the observation of these practices (Adler, Adler & Fontana, 1987). Ethnomethodologists have for instance produced significant knowledge about the way people coordinate at work (e.g., Baccus, 1986; Heath & Luff, 2000; Mondada, 2007; Suchman, 1987). For ethnomethodologists, "social action and communication are mutually constitutive" (Butler, Fitzgerald & Gardner, 2009, p. 3), which implies that the study of one aspect requires the study of the other.

One weakness of ethnomethodology is that it bears on observations of actions that are necessarily indexical, i.e., related to the knowledge of the participants prior to the examined situation, which implies a requirement for context on the part of the observer (Garfinkel, 1967). Additional data collection (e.g., interviews) can expand the available contextual information, but important parts of it will necessarily never be accessible to the researcher.

Conversation Analysis

Conversation analysis is a subfield of ethnomethodology which is specifically concerned with the description and understanding of the way people negotiate the social order in natural conversations, with an indifference to the motives of the individuals, but focusing instead on the interplay of spoken action and displayed understanding of co-participants (Sacks, 1984). Hence, conversation analysis isn't affected by the weakness mentioned at the end of the previous subsection (Attewell, 1974). The sociologist Sacks, the founder of conversation analysis, was, at least originally, not interested in conversation per se, but in the social order, and studied conversation because it could be tape-recorded and hence reexamined at will, which allows to refine the analysis and discover regularities in the data (Sacks, 1984). By repeated and 'unmotivated' (Sacks, 1984, p. 27) scrutiny of fragments of

interaction, conversation analysis deals with the way participants structure the interaction in an orderly manner, according to the socially constructed rules they orient to (Schegloff & Sacks, 1973). The approach is to attempt to "transform (…) 'what happened' from a matter of a particular interaction (…) to a matter of interactions as products of a machinery" (Sacks, 1984, p. 26). As Coulmas (1981) points out, there are standardized routines in conversation which aim at the reduction of uncertainty, (i.e., make things predictable for the coparticipants) in types of exchanges that occur frequently (e.g., greetings).

At its inception, conversation analysis aimed at the inspection of regularities during talk-in-interaction in casual conversation. Since then it has been widely used (for a review, see Drew & Heritage, 1992) in the study of interactions at work (institutional talk): the way people routinely accomplish work-related activities through conversation. Transcripts of conversation are produced and used as a basis for the analysis and to present the results in printed format, but only the recordings are considered as data (Heritage & Atkinson, 1984). The transcription is hence a significant part of the analysis, which is performed and refined by repeated inspection of the recorded material and proper modification of the transcription. Conversation analysis has recently been extended in its subfield called multimodal analyses (e.g., Goodwin, 2000) which aims to study the interplay of bodily (non-verbal) actions and talk. These methods combined allow the study of organizational routines as situated, emergent and embodied conducts. "While these approaches have their roots in sociology, they are now widely used in a diverse range of disciplines, including linguistics and communication, psychology, education, and anthropology" (Butler, Fitzgerald & Gardner, 2009, p. 1).

Workplace Studies

Workplace studies focus on the micro-analysis of work activities as well as the use of technology to coordinate these activities, and originate in several disciplines - but mostly ethnomethodology and conversation analysis (Heath, Knoblauch & Luff, 2000). Heath and colleagues point out that "despite the variety of approaches found within workplace studies, they all reflect a prevailing commitment to the analysis of technology in action, and in particular to the investigation of the ways in which tools and artefacts feature in the accomplishment of practical organizational conduct" (Heath, Knoblauch & Luff, 2000, p. 308). Workplace studies often aim at the design of better systems (e.g., Suchman, 1987) and allow to highlight the difficulties workers encounter in their use of technology (Luff, Hindmarsh & Heath, 2000) and contrast good and poor design of technology (Heath & Luff,

2000). Some workplace studies also are interested in how distributed cognition originates from the interactions between individuals and between individuals and objects (e.g., Hutchins, 1995). As their focus on collaboration through technology use suggests, workplace studies are not limited to face-to-face interactions. Studies have for instance examined how workers use CCTV and videoconferencing to monitor the status of distant environments (Goodwin & Goodwin, 1996; Heath, Luff & Sanchez Svensson, 2002) and to achieve collaborative activities (Mondada, 2007). In the next paragraphs, I will describe 3 studies. I will move from a study of work that is not a workplace study to the prototype of workplace studies.

The macro perspective in studies of work can be exemplified by the following research. The ethnomethodologist Kawatoko, in an analysis of the "flow of loads and flow of work in a refrigerated warehouse" (1999, p. 318), examines how goods and activities are distributed in a system that is composed of wholesalers, a warehouse and local producers and importers. The focus of the study is on the warehouse, in which the author investigates two main elements: the office and the cold storeroom. The office coordinates the entries and exits of goods (from and to the storeroom) with the wholesalers and the local producers and importers. Kawatoko investigates processes of flow in the warehouse by providing a comprehensive description of the organization of work activities. But he doesn't examine the detail of interactions between individuals, or between individuals and the system. Because of this lack of investigation of actual natural interactions and this macro focus, this study of work is not what is usually called a 'workplace study'.

The study of Orr (1996) is closer to workplace studies. This study focuses on how repair technicians discuss the problems they encounter with copiers and the customers. A large part of the analysis is devoted to the description of the setting, such as the territories of activities of the technicians, and to the stories technicians share in order to understand technical difficulties and social matters with the customers. The study also examines how the technicians use the documentation of the machines in their repair activities. The study is reported mostly in the form of descriptions, observations, commentaries, and more rarely analyses of excerpts of actual talk. It can be noted that author relies more on field notes (including reports of discussions) than on recordings of actual interactions.

Workplace studies can be better exemplified by Suchman's (1987) ethnomethodological anaylsis of the use of copiers as situated action, with a focus on the expert help system (an interface that helps the user in his operations on the machine). In this study, the author examines turn-taking (Sachs, Schegloff & Jefferson, 1974) in actual

interactions between users and copiers, as "situated action cannot be captured empirically through either examples constructed by the researcher, paper-and-pencil observations, or interview reports" (Suchman, 1987, p. 118). Suchman opted in favor of an "uncontrolled experiment" (p. 121) in which users were required to perform several tasks selected for their difficulty. The interactions between participants, and participants and machines were filmed. In her analysis, Suchman examines these actual interactions. She details how participants and machines get coordinated or fail to achieve coordination in getting the required tasks done.

Clark's Theory of Language Use

This theory draws on the foundations of conversation analysis, pragmatics and speech act theory (Bangerter & Mayor, 2011, Clark, 1996). Language originates in the joint activities people engage in in everyday life (Clark, 1996, 1999). Language itself is a form of joint activity (Clark, 1999; this assumption is shared with conversation analysis). People have to coordinate with one another both on the process and the content of conversation (Clark, 1996; Clark & Brennan, 1991). How participants manage this is briefly presented below.

Coordination of Process.

The role of language in coordinating the activities that people perform together is usually overlooked (Clark, 1996). There are two tracks in such joint activities. One track is the "official business" (Clark, 1996, p. 389) of the encounter, a basic joint activity. The other track, the coordinating activity, serves to coordinate the first. One signaling component of the coordinating activity is speech, but gestures, gaze or para-verbal signs can be used as part of a coordinating activity (Clark, 1999). There is a hierarchical organization of joint activities (Bangerter & Clark, 2003). The hierarchy emerges out of people's coordination attempts. Entering and exiting a joint project is to perform a vertical transition, whereas navigating at the same level (e.g., within a sub-project) is to perform a horizontal transition (Bangerter & Clark, 2003).

Two papers in particular (Bangerter & Clark, 2003; Bangerter, Clark & Katz, 2004) have thoroughly examined how people use vertical and horizontal transition makers to coordinate their joint projects. Bangerter and Clark (2003) have shown that vertical transition markers are used to enter and exit structured tasks. People also navigate horizontal transitions using other discourse markers. This is also the case when it comes to navigate phone conversations (Bangerter, Clark & Katz, 2004).

Coordination of Content.

Participants in conversation try to reach common ground about the discussed matter. Common ground refers to the knowledge that people believe they share (Clark, 1996). Part of common ground is made from presuppositions originating from, for instance, a shared cultural membership between participants, or a shared domain of competence (their communal common ground; Clark, 1996; Clark & Bangerter, 2004) or shared experiences (e.g., Schober & Clark, 1989) including previous conversations (their personal common ground). For instance, when an utterance is ambiguous, the addressee will judge of its meaning on the basis of the most salient interpretation relative their common ground (Clark, 2006; Clark, Schreuder & Buttrick, 1983). Common ground is what participants start with at the beginning of a conversation, even when they don't know each other, and what allows them to communicate. Each contribution is composed of a presentation phase and an acceptance phase. The proposition phase is the actual transfer of information, and the acceptance phase serves to coordinate that transfer, by showing that the transferred contribution has been understood, a process named grounding (Clark & Brennan, 1991). Therefore, each contribution to conversation extends the common ground of participants (Clark & Schaefer, 1989). Speakers try to establish that they "[are] being attended to, heard, and understood" (Clark & Schaeffer, 1989, p. 259) well enough for their current purpose (Clark & Brennan, 1991). During conversation, speakers ensure their co-participants understand what they say by monitoring their reaction online, and if necessary adjust their utterances in the course of their production (Clark & Krych, 2004). They attend to displays of understanding at 4 different levels: They make sure that the addresses hear that they are talking, that they understand the words they are saying, that they understand the meaning of those words in context, and the continuous commitment of their addressees.

There are five sources of evidence of understanding (Clark & Schaeffer, 1989): continued attention, initiation of the relevant next contribution, acknowledgement, demonstration (e.g., reformulation) and display (verbatim repetition). Depending on the context, continued attention might be an appropriate source of evidence, while verbatim repetition might be necessary in another context. The relevant evidence for understanding also depends on the medium of communication - the possibilities it provides participants with (its richness): copresence, visibility, audibility, cotemporality, simultaneity, sequentiality, reviewability and revisability (Clark & Brennan, 1991). Rich media provide the participants with a lot of the above possibilities. Poor media provide them with few of them and hence require stronger evidence of understanding. Face-to-face interactions offer the more of these possibilities (6 out of 8), whereas e-mail as well as letters the least (2 out of 8).

During conversation, participants develop and refine conceptual pacts, partner-specific ways of naming discussed objects (Clark & Brennan, 1991). In their conversation, participants tend to reuse these conceptual pacts when talking about already discussed objects even though the conceptual pacts can be over-specific in a renewed context. This shows that participants rely on common ground in their way of referring in conversation (Brennan & Clark, 1996). It is noteworthy that overhearers have difficulty understanding the conceptual pacts that others developed, thus showing not only the partner-specificity of conceptual pacts, but also the importance of their interpersonal negociation (Schober & Clark, 1989).

Multimodal Analysis of Human Conduct

In the previous subsections, I presented some of the methodological and theoretical approaches to the study of human communication and conduct. The improvement of technological capabilities in the capture and analysis of human behavior, like high definition camcorders, manual (e.g., ELAN; Brugman & Russel, 2004) and automatic (e.g., Noldus FaceReader) video coding software; as well as portable digital audio recorders and speech analysis software (e.g., Praat; Boersma & Weenink, 2007), allows to attain an unprecedented precision in the study of interactions. It is now possible to align several tiers of action and analyze the simultaneity and sequentiality of several events, and to use specialized software to detect and categorize behavior without human intervention (for a review, see Moeslund, Hilton & Krüger, 2006). In this section I will first briefly introduce the debate on the contribution of nonverbal behavior to communication and research examining the coordination of content and process in communication (Clark, 1999). I will then review literature related to the methodological aspects of the analysis of multimodal action.

It has been argued that people achieve the coordination of their joint actions because "communication is usually anchored to the material world" (Clark, 2003, p. 243). Coordination of process and content relies as much on speech as it does on the performance of visible actions (e.g., Clark & Krych, 2004). But there is a debate on the communicative nature of gestures in interaction. For instance, Kraus and Hadar (1999, p. 93) argue that "the gestural contribution to communication is, on the whole, negligible" and that it serves mostly to facilitate lexical retrieval (facilitating speech). On the other hand, researchers such as McNeill (1985) and De Ruiter (2000) argue that the production of gestures and talk are part of the same communicative (and cognitive) process, and that gestures do indeed participate in communication. In his review, Kendon (1994) concludes that addressees partly rely on speakers' gestures in forming their understanding of their communicative intent and that speakers use gestures for communicative purposes. The finding that interactive gestures are

produced at a higher frequency when research participants are in presence of each other compared to when they are alone (Bavelas, 1994) support this claim. Moreover, addressees reorient their gaze to speakers' hand and arm movements when these exit their field of view, thus showing that they pay attention to the gestural components of interactions (Streek, 1994).

Much research is in accordance with the postulate (e.g., Clark, 1999) that nonverbal actions play an important role in joint activities. Some other examples are provided below.

Coordination of process. Entries in interaction are accomplished by means of coordinated postural changes and gestural action (Mondada, 2009). Participants partly rely on gestures (Mondada, 2006b) and gaze (Bavelas, Coates & Johnson, 2002) to negotiate turn-taking. Speakers rely on changes in gaze direction coordinated with speech production in order to indicate how to parse speech related to reported events and speech related to the current situation (Sidnell, 2006). Position, gestures, and gaze direction are indicators of the engagement and disengagement of participants (Goodwin, 2002).

Coordination of content. Some gestures have a conventional meaning and are often used instead of speech (Ekman, 2004). Gestures are performed in ways that are relevant for current communicative purposes (Streek, 1993). Addressees convey their understanding of current talk in part using gestures (Streek, 1994). Pointing allows speakers to specify or replace verbal deictic references (Bangerter, 2004). Facial gestures are an important part of communication as 40% of facial semantic displays are not expressed within speech (Bavelas & Chovil, 1997). Participants in dialogue also rely on inscriptions coordinated to their verbal productions to establish meaning (Streek & Kallmeyer, 2001).

The analysis of video material in research has started approximately at the time of the commercialization of affordable recording equipment. For instance, Kendon (1967, 1970) analyzed gaze patterns of unacquainted participants who were asked to get to know each other, and the multimodal conduct of participants to a discussion. And Goodwin (1979) analyzed the function of gaze in sentence construction. As the material has become more portable and more complex since that time, scholars have developed guidelines for the analysis of multimodal action. Video material is indeed a necessity for the study of emergent conduct (Suchman, 1987). When possible, recordings need to be performed in a way that conserves the basic properties of the observed situation, such as using of wide angle lens recourse to multiple cameras (Heath & Hindmarsh, 2002; Mondada, 2006c). The filming can be performed using a fixed angle (Heath & Hindmarsh, 2002) or a mobile camera (Mondada, 2006c). Ideally, it should include all participants and allow for capturing changes in participation frameworks (Mondada, 2006c). The transcription is also extremely important and should include the ordering and simultaneity and duration of events (e.g., coordination of gestures, gaze and speech; Heath & Hindmarsh, 2002; Mondada, 2006c).

I have shown above that visible actions are used in conjunction with speech to coordinate process and content. The importance of studying these multimodal aspects in professional settings has also been repeatedly shown in the literature (e.g., Goodwin, 1994, 1995; Goodwin & Goodwin, 1996; Heath, Luff, Sanchez Svensson, 2002; Mondada, 2006a, 2007; Streek & Kallmeyer, 2001). I will now present Studies 3 and 4, which analyze verbal and visible components of interactions during nursing handovers.

STUDIES 3 AND 4: HANDOVERS AND INTERPERSONAL COORDINATION

The examination of how people reduce uncertainty through routines of verbal coordination has been advocated in seminal papers of organization science (e.g., Tushman, 1979), but this has seldom been undertaken in the field. The nursing shift handover is an ideal setting for such endeavors as their aim is to reduce uncertainty in clinical activities by means of verbal communication. Handovers are meetings which are attended by participants who have two main roles: outgoing nurses and incoming nurses. In a classic view of communication (e.g., Shannon & Weaver, 1949), the outgoing nurses are the emitters and incoming nurses the receivers of information. For instance, the Joint Commission Center for Transforming Healthcare (2011, para. 2) defines handovers as follows: "A hand-off process involves 'senders', the caregivers transmitting patient information and releasing the care of the patient to the next clinician, and 'receivers', the caregivers who accept patient information and care of the patient". Studies of handovers have usually drawn upon such a view, for instance comparing the content of handovers with the content of the patient documentation (e.g., Sherlock, 1995). The collaborative views of interaction presented above postulate something very different: Communicating is not just about one person sending a message and the others receiving it. It is a joint activity that all participants collaboratively achieve. For instance, how to refer to things is negociated by the participants (Clark & Wilks Gibbs, 1986). Speakers monitor the understanding of co-participants while talking and adapt what they say accordingly (Clark & Krych, 2004), and listeners contribute to narrations of past events (Bavelas, Coates & Johnson, 2002). Another aim of my dissertation is hence to explain how uncertainty is collaboratively resolved during the handovers. This investigation requires the use of specialized methods that deal with verbal components of interaction at the micro level, and that take their multi-participant nature into account. It also requires a theory that accounts for the coordination of joint actions by participants.

Conversation analysis provides such methods: As presented above, conversation analysis allows for the close investigation of interactional data. This recourse to conversation analysis allows for the examination of excerpts of interaction during handover, showing how

participants in the handover collaboratively accomplish coordination during selected phases of the interaction e.g., while producing direct reported speech and while entering, maintaining, suspending or existing the handover viewed as a joint activity.

Workplace studies have investigated work practices in relation to the use of artifacts in a diversity of settings, which can be investigated by recourse to multimodal analyses. They have highlighted the situated nature of work and the moment-by-moment coordination within teams, and between individuals and artifacts.

Clark's theory of language provides a theoretical framework for the exploration of joint activities such as handovers. Clark's theory considers that there are two tracks in joint activities (e.g., Clark, 1996), one of which serves to coordinate the content of the joint activity and the other its process.

Distancing myself from the comparative framework involved in Studies 1 and 2, I will therefore examine how participants deal with the uncertainty at the level of the components of interactions. I will show how they orient to the problem they have to solve in order to absorb uncertainty and continue the task at hand. Two aspects of uncertainty are dealt with here: non-expectability which is created in the handover routine when nurses have to explain non routine care situations (coordination of content, Study 3) and non-expectability that is related to perturbations and interruptions of the handover which for instance require nurses to negotiate suspensions in the activity (coordination of process, Study 4). These studies and the relevant literature are presented below.

Study 3

In Study 3, we are interested in the way nurses reduce the uncertainty related to non-routine events in the interaction, through the use of narratives (or stories, considered interchangeable here) featuring direct reported speech (DRS). Below, I briefly review relevant literature on narratives and DRS and then present our study. As the literature review in Chapter 6 focuses on the DRS literature, I will present the literature on narratives more thoroughly here.

Narratives.

The study of narratives (storytelling) in organizations has emerged in the recent years as it has been shown that storytelling is a way to share values and norms (see Gabriel, 2000), make sense of unexpected situations (Garud, Dunbar, & Bartel, 2011), and to induce organizational change (Feldman, Sköldberg, Brown & Horner, 2004) such as diffusion of innovation (Greenhalgh, Robert, MacFarlane, Bate & Kyriakidou, 2004). The interest in

studying narratives is also that they provide unique information regarding the issues that participants face in their daily life and the context of their activities (Franzosi, 1998) including in organizations (Feldman, Sköldberg, Brown & Horner, 2004). Narratives "(…) are partial representations and evocations of the world as we know it." (Ochs & Capps, p.21). By recourse to narratives, people collectively make sense of the situations they are involved in, particularly situations that cause problems or subvert expectations (Garud, Dunbar, & Bartel, 2011; Orr, 1996).

Organizational narratives have hence received significant attention in organization and management theories, albeit not without skepticism (for a review, see Rhodes & Brown, 2005). There are many ways to study narratives. The researcher can focus on the themes of the narrative, its structure, the interaction during the production of the narrative, or the social actions performed during the narrative (Kohler Riessman, 1993). I will briefly describe 2 aspects: the structure of narratives, and collaborative processes in narrative production.

Not all events are described in narratives, but only those which are worth reporting (Labov, 2006). The reporting value of an event is a function of its non-routineness (e.g., incidents, unusual situations; Labov & Waletzky, 1967/2003; Robinson, 1981). Hence, before producing the narrative, the narrator must select the event that is the most worth reporting, and construct a series of events that precede (Labov, 2006). In order to constitute a narrative, the events must be organized according to their temporality and causality (Labov & Waletzky, 1967/2003). "Any sequence of clauses that contains at least one temporal juncture is a narrative" (Labov & Waletzky, 1967/2003, p. 88 in the reprint of 2003). But narratives usually feature 5 parts: the *orientation* (introduces the narrative and provides background information), the *complication* (the main part of the narrative in which events are presented - the most important part), the *evaluation* (provides an evaluative reading of the story), the resolution (the climax of the story), the *coda* (the transition from the time of the narrative to the time of the narration) (Labov & Waletzky, 1967/2003).

There is collaboration in the production of narratives. For instance, narratives are situatedly produced in interaction, as they are sequentially related to previous talk and often occur at a change of turn in conversation (Jefferson, 1978). Goodwin (1984) has shown that participants (not the narrator alone) actively co-construct the story, and pointed out the particular role of the addressed recipient of a story in its production. Listeners can contribute to the narrative by verbal and non-verbal actions (Bavelas, Coates & Johnson, 2002; Goodwin, 1984). By means of short moments of mutual gaze, narrators invite reactions from their listeners (Bavelas, Coates & Johnson, 2002). The task of listeners is not thus not only to understand the story, but also the narrator's stance, and respond appropriately (Goodwin, 1984).

Stories are found to be more vivid when they feature direct reported speech occurrences (DRS, reports of previous talk presented as verbatim reproductions, Tannen, 1983), possibly because of the tense variation they involve (Schiffrin, 1981), i.e., reporting past events in the (historical) present tense. I will now turn to a literature review on DRS, before proceeding to the description of Study 3.

Direct Reported Speech.

Reports of past speech are important aspects of everyday conversations and can be done directly (DRS), as in: *she said "we are going to be late"*, indirectly, as in: *she said that they were going to be late* or more rarely in a mixed form, as in: *she said that they are going to be late* (Cappelen & Lepore, 1997). I will focus on DRS here. There are many DRS introductory devices such as *say*, *thought*, *tell*, *ask*, *go*, *be like* (Tannen, 1986). DRS may sometimes not be introduced, a phenomenon known as 'zero quotatives' (Mathis & Yule, 1994). Even though these occurrences of DRS are not introduced, listener still can recognize them on the basis of the features of the DRS occurrence. These are (compared to encompassing talk): a shift in prosody, in verb tense, and in deixis (e.g., in: *Agnes told me "my sister's coming today"*, *my* doesn't refer to the narrator but to Agnes; see Holt, 1996). Shift in gaze direction which can be used to render the boundaries of the DRS occurrence (Sidnell, 1996). DRS is often preceded by background information that permits to better understand the quote (Philips, 1986).

Although DRS implies accuracy in report original speech (Li, 1986), the use of DRS is not to report past interaction in an accurate manner (e.g., Tannen, 1986). It is "constructed dialogue" (Tannen, 1986, p. 314). Narrators are quite inaccurate when it comes to report speech verbatim, especially when their goal is to entertain (Wade & Clark, 1993). Indeed, the function of DRS is to depict and demonstrate selected aspects of the interaction (Clark & Gerrig, 1990). Speakers often use DRS to implicitly convey evaluations of the source's speech and actions, and occurrences of DRS are often followed by explicit evaluations by the recipient (Holt, 2000). DRS is often accompanied by gestures and changes of posture that highlight the quotation (Sidnell, 1996).

DRS is often used in narratives in which it is positioned at their climax (Holt, 2000). This suggests that DRS might highlight the most important event of a narrative, and potentially the reason of its recounting. The use of DRS has not yet been explored in relation to the telling of non-routine situations during shift handover settings.

Description of Study 3.

In Study 3, we examine the use of DRS during handovers with a focus on nurses' telling of non-routine situations. We investigate the sequential placement of DRS in recounting events, and show how participants in handovers collaboratively make sense of these situations through the recourse to narratives featuring DRS.

In this study, I identified the occurrences of DRS in 30 handovers from 2 nursing care units. Based on the transcripts of handovers I reliably coded the quoted source of each occurrence of DRS (Self, Patient, Colleague, Physician and Other). Talk preceding these occurrences was analyzed quantitatively using content analysis and loglinear analyses. I segmented the talk preceding DRS and coded the content of the 3 utterances preceding each DRS occurrence (Situation/medical order, Action and Reported speech, Other). We also analyzed several episodes of DRS using conversation analysis. Quantitative analyses show that there were differences regarding the quoted sources between the two units, and that background information was more often produced before DRS. Conversation analysis revealed that the use of narratives and DRS during handovers allows nurses to justify their own conduct or implicitly evaluate other's conduct in non-routine situations. The recourse to narratives allows them to make sense of unexpectedness and evaluate unusual behavior without producing explicit statements. In the tradition of workplace studies, we have also examined how nurses coordinate with artifacts while producing narratives during handovers.

Study 4

In Study 4, I am interested in the role of the management of the interpersonal territoriality in the collaborative reduction of uncertainty related to unexpected events in joint activities, i.e., perturbations of the nursing handover. I will describe this study after a short literature review of boundary management in interaction.

Territoriality and Boundary Management.

There is an interest in organization theory for the way people manage their territory in the workplace (for a review see Brown, Lawrence & Robinson, 2005). The literature has shown that territoriality creates bonds within a group (see Brown, Lawrence & Robinson, 2005), which is an important factor in facilitating interpersonal communication. People in organizations have a sense of 'psychological ownership' (e.g., their desk, their space; Pierce & Koastava, 2003) and react to territorial infringements (Brown & Robinson, 2010).

People exhibit territorial behavior in activities involving interactions (Scheflen & Albert, 1975), as they take into account their interactional territory in the organization of their actions (e.g., Ashcraft & Scheflen, 1976). Joint activities such as shift handovers require the coordination of participants' individual actions (Clark, 1999). Joint activities have a hierarchy and boundaries (Clark, 1996) that also must be actively managed by participants (see above). Perturbations (e.g., task interruptions) can impact the performance of such activities (Chevalley & Bangerter, 2010) and therefore require supplementary boundary management.

The interactional territory is the space that is shared by the members of a group (Kendon, 1990; Lyman & Scott, 1967). It is collaboratively shaped by the participants in interaction (e.g., Mondada, 2009) and can be reshaped in relation to perturbations that occur during the interaction (Aschcraft & Scheflen, 1976; Luhman, 1987). Indeed, people tend to seek the preservation of their territory (Scheflen & Albert, 1975; Taylor & Brooks, 1980). Non-members of a group also respect such boundaries (e.g., Cheyne & Efran, 1972; Goffman, 1963) and act in ways that show deference to the interactional territory when they have to intrude (Ashcraft & Scheflen , 1976; Pillet-Shore, 2010).

A way participants can manage their interactional territory is by showing availability or unavailability to interact (Goffman, 1973). Indeed, participants give one another acknowledgements of such availability (see Schegloff, 2004), and proof of availability can also be requested verbally and non-verbally (see Goodwin, 1981; Heath, 1984). When such proof is given, participants can enter interaction or continue interacting (Goffman, 1973). When participants fail to show their availability, for instance because of a simultaneous involvement (Goffman, 1963), they can be considered as having exited the interactional territory, or not having entered it yet. Re-entering the interpersonal territory also requires interpersonal work (Chevalley & Bangerter, 2010).

While there has been continued interest in the way people enter, exit, resume and maintain their interactional territory and joint activities (e.g., Albert & Kessler, 1968; Bangerter & Clark, 2003; Chevalley & Bangerter, 2010; Mondada, 2009; Pillet-Shore, 2010; Sacks Schegloff & Jefferson, 1974), these issues have not yet been explored in nursing handovers.

Description of Study 4.

In this study, I investigate the management of the interactional territory during handovers by focusing on perturbations. Perturbations are unexpected events that pose a threat to the integrity of the interactional territory of handovers, as they can lead to rupture in task continuity (interruptions). I will analyse how nurses deal with these perturbations and contrast this to the management of entries and exit of the interactional territory at the beginning and ending of handovers.

In this study, I collected data in four nursing units from two hospitals (2 surgery units and 2 ICUs; same data as in Study 2). I filmed the handovers and took notes of perturbations during one week in each unit. In all four units, we reliably coded the perturbations for source: caregivers, physicians, mixed groups, phone, patient; and type: *entry* (with/without verbal interaction), *exit* (with/without verbal interaction), *verbal interaction* (without entry or exit), and *Other*. In one unit, I transcribed the occurrences of perturbations in detail and performed micro-analyses inspired from conversation analysis to explore the management of the boundaries of the interpersonal territory of handovers. Results show perturbations are frequent during handovers (approximately one interruption each 3 minutes) in 3 of the units, but almost inexistent in one unit. The absence of perturbation in this unit is explainable by the fact that gatekeepers (outgoing nurses) are posted outside the handover room, and take care of perturbations and urgent patient situations. In all other units, nurses are the most frequent sources of perturbations (2 thirds approximately). There is some variety regarding the type of perturbations in these units. Whereas the beginning and ending of handovers is performed mostly by explicit verbal statement, the management of perturbations is mostly performed non verbally (e.g., by showing availability or unavailability to the perturbation). Nurses have recourse to strategies to handle perturbations. These strategies allow them to minimize the impact of perturbations on handovers.

In the next 2 chapters, I report on these two studies in more detail.

Chapter 6 – Reported Speech in Conversational Storytelling During Nursing Shift Handover Meetings (Study 3) [4]

ABSTRACT

Shift handovers in nursing units involve formal transmission of information and informal conversation about non-routine events. Informal conversation often involves telling stories. Direct reported speech (DRS) was studied in handover storytelling in two nursing care units. The study goal is to contribute to a better understanding of conversation in handover and use of DRS in storytelling in institutional contexts. Content analysis revealed that the most frequent sources quoted were oneself and patients, followed by physicians and colleagues. Further, DRS utterances are preceded by reports of situations, actions and other reported speech, often constituting the climax of a story. Conversation analysis revealed how DRS participates in multimodal re-enactments, complaints about patients, and justifying deviations from medical protocols. Results inform understanding of the uses of DRS in institutional storytelling, showing how they index relevant membership categories and related knowledge and expectations, and serve as resources for making sense of non-routine events.

INTRODUCTION

High-reliability organizations like hospitals maintain task continuity around the clock (Roberts & Bea, 2001; Weick & Roberts, 1993). Thus, work is often organized in shifts. Shift changes occur several times a day and are punctuated by *shift handover meetings* (hereafter: handovers) during which relevant task information is transferred from an outgoing shift to an incoming one. In nursing care units, handovers serve to transfer relevant patient information. Handovers are complex events (Grosjean, 2004): They are formal communicative routines conducted according to specific roles, while also allowing informal conversations. Informal conversation during handover serves to make sense of ambiguous, non-routine events, thereby helping nurses construct and update a shared understanding of the current state of the care unit. However, little is known about how informal conversation facilitates the emergence of shared understanding. Much information transferred during handovers is in narrative form, e.g., stories about noteworthy incidents, circumstances justifying a medical order, or conflicts

[4] Bangerter, A., Mayor, E., & Pekarek Doehler, S. (2011). Reported speech in conversational storytelling during nursing shift handover meetings. *Discourse Processes, 48*, 183-214.

with patients. Stories are vivid, collectively elaborated, grounded in experience, and constitute important means of creating shared understanding in professional groups (Orr, 1996). They may thus be a means by which nurses create shared understanding. Despite the theoretical and practical importance of understanding stories in handover conversations, there has been little research on this topic.

Here we study the interactional functioning of *reported speech* in handover storytelling. Reported speech (RS) is using "talk to report talk" (Clift & Holt, 2007). RS can be direct or indirect. In direct reported speech (DRS), or quotation, one purports to use the exact words of a speaker. In indirect reported speech (IRS), one adapts the speaker's words to the current circumstances (Clift & Holt, 2007). DRS and IRS are very different linguistic acts: In DRS, speakers *depict* a selected aspect of the speech they are citing, whereas in IRS, they *describe* it (Clark & Gerrig, 1990). Depiction makes DRS a potent narrative device. As such, reported speech is ubiquitous in storytelling.

We present results of both quantitative content analysis and qualitative conversation analysis. Content analysis reveals the various sources quoted in DRS (patients, colleagues, doctors, oneself) as well as how DRS utterances are embedded in stories. Conversation analysis of selected excerpts shows how DRS is used as a resource for flagging non-routine events that happened during patient care and for constructing accountability of the nurses' professional conduct. Taken together, results suggest that DRS constitutes an important tool in the ongoing social construction of shared culture in care units through storytelling. We now review research on discourse in handover and RS before presenting our study.

Discourse Processes in Nursing Handover Meetings

Nursing handover is a communicative routine that takes many forms. For example, it may involve all shift members or only pairs of nurses responsible for particular patients; it may take place at the bedside or in an office; it may be fully interactive, fully written, or even tape-recorded (Kerr, 2002). In many settings, however, it is an organized dialogue (Coulmas, 1981) between representatives of the outgoing and incoming shift. Topics are typically organized according to the sequence of patients in the unit. Obviously, outgoing members have more information to contribute initially and thus talk more (however, incoming members may participate by asking questions or introducing information from earlier meetings, Bangerter, 2002). There are also implicit rules governing rights to the floor, with high-status personnel talking more (Grosjean & Lacoste, 1999; Grosjean, 2004).

Within this routine, however, Grosjean (2004) has documented the emergence of polylogues (spontaneous multi-participant talk). In such situations, extant rights to the floor (the participation framework; Goffman, 1981) are temporarily suspended, allowing all participants to potentially contribute. For example, in a pediatric unit, she found that discussing the juvenile patients often led beyond strictly medical topics, e.g., emotional issues or gossip. In such moments, nurses and auxiliaries can talk on an equal footing in a storytelling mode rather than a clinical reporting mode. Data on storytelling during handover is sparse. However, Grosjean and Lacoste (1999) noted a large variety of story forms during handover, including minimal narratives, concrete, emotional stories, argumentative accounts, talk about dysfunctional aspects of the workplace, or "war stories" about trials that were overcome. They also noted that these stories may serve different collective purposes in different care units.

Handover meetings are thus routinized dialogues with periodically emerging informal conversations that feature stories. Because informal conversations are more time-consuming, less task-focused in a narrow sense, commentators have questioned the utility of handover, arguing that the content transmitted often is poor or duplicates written records (Sexton, Chan, Elliott, Stuart, Jayasuriya, & Crookes, 2004). There have been influential initiatives to standardize oral communication in shift handover, e.g., focus charting (Lampe, 1985), a technique for structuring information content. However, health care delivery systems must ensure patient safety. It is here that informal conversation may have important functions in handover meetings beyond transmission of relevant patient information in a narrow sense. First, the information sharing, serendipitous cross-checking and updating of task-related common ground that is a natural byproduct of informal conversation (Clark, 1996) can enhance a system's resilience against errors and incidents (Patterson, Woods, Cook, & Render, 2007). Moreover, informal conversations in work settings may also have social functions, i.e., social support of individual members or collective legitimation of nursing acts by colleagues (Grosjean & Lacoste, 1999). Finally, although it is less efficient than formal routinized transmission, informal conversation may be more accurate to convey information in non-routine situations, as suggested by data from air-traffic control dialogues (Morrow, Rodvold, & Lee, 1994). The storytelling activities recurrent in informal conversations may constitute important ways of accomplishing sharing of experience and collective learning in professional communities (Middleton, 1997; Orr, 1996). However, little is known about how stories are actually accomplished in handovers. RS is instrumental in this accomplishment.

Reported *S*peech in *C*onversational *S*torytelling

The study of reported speech has a long tradition in pragmatics and philosophy of language (e.g., Bakhtin, 1981; Clift & Holt, 2007). Contemporary work on DRS, especially in conversation analysis, focuses notably on what it accomplishes in interaction, its design features, recipient participation, and the related phenomenon of reported thought.

What DRS Accomplishes.

In an influential paper, Clark and Gerrig (1990) argued that DRS selectively depicts a particular aspect of an action for an addressee. It is thus an effective way of telling stories by presenting evidence for claims speakers are making about what others have said (Holt, 1996). It allows recipients direct access to the quoted utterance and the circumstances of its production, enabling them to experience those circumstances for themselves. Ironically, despite its ostensibly accurate nature, DRS often depicts reprehensible comments embedded in complaints about the persons quoted (Holt, 2000). For example, speakers can exaggerate prosody or accent to convey a negative evaluation of the reported utterance (Buttny, 1997). More generally, DRS enlivens complaint stories, especially as part of climaxes (Drew, 1998; Holt, 2000). Also, experiments show that when instructed to entertain, narrators use more DRS than when instructed to be accurate (Wade & Clark, 1993).

Design Features.

Quotations can be verbal (e.g., DRS) or physical acts (e.g., miming Roger Federer serving an ace). They are semiotically different from other types of language use in that they depict, or mimic, rather than describe, the event they refer to. Thus, DRS exhibits particular design features (Holt, 1996) like (1) shift of personal, spatial and temporal deixis toward the site of the reported talk, (2) prosodic marking, and (3) enquoting devices like *she said*, or *like* (Fox Tree & Tomlinson, 2008; Jones & Schieffelin, 2009).

As a selective depiction of another's action, DRS is embedded in narrative. This creates a *binding* problem (Levinson, 2006) for participants who have to parse the often fast-paced switches between those narrative components grounded in the immediate context and those grounded in the context being recounted. To solve this problem, they may use cues like deixis or the enquoting devices mentioned above to identify the onset of DRS (Sidnell, 2006). Several techniques are also used to mark its offset, including "unquote" devices (Bolden, 2004) or speaker gaze (Goodwin, 1984). Talk, gesture and gaze are coordinated in re-enactments of events, thereby helping participants parse depictions and descriptions. For example, Sidnell (2006) quotes one case where a speaker mimics honking a horn with a gesture while producing a vocal imitation of sound. During the re-enactment, he averted his gaze from the other participants and returned it only afterwards.

Recipient Participation.

DRS is associated with increased recipient participation. The fact that speakers often refrain from commenting on their own DRS (Holt, 2000) often elicits spontaneous assessments from recipients. Thus, recipients often are the first to offer independent evaluative comments on DRS. This subsequently allows speakers to collaborate with the listener's response. Or they may be explicitly enlisted by speakers: Returning gaze to recipients at the end of a re-enactment may solicit reactions from them (Sidnell, 2006; see also Bavelas, Coates, & Johnson, 2002). Also, other individuals who have experienced the narrated events can participate in the retelling by projecting concurrent actions that anticipate an imminent narrative element (e.g., anticipatory laughter, Goodwin, 2007).

Reported Thought.

A phenomenon related to DRS is reported thought: quoting a thought of the speaker's during a narrated event, as in *I thought oh hang on I have to learn a little more about cars* (Barnes & Moss, 2007, p. 134). The design features of reported thought are similar to reported speech. Often-used enquoting devices include *I thought*, *I was thinking* (Barnes & Moss, 2007), or *at first I thought* (Jefferson, 2004b). Sometimes, it is not explicit whether a quote was actually said during the interaction or whether it remained a "silent" thought, as when speakers use *I was like* (Haakana, 2007). Reported thought, like reported speech, is used in complaint stories as an evaluation device, to express "silent criticism" (Haakana, 2007) of someone's attitude or behaviour. Moreover, reported thought in institutional interactions constitute a device for conveying "how it appeared to me then" (Barnes & Moss, 2007) as well as for constructing an account of one's behaviour as rationally motivated according to shared norms.

OUR STUDY

Our goal is to contribute to a better understanding of (1) discourse processes in handover situations and (2) DRS use in institutional contexts. More generally, in pursuing the question of what DRS accomplishes, we seek to understand how storytelling contributes to creating and updating collective mind among unit members. This is an important function in work groups. In a classic ethnography of service work, Orr (1996) documented the "war stories" photocopy repair technicians tell each other about the machines they fix. These stories are routines for updating their collective state of knowledge, but also for sharing insights about newsworthy aspects of copier repair:

> Much of technicians' talk about machines really involves keeping track of each other's movements and collecting the latest news about what is happening to their flock [i.e. the machines], and as such it is necessary business. This is not, however, the most interesting part of talking about machines for the technicians. What really holds their interest is a situation they do not understand. (p. 95)

Talk excerpted by Orr (1996) features DRS, leading us to surmise that DRS may play an important role in stories about both routine and extraordinary circumstances of the technicians' work. Although the work of service technicians and nurses is very different in some respects, they both feature technically complex tasks and recurrent social interactions. As described above, prior work (Grosjean & Lacoste, 1999) has documented a rich variety of forms and functions in nurses' storytelling, but without examining in detail how these stories are accomplished. In this study, we therefore examine DRS in storytelling in handovers of two nursing care units in French-speaking Switzerland.

Research Questions

Our first research question is, simply, *who is quoted*? Hospital work involves many complex social interactions grounded in an intrinsic situational uncertainty (Iedema, 2007; Middleton, 1997). For nurses, typical interaction partners include colleagues, physicians, patients and their families. Nurses' choices as to whom they cite using DRS in handover stories may reveal important aspects of their everyday social interactions as well as how social relations in the hospital are constructed.

Our second research question is, *how is DRS positioned within a story*? We will explore this question both quantitatively and qualitatively. The quantitative analysis will seek to determine typical patterns of narrative elements that precede DRS. The qualitative analysis will draw out in detail how the positioning of DRS contributes to the dramatization of the story. This combination of quantitative and qualitative approaches speaks to the ongoing research on (1) the sequential organization of DRS (Holt, 1996; 2000), (2) the demarcation of DRS from other narrative elements (Sidnell, 2006), (3) its multimodality and (4) the role of recipients in the co-construction of narrative discourse.

Our third research question is, *what does DRS accomplish for participants*? Here we explore the types of interactional work that gets done by the use of DRS. Research on DRS has documented its recurrent role in complaint stories and amusing anecdotes (Holt, 1996;

2000). Complaints (e.g., about patients) may also emerge as a recurrent feature of DRS narratives in handover settings. In an institutional context, however, complaint stories may reveal nurses' notions of what constitutes deviant conduct. That DRS and reported thought plays a role in constructing claims to epistemic access and authority (Sidnell, 2006) and in constructing rational accountability (Moss & Barnes, 2007) may also be particularly important in institutional settings like handover, where justification of professional acts to colleagues is an important activity (Grosjean & Lacoste, 1999).

We brought complementary methods of content analysis and conversation analysis to bear on our research questions. First, we identified all DRS utterances in the transcripts. We then coded the source (i.e., the type of person quoted) of each utterance as well as its context (i.e., the content of the preceding utterances). This data addresses the first and second research questions: who is quoted and how is DRS positioned within a narrative. In a second step, we retranscribed in more detail selected sequences of DRS from the corpus and subjected them to qualitative micro-analysis, using the methods of conversation analysis. This data reveals the sequential organization of DRS as well as what it accomplishes for participants (our third research question).

Care Units.

The units, a surgery and a rehabilitation unit, differed regarding their institutional context, the tools mediating communication, and care provided (acute and non-acute). The surgery unit was part of a small hospital. Its mission covered orthopedic, vascular, visceral and ophthalmic surgery. Verbal communication during handover was supported by handwritten notes and patient files. Handovers took place four times a day. The cardiovascular rehabilitation unit was part of a large clinic. Its mission covered thoracic surgery and general and cardiovascular rehabilitation. Verbal communication during handover was supported by patient-related information entered into a laptop at the patient bedside. Handovers also took place four times a day.

Participants.

There were on average 5.7 persons present per handover in the surgery unit and 2.9 in the rehabilitation unit. Observers conducted exploratory interviews prior to data collection and secured trust from staff by observing some handovers without filming.

Data Collection and Transcription.

In each unit, three of the four handovers per day were video-taped during five consecutive days (30 handovers in total) and subsequently transcribed. The surgery corpus

contained 59’225 words and the rehabilitation corpus 28’865. Names of patients, caregivers, physicians and hospitals were anonymized in the transcriptions. In the surgery unit, we were contractually obliged to destroy recordings after initial transcription. The video recordings of handovers in the cardiovascular rehabilitation unit could be kept longer for more detailed transcription. Hence, selected transcriptions of this material were transcribed following the Jefferson system (Jefferson, 2004b, see Appendix 1). Prosody was noted intuitively (i.e., through listening) and, where necessary, checked against a prosodic representation generated through Praat (Boersma & Weenink, 2007). In the excerpts we analyze, the original French dialogue is displayed along with an English translation on the line below.

CONTENT ANALYSIS OF SOURCE AND CONTEXT OF DRS UTTERANCES

First, we coded the sources quoted by means of DRS. This is interesting because, as a device for presenting evidence augmenting vividness in storytelling, DRS may reveal what kind of authoritative claims are relevant in nurses' stories. Second, we coded the content of the three utterances immediately preceding each DRS utterance. This allowed us to shed light on how DRS are embedded in stories by analyzing what kind of utterances constitute the pre-context of a DRS utterance.

Coding

We first searched for all occurrences of direct reported speech (DRS) in the transcriptions, according to design features described by Holt (1996) and discussed above. Reported thoughts (Barnes & Moss, 2007, Haakana, 2007) were also included as DRS.

Initial qualitative analyses indicated that DRS was used differently depending on who was quoted. We therefore coded for the type of person quoted (the *source*): *self* (*I said oh it's alright it looks like it's improving*), *patients* (*she said give me a Temesta because I can’t sleep*), *physicians* (*he said no it’s okay he didn’t bleed much let’s check that tomorrow morning*), *colleague* (*she said wait I need to get your pulse*), and *other persons* (*and his wife oh but if we look at how you do it*). We double-coded 23 % of the data for interrater agreement, which was high (Cohen’s kappa = .86). We operationalized the *context* of a DRS utterance as the 3 utterances immediately preceding it. We coded each context utterance for content, according to the following categories (derived inductively from inspection of the data): *situation/medical order*, *actions*, *reported speech* and *other*. An example of this coding is provided in Excerpt 1.

Excerpt 1

1 PAM et: et alors euh: (.) euh:: (..) elle est un peu eum:
and and then she is a bit

2 y a (quand même) Ivan qui est passé après qui a été la voir,
Ivan came around afterwards came to see her

3 (.)et pis qui a rediscuté de son traitement,
and talked about her treatment again

4 et pis elle elle me disait que:: ouais (.) ça la perturbe=
and she she told me that yeah it disturbs her

5 =un peu c'te changement de: de spray, euh:
a bit this change of spray

6 par rapport au au (Perubar).
in relation to the (Perubar)

7 elle a dit **je sais pas si je vais le garder,**
she said I don't know if I will keep it

8 **ou si je vais pas reprendre les autres,** euh
or if I won't start the others again

9 on sent qu'elle est assez:: (.) assez récalcitrante au changement.
you can feel that she is quite resistant to change

This excerpt illustrates how a nurse is narrating a patient's dissatisfaction with a recent change of medication. Consider one of the target DRS utterances (7): *She said I don't know if I will keep it* (the source is coded as the patient). The three immediately preceding utterances are *and she she told me that it disturbs her a bit this change of spray in relation to the perubar* (content coded as *reported speech*), *and he talked about her treatment again* (content coded as *action*), and *Ivan came around after he came to see her* (content coded as *action*). We computed interrater agreement for coding content of contextual utterances on 20 % of the data. It was high (Cohen's kappa = .80).

Results and Discussion

Number and Length of Quotations.

There were 123 occurrences of DRS in the surgery unit corpus and 61 in the cardiovascular rehabilitation unit corpus. We computed the ratio of the number of words devoted to DRS in each session to the total words used in the session. The two units do not differ significantly on this ratio: $F(1, 28) = .622$, *ns*.

Quoted Sources and Unit Types.

The units differed according to the distribution of sources quoted: $\chi^2(4, N = 184) = 12.77$, $p = .012$ (see Figure 2). In the surgery unit, caregivers quoted themselves and patients most often, followed by physicians, then colleagues. In the rehabilitation unit, caregivers quoted patients most often, followed by themselves, then colleagues. Only one quotation was from a physician.

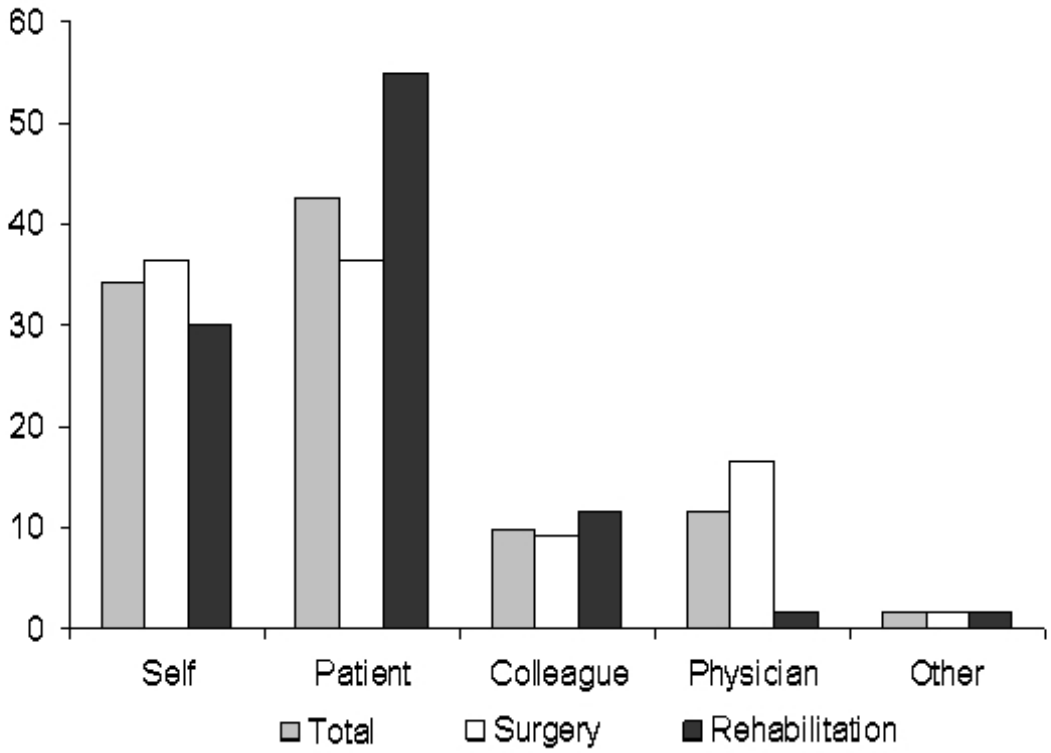
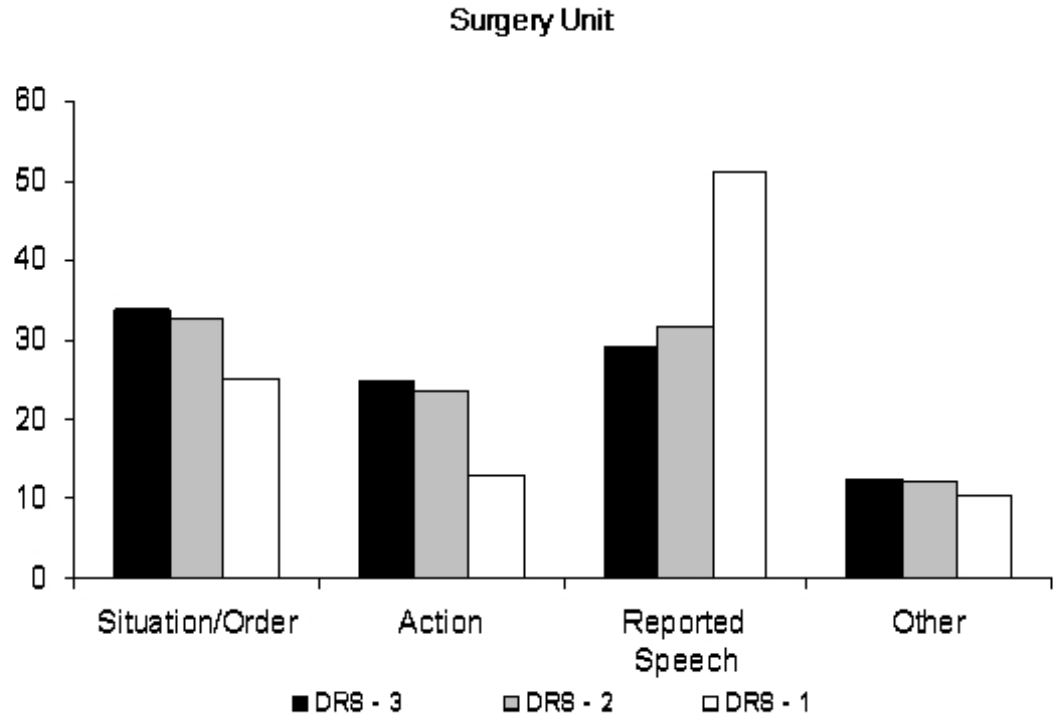


Figure 2. Distribution of sources quoted (bars of the same color sum to 100%) in DRS for each unit and in total.

Caregivers quote patients less often in the surgery unit than in the rehabilitation unit. In contrast, they quote physicians more often in surgery than in rehabilitation. These differences may reflect the different work situations of the units. Indeed, in the acute care context of the surgery unit, physicians intervene more often than in the rehabilitation unit. On the other hand, in the rehabilitation unit, patients typically stay for a longer period, and thus potentially engage in more meaningful (and potentially problematic) interactions with the nurses. More of these interactions end up as quotations in the nurses' stories. The qualitative analysis will shed complementary light on these findings, showing that nurses accomplish different things by means of DRS depending on who they quote.

Content of Contextual Utterances of DRS.

We tested the association between the *content* of the contextual utterances, their relative *position* to DRS (1-3 utterances preceding a DRS utterance) and the *unit type* using loglinear analyses (Agresti, 1984). Loglinear analyses allow identification of the structure of multidimensional categorical data by testing the goodness of fit (G^2 likelihood ratio) of successive models. A non-significant G^2 value means that the tested model fits the observed data. In our data, models in which the main effects of unit type, position and content were introduced alone or two by two didn't fit the data, nor did models including only first-order interactions or models including the main effect of a factor and the interaction of the other two factors. The only model that fitted the data included a main effect of unit and an interaction between position and content, $G^2(11) = 8.70$, $p = .65$. The main effect of unit reflects the fact that, as described above, the surgery unit produced more DRS than the rehabilitation unit. The interaction between position and content indicates that content of contextual utterances varies according to their position (see Figure 3). In the surgery unit, *situations/medical orders* and *actions* became less frequent immediately preceding the DRS utterance, whereas *reported speech* became more frequent. In the rehabilitation unit, *situations/medical orders* became less frequent immediately preceding the DRS utterance, whereas *reported speech* became more frequent.



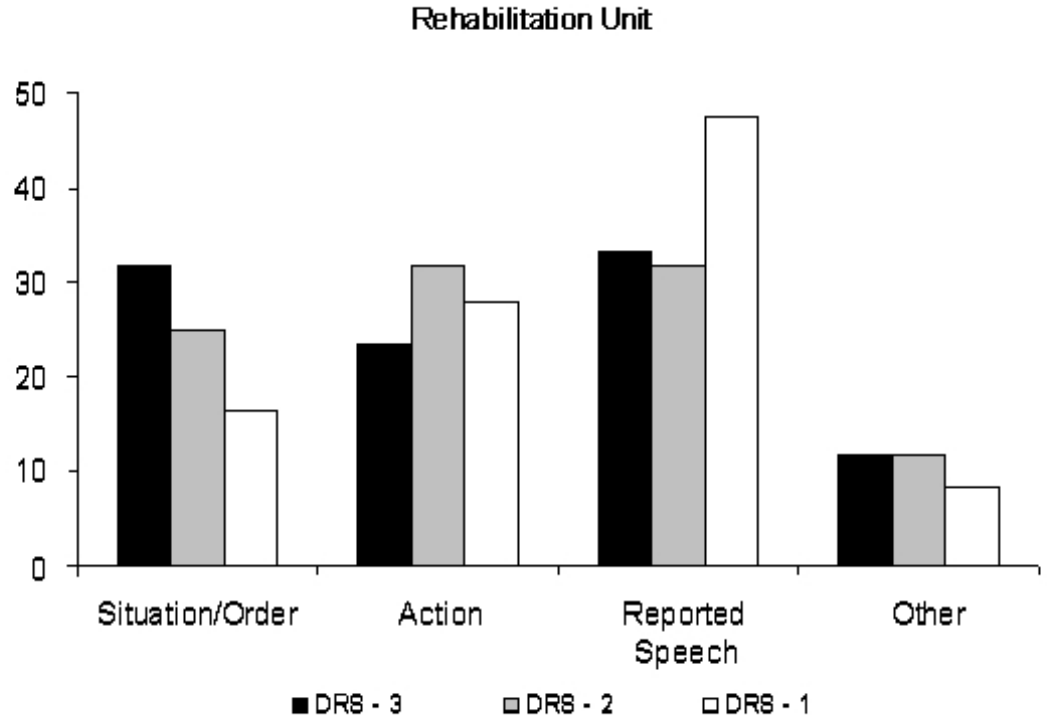


Figure 3. Content of the three utterances preceding DRS (bars of the same color sum to 100%) in the rehabilitation and surgery units. DRS-1 is the immediately preceding utterance, DRS-2 is the second utterance back, and DRS-3 is the third utterance back.

In other words, there is a buildup of context preceding DRS. Roughly speaking, DRS tends to be *distally* preceded by narrations of situations and actions. It tends to be *immediately* preceded by other reported speech (both IRS and DRS) – reported speech often occurs in clusters of more than one utterance. This finding is a quantitative demonstration of the qualitative observation that background information is often provided prior to DRS, which constitutes the climax of a story (Drew, 1998; Holt, 2000). In our data, background information is provided in the form of a situation description, usually the patient's diagnosis or symptoms, which is followed by the description of the actions undertaken (e.g., treatment administered). In conclusion, caregivers' narrated situations and actions build up context for the production of reported speech (both direct and indirect) and finally the focal DRS utterances. The sequential analysis that follows will shed more light on the details of this build-up.

QUALITATIVE ANALYSIS OF DRS SEQUENCES

In this section, we use conversation analysis to document how DRS(1) is produced in storytellings though the use of verbal and other means, (2) is embedded in jointly managed activities and (3) serves as a resource for accomplishing both interpersonal and institutionally relevant jobs, like flagging non-routine events, displaying technical reasoning or legitimizing the speaker's own recounted action. This qualitative study of selected data excerpts will extend the quantitative analysis, demonstrating in detail how the functions of DRS in our data differ depending on who is invoked as source, and also how narrators build up stories to a climax.

One recurrent feature of DRS in our data is its occurrence in reports of potentially problematic matters, i.e., episodes oriented to by the participants as going against normal expectations. Four such episodes, taken from the rehabilitation unit, are analyzed, containing a total of twelve instances of DRS. Each excerpt features a situation deviating from the nurses' everyday practice: Dealing with an unusual technical aspect of patient care (cleaning a wound, Excerpt 2), dealing with a patient's unreasonable request (Excerpts 3 and 4), or dealing with a deviation from a medical protocol (Excerpt 5). Seeking to account for the embeddedness of DRS in courses of jointly accomplished activities, we will present a detailed analysis of a long interactional sequence in Excerpt 2, and will be more expedient with the discussion of Excerpts 3-5.

Excerpt 2: Displaying Professional Conduct in Dealing With an Unusual Technical Aspect of Patient Care

Excerpt 2 involves three nurses seated at their computer-equipped desks (see Figure 4; the notes[A], [B], and [C] in the excerpt link the transcript to the appropriate panel of the figure): Lea and Ann are facing each other while Mag sits at the bottom end of the desk (with her back to the camera, slightly off the field of view). The excerpt presents a lengthy stretch of interaction where Ann recounts her cleaning of a patient's knee wound to Mag and Lea. We will first look at the general organization of the narrative and then analyze the repeated use of DRS.

Excerpt 2

```
23 ANN  je lui ai demandé (.)
        I  asked him
        <looks at MAG >

24      qu'il mette un antalgique avant la réfection des pansements? [A]
        to    put   an analgesic  before changing       dressings

25      (1.5)  <ANN lowers eyes to left knee, right hand on the knee> [B]

26 ANN  .h euh ce qui était dégueulasse aujourd'hui c'est que de ce côté?
              what   was   disgusting  today      is that  on this side
           <------------------left hand points to knee----------------->

27      (. . .)
        <---------------- looks at LEA, maintains point-------------> [C]

28 LEA  ouais
        yeah
        <nods>

29 ANN  euh j'ai commencé à tirer et puis j'ai dit à Daniel regarde
            I started    to pull and then I told    Daniel look
        <--------------------looks at LEA-------------------------------

30      je lui tire de la fibrine,
        I'm pulling       fibrin
        ----------------------->

31      et puis je lui ai dit mais t'es sûr que c'est de la fibrine,
        and then I told him   but are you sure  it's       fibrin
        <-------------------------looks away--------------------->

32      parce que c'est d'une consistance
        because  it's got a    texture
        <----------looks at MAG -------->

33      asse:z (.) dure comme ça,
        quite      hard like that
        <-----looks away----->

34      .h et j'ai dit c'est un vaisseau qui: [qui a plus]
          and I  said  it's   a  vessel  that  that hasn't
        <looks at LEA>          <----iconic gesture----->
```

35 MAG [qui part]
that's coming off

36 ANN **été irrigué, qui est loin,**
been irrigated anymore that's gone
<iconic gesture of the left hand on the knee>

37 MAG qui part,
that's coming off

38 ANN et puis en fait il disait **non non continue à tirer,**
and in fact he said no no keep on pulling
<----------- looks away ----------->

39 .h et puis tu tirais tu tirais,
and you pulled and pulled
<looks at her knee, mimics pulling >

40 et puis c'est c'était vraiment dégueux,
and it's it was really disgusting
<----continues the gesture, looks away ----

41 y avait tout qui venait dessous,
everything was coming out underneath
---------->

42 .h on coupait et puis en fait on pense que c'était un
we were cutting and in fact we think it was a
<----------looks at MAG ---------->

43 tendon=qui: qui était [dessous],
tendon that was underneath

44 MAG [°ah ouais°]
ah yeah

45 ANN qui qui était mort. enfin c'est vraiment d- °vraiment° dégue.
that that was dead anyway it's really really disgusting
<----------looks at her knee, iconic gesture---------->

Directly preceding the excerpt, Ann has been describing the patient's wound. In doing so, she progressively upgrades the dramatic character of her telling, moving from a neutral identification of the patient's situation, to a more detailed assessment of the wound, of the patient's reluctance to receive pain medication, and finally to a vivid description of the wound-cleaning process (starting at 25) that she accomplished together with Daniel, a senior colleague. DRS is used in the last, most dramatic phase of the story, which is reproduced in Excerpt 2. This is in line with earlier findings by Drew (1998) and Holt (2000), and also illustrates our findings in the quantitative analysis.

In Excerpt 2, several features of talk mark the segment starting in 25 as the beginning of the peak of the story. First, the segment is demarcated by a pause of 1.5 s, followed by Ann's audible in-breath. Second, the segment shows a multimodal constitution of a virtual model of the patient's wound: In 25, Ann gazes at her knee, starts to point at it and then, in 26, when she

qualifies the wound as *disgusting*, she adjusts her gesture in order to point to a more specific location. She thereby uses a *local metric* in which "features of the current scene are used to describe the narrated one" (Goodwin, 2003, p. 323). Goodwin reports verbal uses of local metrics, such as *their dining room is about five times as big as ours* (said by a person at the table designated as *ours*). Here, Ann resorts to an *embodied local metric*: she uses her hand and knee as material to build a description of the patient's wound. The embodied use of local materials to which the current interlocutors have access is a way of making intelligible a scene the addressees did not witness, thereby augmenting the authenticity and the dramatic character of the depiction.

Third, the start of the story is also demarcated by means of a specific syntactic format in 26 which opens the depiction of the wound-cleaning process, namely a pseudo-cleft construction (or WH-cleft): *what was disgusting today is that*. Pseudo-cleft constructions involve an "A is B" scheme, where A (*what was disgusting*) is underspecified, and B presents a specification of A. Interestingly, B can consist of a long stretch of talk, in which case the A-part projects something that will be elaborated on in what follows (Hopper & Thompson, 2008; Pekarek Doehler, 2011). Thus, *what was disgusting* projects a specification of 'what was disgusting' as a relevant next action. The specification is provided by the subsequent segment of talk (26-45). This device is instrumental in upgrading the dramatic character of the story. The effect is further enhanced by the lexical choice of *disgusting* which echoes the preceding assessment of the patient's wound and further contributes to specifically demarcate the segment in 26 to 45 as the peak of the narrative. Indeed, *disgusting* is used again with the discourse marker *anyway* in 45 to close the story.

The sequential ordering of the narrative buildup corresponds to the patterns found in our content analysis of the utterances immediately preceding DRS. This analysis showed a progression from the narration of situations and actions to reported speech immediately preceding a target DRS utterance. This pattern can be observed in 26 and 29, where Ann narrates a situation (*what was disgusting*) and an action (*I started to pull*) before a DRS utterance in 29-30 (*look I'm pulling fibrin*), which is then followed by other DRS segments.

The transition between building the scene and reporting the wound-cleaning process is marked by a step-by-step reorientation of body posture and gaze, as shown in Figure 4: in the preceding talk, Ann's gaze and whole posture was turned toward Mag (23, Fig. 4A); now, Ann first gazes and points toward her knee (25-26, Fig. 4B) and then engages in mutual gaze with Lea (27, Fig. 4C), involving her as a co-addressee. In sum, then, Ann deploys a remarkable array of gestural, bodily, syntactic, lexical and sequential means to create a virtual scene and thus set the stage for the peak of her story.

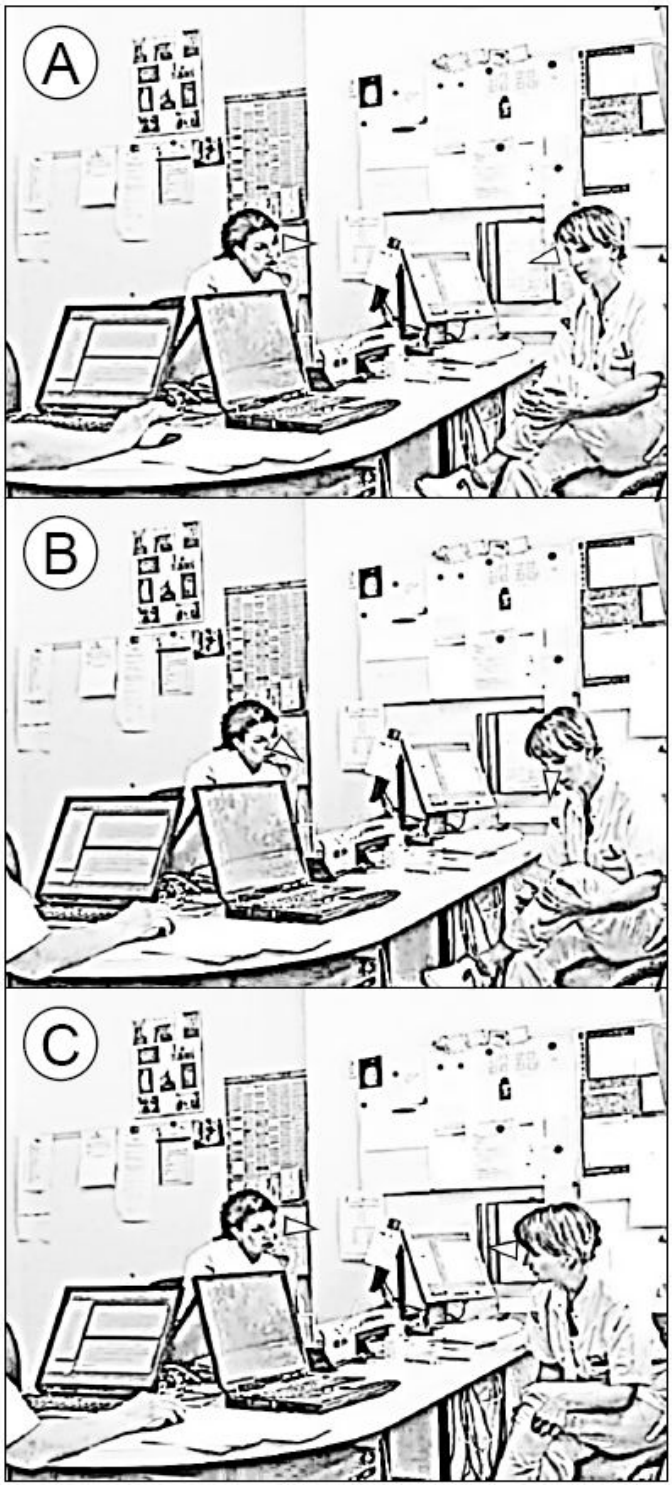


Figure 4. Multimodal actions in Excerpt 2. Panel A: Ann's (on the right) gaze and posture are oriented toward Mag. Panel B: Ann points to her knee; Lea looks at it. Panel C: Ann's and Lea's gaze meet; Ann's body is reoriented toward Lea. Arrows indicate direction of gaze.

At this moment, once the attention of both colleagues has been captured, Ann's actual recounting of her working on the wound starts: *I started to pull* (29), Ann uses a series of DRS utterances to do so. These show typical design features (Holt, 1996; Sidnell, 2006), e.g., recurrent use of enquoting devices (29, 31, 34, 38), shift of deictic space toward the place of the reported action (e.g., the exophoric use of the third person *him* in 31), and coordination between offset of DRS and gaze (31). Most importantly, the DRS itself is accompanied by iconic gestures which mime the events reported (34, 36, 39-40) and highlight their dramatic character. Together with the devices used to create the virtual scene in the preceding talk, Ann's quotations constitute an embodied re-enactment (Sidnell, 2006) of her experience, where gesture, talk and gaze are coordinated so as to augment the authenticity of the events being reported. This "reassembly" (Schegloff, 2005, p. 463) of different modes is instrumental in *depicting* (Clark & Gerrig, 1990) the wound-cleaning process. This observation converges with previous accounts of DRS as augmenting the experiential realism of the scene depicted (Holt, 1996, 2000; Sidnell, 2006). It is, however, not the DRS alone, nor its combination with gesture, that does the job of augmenting the dramatic character of the narrative, but also its embeddedness in a specific course of action leading up to a climax.

This being said, the data allow us to carry the analysis one step further. Ann chooses quotations of concrete technical information that constitute successive conjectures about the possible nature of the substance pulled out of the wound. She re-enacts a process of collaborative diagnosis through the reported interaction between Ann and Daniel. More specifically, the process is depicted according to an "At-first-I-thought-X-then-I-realized-Y" routine (Jefferson, 2004a), which involves the initial mention of reported thoughts positioned as mundane explanations of events that are subsequently revealed as incorrect. This routine constitutes a device for marking an event as extraordinary (Sacks, 1992). Here, Ann's initial conjecture of *look I'm pulling fibrin* (29-30) is followed by *but are you sure it's fibrin* (31), which depicts a state of doubt and introduces an element of unexpectedness into the story. Her aside to Mag and Lea in 32-33 (*because it's got a texture quite hard like that*) delivers an account of that doubt. Her subsequent DRS *it's a vessel that hasn't been irrigated anymore* (34, 36) offers a second technical diagnosis of the tissue that is being worked on and provides further qualification of the situation as unusual. Finally, in 38, her quote of Daniel (*no no keep on pulling*) invokes a colleague's voice as an authority whose reported go-ahead signal legitimizes Ann's own subsequent actions (see also Excerpt 5), leading to the discovery of the nature of the substance being pulled and, ultimately, to the denouement of her story.

In sum, DRS is used to tell a story about an unexpected departure from a routine activity (cleaning a wound) and to show Ann's dealing with it in a reasoned, expert manner. In doing so, Ann has her audience witness her actions as a thoughtful professional in what she presents as an unusual, critical moment. What we see her do is construct a rational accountability for their conduct. Her orientation to the normality of things, i.e., to what is habitual and what is exceptional, indexes Ann's belonging to a specific membership category. As Sacks (1972a, b) has pointed out, membership categories activate alternative bodies of commonsense knowledge, perception, relevant conduct and understandings of situations. Commonsense knowledge includes what Sacks (1972a, b) has termed category-bound activities, i.e. "kinds of activities or actions or forms of conduct taken by the common-sense or vernacular culture to be specially characteristic of a category's members" (Schegloff, 2007, p. 470). Mentioning such a category-bound action makes relevant the category to which that action is bound. By using DRS and letting her colleagues "witness" (Holt, 1996) not only her actions but also her purported interpretations of the technical issues at hand, Ann orients to the category of 'a professional nurse' without saying things like 'I am a good nurse' (Schelgoff, 2007). Also, her orientation to normal expectations and to what goes against normality is observably related to this membership category; what is enacted by means of the DRS is Ann's understanding of the wound-cleaning process as a non-routine event and of herself as a conscientious nurse, in view of sharing this interpretation with other members of that same category (nurses). Ann's story is similar to the "war stories" by which photocopy repair technicians share anecdotes about complex cases of machine failure diagnosis (Orr, 1996). Her use of DRS is instrumental in the enactment and sharing of a professional culture that involves dealing with and solving technical problems as well as displaying and sharing relevant experience.

Excerpts 3 and 4: Dealing With Deviant Patient Behavior

We now analyze another recurrent use of DRS in our data: complaining (Buttny, 1997; Holt, 2000) about a patient's deviant behavior. A first illustration is provided in Excerpt 3. Lea recounts her interaction with a patient who claims to have paid for the entire day, but has actually only paid until 10 a.m. The room is needed at 3 p.m., but the patient wants to stay until 5 p.m.

Excerpt 3

1 LEA elle pense qu'elle paie pour toute la:::: toute la journée,=
she thinks that she's paying for the whole the whole day

2 =elle dit **mai:s** (.) **puisque c'est comme ça:**, (.)
she says but since that's the way it is

3 **ne vous en faites pas, je vai::s** (.)
don't worry I will

4 **je serai:** (.) **dehors à trois heures.**
I will be out by three o'clock

5 PAM hhhh

6 LEA et puis après je lui ai fait un souri:re,
and then I smiled at her

7 j'ai commencé à lui dire=
I started telling her

8 **=mais vous save:z si vous avez besoin de l'ai:de**
but you know if you need help

9 **je suis là, je peux vous °aid:er°,**
I am here I can help you

10 j'ai commencé à faire une théori:e,
I started to chat her up

11 et pour finir elle était elle était contente,
and finally she was she was satisfied

12 et pis elle a dit **ouais, y a pas d'problème, (.) je °vais sortir°.**
and then she said yeah there's no problem I will go

Lea starts her story by implying that the patient is wrong (1). She then uses DRS to depict the patient as annoyed by the situation (2: *if that's the way it is*), but willing to comply (4: *I will be gone by three o'clock*). Her use of DRS is a powerful means not only for highlighting the patient's conduct as deviant from the norm, but also for getting her colleague's alignment: Pam reacts with an audible out-breath (5), possibly a sign of exasperation. Once Lea has received her co-participant's alignment to the picture she is painting, she sets out to recount her attempt to calm the patient: she reports smiling at the patient (6), and backs up the display of her conduct by using DRS to quote her own words (8-9): *I am here I can help you*. She then tells Pam about the patients' satisfied reaction (11-12), using again DRS as evidence: she quotes the patient's complying *there's no problem I will go*. The juxtaposition of self-quotes and patient's quotes within a reported dialogue (see also Excerpt 4) allows the speaker to provide evidence for her own

professional conduct in the face of a patient that is depicted as difficult. Thereby, the change in the patient's attitude, from uncooperative to complying, is presented as a result of the nurse's attempts to mollify her.

Excerpt 4 provides another illustration of complaints about patients. It is taken from an interaction between Lea and Ann, who discuss the case of a patient leaving the hospital that very day. Two other nurses are present, but they do not participate in the interaction. The excerpt starts with Lea's reporting the patient's reaction to a question from Sara, another nurse, about whether the patient needs a nurse to assist her after her return home.

Excerpt 4

12 LEA [voilà alors euh]
so then

13 elle a: oui (.) parce que: Sara elle a demandé que:
She has yes because Sara she asked that

14 de lui dire qu'est-ce qu'elle avait besoin pour la: pour
to tell her what she needed for the for

15 rentrer à la [maison],
going back home

16 ANN [euh]
<writes and looks at her papers>

17 LEA si elle avait besoin d'infirmiè:re. (.) puis elle a dit
If she needed a nurse and she said

18 **OH NON mai:s l'infirmière elle m'a dit que j'avais rien**
ah no but the nurse she told me that I didn't need

19 **besoin, que :** [(**je** XX)]
anything that I

20 ANN *[non]
no
**<looks up from her papers, looks at Lea, signals 'no' with her index finger>*

21 c'est pas vrai, je lui ai pas dit ça.
that's not true I didn't tell her that

22 LEA c'est vrai?
really?

23 ANN je lui ai dit elle [voulait]
I told her she wanted

24 LEA [(laughs)]

25 ANN que quelqu'un passe tous les jours. j'ai dit
someone to come by everyday I said

26 qu' y avait des gens qui étaient beaucoup plus mal qu'elle,
that there were people who were much sicker than her

27 et qui avaient pas une infirmière tous les jours,
and who didn't have a nurse everyday

28 LEA ouais voilà
yeah that's it

29 ANN qu'elle elle est capable de se laver un petit peu,
that she she's capable of washing herself a little bit
<----------looking at LEA----------

30 de de s'faire- elle voulait quelqu'un pour lui faire
to to make herself she wanted someone to make her
---------->< looks at LEA, beat gesture with index -

31 le petit déjeuner, j'ai dit **mai :s [euh]**
breakfast I said but
---------><----looks at LEA-->

32 LEA [(laughs)]

33 ANN **vous êtes indépendante.** (.) °faut pas se foutre
you're independent what a nerve
----------> <-lowers her head on her notes -

34 de la gueule du monde quoi°. alors je lui ai dit
really so I told her
---------->
35 qu'on coupait la poire en deux, au lieu de l'envoyer
we'll compromise instead of sending her

36 quelqu'un <chaque jour>, (.) chaque deux jours.
someone every day every two days

37 et puis elle veut des douches deux fois par semaine
and she wants showers twice a week

38 LEA mhmm
mhm

[15 seconds of talk omitted]

46 ANN [mais moi euh une dame] comme [ça]
but me a lady like this

47 LEA [(X ?)] [ouais]
yeah

48 ANN je suis pas d'accord qu'on lui envoie quelqu'un (.) euh
I don't agree to send her someone

49 tous les jours, parce que :: (.) c'est: euhm (.)
every day because it's

50 LEA oui
yes

51 ANN franchement elle a pas besoin de quelqu'un [tous les] jours.
frankly she doesn't need someone everyday

52 LEA [non non]
no no

53 ANN faut qu'elle s'bouge
she needs to pull herself together

54 LEA ouais
yeah

55 ANN >et puis c'est tout quoi<.
and that's it really

56 LEA ouais
Yeah

Two cases of DRS are embedded in this episode where Lea and Ann recount separate dialogues with the patient. The excerpt shows a recurrent phenomenon in our data, namely the proximity of DRS and IRS (see the quantitative analysis above). The first DRS segment, occurring at 18 and 19, reports a patient quoting what Ann had purportedly told her, while the second, in 31 and 33, reports Ann's own words as addressed to the patient. The two DRS segments function as indexical tokens highlighting the authenticity of the dialogue that is being reported. They also create a tension between the patient's complaining stance as to Ann's purported statement, and Ann's own account of her words.

With *oh no but the nurse she told me that I didn't need* (18-19), Lea reports the patient's verbatim remark: purportedly, Ann had told the patient that she does not need someone to assist her after returning home. The DRS segment shows features which contrast with the self-quotes in Excerpt 3: it is an single quote, it is not accompanied by any noticeable gesture or shifts in gaze or posture, and it is introduced by an emphatic marker (*oh no*), produced with markedly louder voice. These characteristics are significant. The use of a single quote and the absence of gesture suggest that this is not about enacting a whole scene, but rather about displaying the authenticity of a single assertion. The emphatic marker *oh no* indexes the patient's irritation, further highlighting the quote's authenticity (Holt, 1996).

In our data, mimicry of the original voice, as shown by change of pitch, loudness and tokens such as *oh*, are typical of nurses' quotes of patients' talk. Such techniques are not just devices for demarcating DRS from one's own speech. Mimicry of patients has the effect of letting patients' words *depict* their attitude – rather than conveying it via the narrator's description. Suggestive mimicry (e.g., of a petulant tone of voice) can obliquely convey a negative evaluation of the reported utterance (Buttny, 1997). Thus, nurses can use this practice to complain about patients by displaying their speech. Mimicry also allows the narrator to deemphasize her role and confront her co-participants with purported pure fact. This is particularly important in the present case, as Lea's quoting of the patient's complaint as to what Ann said may constitute a reproach to Ann. This shows a powerful use of DRS to address, in an indirect way, a potentially complaint-worthy action of a co-participant (here: Ann).

Ann's subsequent talk shows that she indeed orients to Lea's remark as a potential reproach. She starts to report what she really said (23*, I told her*), then aborts and describes what the patient wanted (*she wanted someone to come by every day*). She then develops a story that alternates between examples of the patient's preposterous wants (recurrent use of *she wanted/she wants* in 23, 30, and 37) and her own indirect speech (recurrently marked by *I said*/*I told her* in 25, 31, and 34). In doing so, she builds up a systematic contrast between the patient's unreasonable requests and her own efforts to reason with her. This sequence serves to discredit the patient's assertion (the first DRS segment, quoted by Lea in 18-19) about what Ann purportedly said, and to outline the absurdity of the patient's request. The story comes to a peak (30-31) when Ann mentions that the patient *wanted someone to make her breakfast*, while looking at Lea and accompanying her words with a beat of her index, possibly suggesting her impatience. Also, her *she wanted someone to make her breakfast* elicits laughter from Lea, who signals her endorsement of Ann's point of view as to the absurdity of the patient's request. It is now that Ann introduces her key diagnosis of the patient's needs, by means of a second DRS segment, *but uh you're independent*, followed by an explicit evaluation, *what a nerve really* (33-34), in a turn expansion. Interestingly, this evaluation, which contrasts with the matter-of-factness effect of the preceding storytelling enhanced by the DRS segments, occurs only once co-participants' alignment with the depiction of the patient has been secured (32). Also, it is produced as an aside, in low voice and with Ann's gaze withdrawn from Lea.

Ann's retelling of her interaction with the patient, from which both DRS segments are quoted, builds up a context allowing her to demonstrate the truth of her assertions as well as the accuracy of her diagnosis of the patient's needs. Her narration also has the effect of shifting the issue at stake from what she told the patient to what the patient is like, thereby accounting for her subsequent negative assessment of the patient. The very orientation to a patient's behavior as deviant features reference to shared knowledge by indexing a membership category. Ann's expression (46) *a lady like this*, unambiguously classifies the patient as an exception, as a member of the category 'patients' that is different from the others, thereby maintaining orientation to a shared understanding of the normality of the category.

Taken together, the use of DRS in Excerpts 3 and 4 accomplishes more than highlighting the authenticity of the reported dialogues. The use of DRS for quoting patients displays patients' attitudes, thereby depicting them as deviant from usual patients, without explicitly qualifying them as such. This shows the powerful indirectness of DRS to convey

blame. These quotes build up a background against which the nurses display how they dealt with the deviant patient. Their self-quotes are instrumental in this: Self-quotes provide evidence for the professional character of the nurses' conduct on behalf of the patient, in a similar way as they provide evidence for the nurse's professional way of dealing with non-routine technical issues (See Excerpts 2 and 5). In both cases, the stories are sequentially built up to first describe the non-routine character of the situation, and then depict the nurse's conduct in the face of it.

Excerpt 5: Dealing With Deviation From a Medical Protocol

DRS is also used in non-routine episodes in administering medical treatment. Here we analyze a case where a nurse deviated from routine medical protocol. It features the use of DRS in quoting an authority to legitimize the nurse's actions (see also Excerpt 2), as well as self-quotes and reported thought to display the rationality of her actions. In Excerpt 5, the nurse (Ann) is explaining the situation to a colleague in a long narrative.

Excerpt 5

7 ANN j'arrivais pas à lui prendre les tensions,
I couldn't take her pressure

8 elle était dans les chaussettes
it was rock bottom

9 le pouls j'arrivais pas à le prendre. .h j'ai mis un sacré moment
the pulse I couldn't measure it took me a long time

10 pou:r euh arriver à prendre une tension et un pouls.
to manage to measure the pressure and a pulse

11 (0.2).h elle était pas symptomatique pourtant, et puis euh
she was not symptomatic though and

12 elle urine pas quoi. (0.2).h (alors on a appelé:, euh: elle nous a
She's not urinating so we called she made us

13 fait augmenter la perf= >ce qui était un peu bizarre,<
increase the perfusion which was a little weird

14 =elle a: doublé les les doses. (0.3) .h et puis euh:
she doubled the doses and

15 moi j'avais pas donné euh tout le traitement cardiaque
me I hadn't given uh all the cardiac treatment

16 ce matin, parce que je me suis dit euh ***°je vais la faire**
this morning because I told myself I'm gonna

17 **euh *crever°**. .h donc j'ai pas fait l'oedemex, j'ai rien faire
kill her so I didn't do the oedemex I did nothing

18 les comprimés, rien. ET euh ils (m')ont mis en suspens à la
the pills nothing and they postponed at the

19 visite. on m'a juste donné les prises, tout le reste ils ont mis
Visit. I was only given the blood tests all the rest they

20 en suspens, et l'oedemex IV ils ont mis en pause aussi.
postponed and the oedemex IV they stopped it too

21 .h après:s euh quand je l'ai: dit
afterwards when I told her

22 que: de venir voir la dame, euh Daniel a mis la dopamine,
that to come and see the lady, Daniel put the dopamine

23 =alors j'ai mis (0.3).h +elle a (0.2) quarante mille microgrammes
so I put she has forty thousand micrograms

24 de dopamine sur vingt-quatre heures ((pronounced distinctly)),
of dopamine *over twenty-four hours*

25 .h donc j'ai dilué selon le protocole
so I diluted according to the protocol

26 >donc niveau glucose 5 pourcents<,= j'ai bien posé la question
so glucose 5 percent I made sure to ask

27 à: (0.2) Daniel .h **la dame est diabétique est-ce que tu veux**
Daniel the lady is diabetic do you really want

28 **vraiment que je mette le glucose 5 pourcents,**
me to put the glucose at 5 percent

29 =il m'a dit **oui.** (0.2) donc je suis couverte à ce niveau-là?
he told me yes so I'm covered at that level

30 ça coule à 10 millilitres heure.
It's flowing at 10 milliliters per hour

Ann is narrating the case of a seriously ill patient, whose blood pressure and pulse were low. The first case we examine is an instance of reported thought in 16-17. Preceding it, several aspects of the patient's condition are reported as being unusual, notably not urinating (12), the fact that a physician was summoned (12), and that she administered a procedure qualified as *weird* by Ann (13). Then Ann reports that her earlier action deviated from a prescribed treatment, *I hadn't given uh all the cardiac treatment this morning* (15-16). The subsequent segment of reported thought, *I told myself uh I'm gonna uh kill her*, is presented as an account for that action, introduced by *because* (16). It provides a rationalization of her not administering the cardiac treatment as being based on an assessment of its possible consequences, namely the patient's death. Her projection of the patient's death is most likely a hyperbolic statement, which makes her reported thought all the more dramatic, thereby underscoring the key nature of her insight. Ann's deviation from orders is thus presented as

having been based on a rational decision-making process. At the same time, the DRS provides the justification for actions that are recounted subsequently (17-18) and presented as consequences of that rationalization, introduced by *so* (*so I didn't do the oedemex I did nothing the pills nothing*). As it turns out, Ann's decision was vindicated by the doctors' subsequent suspension of treatments (18-20).

The second case of DRS (27-29) is a piece of reported dialogue between Ann and Daniel (the same senior colleague as in Excerpt 1). It occurs in a context where accuracy is a high stake issue – and where the transmission of precise information from Ann to her colleague is crucial. Ann recounts her administering of a precise quantity of medicine to the patient. What is oriented to as unusual by Ann is the fact that the patient gets glucose although she is diabetic; this in turn implies that the treatment of a diabetic patient makes relevant a non-standard medical protocol. Ann first exposes technical information about the patient's medicine as administered by Daniel (23-24). She then presents that information as a basis (using *so* in 23) for her own administration of a 5% glucose solution to the patient, which she claims to have diluted *according to the protocol* (25). Subsequently, she backs up the appropriateness of her action by letting her colleague "witness" a purported dialogue with Daniel that demonstrates how Ann had double-checked her decision by quoting her question to him (27-28), *the lady is diabetic do you really want me to put the glucose at 5 percent*. Significantly, with *do you really want*, Ann demonstrates her awareness that such a dose is unusual for a diabetic patient. At the same time, she establishes Daniel as an expert, and hence as the warrant for the legitimacy of her action: His reported *yes* (29) is presented as legitimizing the administration of that dose. The legitimizing function of DRS is made explicit by Ann's subsequent meta-comment *so I'm covered at that level*.

Excerpt 5 corroborates our previous observations. As part of a reported dialogue, DRS not only stresses the authentic character of the exchange, but allows the display of professionally appropriate conduct, staging the teller as a team member who asks relevant questions or brings up doubts based on analysis of the technical parameters at hand (Excerpts 2 and 5) or as caregiver who deals with a patient in an understanding and empathic way (Excerpts 3 and 4).

In addition, Excerpt 5 also illustrates the use of direct reported thought. By publicly demonstrating how actions are based on rational thought, nurses respond to the specific institutional need for displaying expertise and accounting for their own actions as being professional. Our data do not allow us to check whether the DRS has actually been produced or not. But this might not be relevant in the first place. What is analytically relevant, however,

is that talk addressed to oneself is selected to depict "thoughts appropriate to some situation and/or Membership Category" (Jefferson, 2004a, p. 136). Thereby, an institutionally relevant thinking-in-action gets depicted that functions as a display of the speaker's mastery of the professional code of conduct, offered for collective recognition and ratification. By the same token, a particular professional culture is being enacted, as well as the speaker's and the addressee's belonging to it.

DISCUSSION

This study explored the use of DRS in conversational stories during handover in two nursing care units. We used quantitative content analysis to show what sources are typically quoted as well as what kinds of content are brought up immediately preceding DRS. We used qualitative conversation analysis to document how DRS is sequentially embedded in stories as well as what kind of purpose it accomplishes for participants. Our study contributes to the extant scientific literature on DRS and sheds light on how DRS is used in workplace storytellings.

Our findings converge with others showing that DRS in conversational stories has the effect of augmenting the authenticity of the elements being reported (Holt, 1996, 2000), by depicting rather than describing (Clark & Gerrig 1990) selected aspects of speech produced earlier, thereby simulating direct access to the reported events. Our findings also converge with earlier work showing how the functioning of DRS is closely related to its local sequential environment and minutely coordinated with multimodal resources, such as the use of gaze, gesture and body movement.

Our study also offers several new insights as to the use of DRS in an institutional setting. The most immediately recognizable way in which institutional order is apparent in the use of DRS is through the limited range of sources quoted, as well as systematic differences between the care units in this respect (see Fig. 1). Micro-analysis of selected excerpts revealed in turn that quoting different sources appears to accomplish different kinds of purposes.

Self-quotes and reported thought seem to account for the speaker's professional rationality. They typically embody public displays of professional conduct and decision making in action, warranting peer recognition of the well-foundedness of the nurse's analysis and conduct in non-routine situations. This is done for instance by indexing the technical phenomena on which an analysis is founded (Excerpts 2 and 5) or by depicting the nurses' patience when dealing with patients (Excerpts 3 and 4). Self-quotes and reported thought allow direct access to decision-making processes and ways of dealing with (technically) complex tasks, similarly to the "war stories" reported by Orr (1996).

Direct quotes of other nurses (and possibly of doctors) seem to be used as public displays of the legitimacy of one's own actions or decisions. In Excerpts 2 and 5, they occur when the nurse recounts non-routine actions that deviate from official protocol, but that are presented as being called for by the special circumstances reported, and as being in accordance with a colleague's assessment of that situation. Thereby, legitimacy of one's actions and sharing of responsibilities is enacted, as well as working in a team.

Direct quotes of patients, by contrast, are instrumental in complaint stories and can be powerful instruments for conveying potential blame about the person being quoted. Nurses use DRS to stage the patient's conduct as an exemplification of his or her mood, state of mind or, more generally, character (another example of this can be seen in Excerpt 1, where DRS (8) is directly followed by an interpretation of a patient's attitude as expressing resistance to change (9)). By means of DRS, personal assessments can be implicitly conveyed in a way that is compatible with the shared professional code of conduct. Therefore, DRS of patients' talk allows nurses to compromise between a work ethic that calls for neutrality with regard to the patient and the need to share difficult, non-routine patient situations with other nurses. DRS constitutes an institutionally relevant technique in a professional context where a clear distinction between facts and their interpretation is a consequential issue.

The differential functioning of DRS described above is inscribed in some of its design features. For example, mimicry of voice tone in quotes of patients more vividly depicts their attitude, while mimicry of actions using gestures in self-quotes rather serves to enact physical aspects of a situation. And the absence of mimicry in quotes of other nurses indexes a stance of neutrality and matter-of-factness with which their talk is being reported.

That DRS may have different functions depending on the source quoted points to another aspect of our findings, namely how DRS indexes membership categories. DRS is *selected* speech. It is chosen to be reported as appropriate to a particular membership category, in two ways. It displays both the narrator's enactment of a membership category (for instance as a *nurse*) and his or her orientation to the membership category of the addressee (e.g. co-members of the category of nurses). At the same time, depictions of patient's character and behavior also index shared expectations about what does and does not constitute normatively acceptable behavior of members of the category of *patients*. Thus, DRS participates in what we might call *membership-bound tellings* (see Sacks, 1972b for membership-bound activities). As such, they are a way for nurses to accomplish the category "nurse" – and even "good nurse" – through talk-in-interaction, without overtly stating their membership in that category (Schegloff, 2007).

Possibly the most interesting implication of this analysis is an account of how DRS is involved in recounting *non-routine events*, i.e., events that – in our case – go against the normative expectations of the nurses' community of practice. That DRS indexes membership categories and their associated knowledge suggests that such knowledge is an important part of how people make sense of non-routine happenings. Indeed, part of the construction of such events as non-routine and newsworthy happens through the use of DRS which allows a contrast with unspoken but shared expectations of what constitutes the norm, the routine. The experiential realism enabled by DRS and enactments may facilitate the collective sense-making that has been identified as a key element of well-functioning teams.

CONCLUSION

Storytelling is a recurrent practice of nurses accomplishing their everyday professional business in handovers. It is instrumental in the social sharing of knowledge and experience and in the updating of collective mind among care unit members. In DRS, we observe nurses' "doing being professional", that is: displaying the rationality and professionality of their conduct and sharing it with others. This is a central part of the continual creation and consolidation of the nurse's community of practice. DRS is particularly instrumental as a device for constructing story events as non-routine and newsworthy by appealing to membership category knowledge like shared patterns of reasoning or shared expectations about appropriate conduct.

Finally, from an organizational perspective, our analysis of DRS in handover storytelling opens an interesting window on what is at stake in these meetings. They are not only a standardized communicative routine for transmitting medical or technical information in a narrow sense. They are also a place for sensemaking processes where the collective sharing and reconstruction of professional culture is materialized through stories (Orr, 1996). These stories are crucial in the transmission and conservation of the experiential dimension of the nursing profession. And the use of DRS is instrumental precisely in enacting that experiential dimension.

APPENDIX: TRANSCRIPTION CONVENTIONS

`[  ]`	onset and offset of overlap
`=`	intra- and inter-turn latching
`&`	turn continuation after overlap
`(.) (..) (...)`	unmeasured (micro-) pauses up to 1 s
`(1.5)`	measured pauses, in seconds
`coul-`	cut-off
`ti:me`	lengthening of preceding sound
`tirer?`	rising intonation
`ordinateur.`	falling intonation
`j'achète,`	continuing intonation
`vraiment`	stress
`NON`	loud voice
`°ça fait tout°`	soft voice
`>et ça ça<`	faster
`<tout ça coûte>`	slower
`(du;de)`	dubious hearing
`(xx)`	unintelligible stretch of talk

Gaze, posture and gesture are annotated in a separate line in < > brackets. DRS utterances are annotated in bold.

Chapter 7 - Interactional Territoriality During Meetings: Managing Participation Boundaries (Study 4) [5]

ABSTRACT

The study of meetings in organization sciences and I/O psychology has mostly consisted in identifying the factors predicting meeting efficiency and participants' satisfaction. These disciplines have overlooked the identification of processes of actual interpersonal coordination during meetings and the importance to relate these to the institutional aims of meetings. Here, we draw on sociological and psychological research in order to investigate how participants coordinate during nursing handover meetings by focusing on activity transitions during perturbations and the maintenance of the activity in the face of perturbations resulting from non-participants' interventions. We filmed handovers in four nursing units and took notes of the perturbations. We coded and analysed the notes in the four units and analysed perturbations qualitatively in one unit, by investigating their interactional management in the videos. We show that participants in meetings collaboratively establish and seek the preservation of their interactional territory, by managing its boundaries using verbal and bodily conduct. We show that the concepts of joint activity and interactional territory are useful for investigating perturbations of collaborative activities such as meetings as they allow to highlight the strategies participants mobilize when perturbations arise.

INTRODUCTION

There have been repeated encouragements to study meetings in related disciplines such as I/O psychology and organization sciences (e.g., Leach, Rogelberg, Warr & Brunfield, 2009; Rogelberg, Leach, Warr & Brunfield, 2006; Schwartzman, 1986; Volkema & Niederman, 1995), but these has not received much attention (Rogelberg, Leach, Warr & Brunfield, 2006) except in studies originating in conversation analysis. Among the few studies of meetings in organization sciences and I/O psychology, almost all are justified by the mention of significant and increasing portion of work time that employees spend in meetings (e.g., Luong & Rogelberg., 2005; Rogelberg, Leach, Warr & Brunfield, 2006). While this is a

[5] Mayor, E., & Bangerter, A. (2011). *Interactional territoriality during meetings: managing participation boundaries.* Manuscript in preparation.

point to which we subscribe too, a consequence of this emphasis on productivity issues is that studies have mostly focused on the efficiency of meetings and their impact on participants (e.g., disatisfaction). Predictors of perceived meeting effectiveness are for instance the existence of an agenda prior to the meeting, the timely starting and ending of a meetings and minutes taking during the meeting (Leach, Rogelberg, Warr & Burnfield, 2009). Attending more meetings, and spending more time in meetings reduces employee well-being (Luong & Rogelberg, 2005). This relationship is moderated by employees' perception of the effectiveness of meetings, task interdependence and individual factors (Rogelberg, Leach, Warr & Brunfield, 2006). Satisfaction with meetings is positively related to job satisfaction, and the former is a facet of the second (Rogelberg, Allen, Shanock, Scott & Shuffler, 2010).

The overall focus of these studies has been organizational (perceived effectiveness) and participant (their satisfaction and well-being) outcomes. What is overlooked, and possibly frequently taken for granted, is the actual achievement of moment-by-moment coordination during meetings. This lack of focus on actual coordination processes is a serious weakness of previous research. As the aim of meetings is mostly coordination in organizations (March & Simon, 1958), how this coordination is accomplished should be investigated for a better understanding of meetings. While actual coordination processes are worth investigating in their own right, such investigations could potentially lead to the discovery of practices that improve meeting effectiveness. The type of study we propose is therefore complementary to, rather than conflicting with, previous research.

A discipline which has extensively dealt with patterns of interpersonal coordination during meetings is conversation analysis. Subjects of inquiry are for instance: turn taking (e.g., Larrue & Trognon, 1993), plurilingualism (e.g., Mondada, 2004), laughter (e.g., Markaki, Merlino, Mondada & Oloff, 2010), disagreement (e.g., Kangasharju, 2002) and coalitions (e.g., Bruxelles & Kerbrat-Orecchioni, 2004) in meetings. But the organizational import of meetings has seldom been the focus of study in this literature (but see Boden, 1994). Examples of exceptions are the study of the coordination of meeting agenda (e.g., Deppermann, Mondada & Schmitt, 2010), the study of (dis)alignment during topic transitions in meetings (e.g., Mondada & Traverso, 2005) and participant-related perturbations during transitions between patient reports in medical meetings (e.g., Mondada, 2006a).

In this paper, we argue in favour of the microanalysis of patterns of interpersonal coordination during meetings, and of relating these to the organizational need to maintain the focus of the meetings in order to fulfil their aim (e.g., make a decision, transfer information,

brainstorm). Moreover, part of the dissatisfaction with meetings (Rogelberg & al, 2006) might originate from the difficulty to deal with perturbations and the stress that this occasions. Indeed, achieving and maintaining collaboration in face-to-face encounters, notably, requires much interpersonal coordination (Clark, 1996). Dealing with perturbations, such as interruptions, increases this necessity (Chevalley & Bangerter, 2010). Here, we will examine this coordination work at points of transitions between activities (e.g., the moment when participants suspend one task to deal with another) within meetings. This allows for the inspection of the practices or strategies that participants mobilize in order to manage their interactional territory (the area shared by people in interaction including themselves; Lyman & Scott, 1967) and permits to show the complexity of coordination during meetings, particularly in the face of perturbations. There is hence an interest in how the interaction between participants is affected by perturbations of the ongoing activity, such as demands from the environment resulting in attention sharing or switching (e.g., answer a non-participant's question, pick up the telephone, monitor the reason of movement in the room). More precisely, we are interested in investigating the problems participants have to solve in order to achieve collaboration in meetings, and how they deal with them. These problems are: how to coordinate the joint entry into interaction, how to maintain interaction in the case of competing demands (see Monsell, 2003), how to momentarily suspend it, and how to cease interacting. All these aspects are related to changes in interpersonal boundaries (navigation between interactional territories, or task switching) or attempts to stabilize interpersonal boundaries (remaining in the same territory).

Our corpus is based on data collected in four nursing care units during the handover meetings which occurred during one week of observation in each unit. This corpus is composed of the video recordings of each daily handover in all nursing units during 5 successive days, for which detailed transcriptions of perturbations were performed in one unit.

An observer also produced field notes of perturbations in all units. The notes of perturbations included the list of perturbations and the approximate time of their occurrence. We will analyse these notes and will also rely on interview data collected some months prior to the research in our description of the settings of data collection.

Before describing our study in detail, we first review the literature on two theoretical aspects of interest: a) interactions considered as joint activities, and b) territory and boundaries in interactions.

Joint Activities

Joint activities are activities that are performed by pairs or groups of individuals simultaneously and collaboratively (Clark, 1996). In contrast with individual activities which an individual can carry on independently, joint activities require coordination, which participants achieve by recourse to verbal and nonverbal language (e.g., gestures; Clark, 1999). There are hence two tracks in joint activities: basic activities and coordinating activities (Clark, 1999). According to Clark, *basic activities* refer to the official business of the encounter, in the context of meetings, institutional coordination (e.g., make a decision, transfer information on what has been done or what to do next). *Coordinating activities* refer to the interpersonal means of coordinating the official business of the encounter. Participants hence have to deal with coordination issues at different levels. They first have to coordinate how the official business is to be carried on collaboratively and the phases of such activities: their entry, body and exit (Clark, 1996). This requires negotiating five conditions of the official business: participants, roles, content, time and commitment (Clark, 1999). These aspects are not coordinated once and for all, for instance in the case of perturbations, but often involve repeated interpersonal adjustment. This is necessary to organizational coordination (the basic joint activity).

The boundaries of joint activities are hence continuously managed when perturbations arise during the joint activity. Our investigation hence requires broadening the concept of 'joint activity' (Clark, 1996, 1999): Clark's original concept of joint activities has dealt with constant participation , i.e., no change of participants from the beginning to the end of the joint activity (but see Chevalley & Bangerter, 2010) and common goals in the interaction. But, participation can be flexible and dynamic (e.g., Goodwin & Goodwin, 2004; Mondada, 2009). Clark's concept thus ignores the reality of joint activities in organizations, where people are often unwillingly interrupted at a high frequency (e.g., Jett & George, 2003), frequently have to deal with competing activities and switch tasks continuously (e.g., Gonzalez & Mark, 2004). Hence, exploring joint activities in organizations also requires a focus on the territories of interactions: Perturbations are threats to the joint activity as they abolish or suspend some of their negotiated features (see the five conditions of joint activities above). Interactional territoriality is a way to preserve interactions from perturbations (Lyman & Scott, 1967). We suggest that joint activities during meetings can be better understood with a focus on the interactional territory of the activity. Before we proceed to a more detailed description of our study, we first briefly discuss the concepts of boundaries and territories with a focus on entering, maintaining, suspending, resuming and ending interactions. These aspects will be further investigated in our study.

Territories and Boundaries

People organize their joint activities taking the socially determined territorial boundaries (e.g., who can be present for an activity; who are participants and non-participants) into account (Goffman, 1963). In Ashcraft & Scheflen's (1976, p.6) words, "People (…) recognize [the boundaries] in terms of their behaviour. They acknowledge a claimed space in their action. (…) For example, people orient their bodies in a particular direction and that orientation can lay claim for some increment of space for a period of time". In the case of face-to-face interactions, the boundaries are delimited by the position of the participants (Luhman, 1987). Lyman and Scott (1967, p.237) call 'interactional territories' the areas which are delimited by the arrangement of people in interaction. Similarly, Kendon calls an F-Formation (Kendon, 1990) the arrangement "in which the space between them [participants] is one to which they have equal, direct, and exclusive access" (p.209). Any spatial unit is a territory as long as it is "discernibly bounded, respected, and defended" (Scheflen & Albert, 1975, p. 159). In the case of interactional territories, participants' gaze and posture mark the interpersonal boundaries (Goffman, 1972): who (and what) is part of the interactional territory (Lyman & Scott, 1967), and who (and what) is outside of it. Hence, walls and doors do delimit the surface of the area (Goffman, 1963), a room for instance, where an interaction takes place, but the interpersonal territory is limited to a subset of this area (the space shared by people discussing, or working together, including themselves). Entering the area is nevertheless likely to be perceived as a signal of a potential intrusion of the interpersonal territory. As boundaries are open to transformations that participants can operate by their presence and actions (Aschcraft & Scheflen, 1976; Lyman & Scott, 1967; Taylor & Brooks, 1980), it follows that territories are not given, but express "space as lived experience" (Tayor & Spicer, 2007, p. 333), i.e., the negotiation and production of boundaries through coordination. One of the aims of such territorial boundaries is the preservation of the integrity of joint activities.

Encounters are generally composed of interactions between ratified participants, and differ on their acceptance of intruders (bystanders, Goffman, 1963). There are some in which only members are accepted, and others, which Goffman calls 'accessible' (Goffman, 1963, p. 153), in which non-members (bystanders) are allowed to attend the exchange, but do not contribute to it, usually. Sommer (e.g., 1959; 1962; 1967) has shown that individuals are sensitive to the mere presence of others, and that the emergence of collaboration is dependent upon spatial matters, i.e., the distance between individuals, their entering in a shared location. For example, when a new participant enters an interaction, its boundaries are redefined as to include the newcomer (Luhman, 1987).

Managing the Boundaries of Territories in Interaction

Below we propose a literature review on the way participants in interaction negotiate the boundaries of their interactional territory and related aspects. This review is organized in relation to the features we will investigate in our study.

Beginning Interactions.

Participants in the encounter have to coordinate the beginning of their engagement (e.g., Schegloff, 1968; Pillet-Shore, 2010), but also the maintenance (Bangerter & Clark, 2003) and the end of it (Clark, 1996; Schegloff & Sacks, 1973). Considering coordination of the beginning of encounters, Mondada's 'interactional space' (2009) is a relevant aspect in the study of interpersonal boundaries, as it refers to the establishment of verbal interaction by means of bodily conduct: Participants first nonverbally signal their intent to enter interaction before producing talk. The presence and availability of individuals is indeed a requirement for them to be considered as participants of the encounter by the other participants (Goffman, 1963). The term 'copresence' (Goffman, 1963, p. 22) encompasses physical presence, availability to others, and the knowledge of others of this presence and availability (Goffman, 1963). Available individuals usually provide one another with 'co-presence acknowledgments' (Schegloff, 2004, p. 80) to signal the possibility of the initiation of an encounter, or the possibility for its continuation (Szymanski, 1999). Copresence is a requirement for the beginning and maintenance of the encounter, but doesn't entail an obligation to it (Goffman, 1963). Once copresence has been acknowledged, participants still need to coordinate their entry in the interaction. This is actively performed by participants, who collaboratively get to establish the mutual belief that they successfully entered interaction (Clark, 1996; Mondada, 1999). Examples of ways of accomplishing the entry into joint activities are explicit statements, like "let's start" or the use of markers, like 'okay' (Bangerter & Clark, 2003).

Maintaining and suspending interactions in the face of perturbations.

Copresence is a temporary state, and manifestations of this availability must be regularly provided, usually nonverbally (e.g., gaze and body orientation; Goodwin, 1984), as "lack of attention or coordinated response constitutes a breach in the mutual commitment of the participants" (Goffman, 1963, p. 90). Coparticipants constantly monitor the state of copresence, and when participants witness such breaches, they usually produce verbal (Goodwin, 1981) and nonverbal requests (Heath, 1984) for attention, to which the thereby summoned participants usually respond providing proof of their availability to interact. Failure to provide such proof of availability can hence be treated as a sign of not participating in the exchange anymore (Goodwin, 2002).

The interactional territory, and hence the interaction itself, are actively preserved against intrusions by the group which owns it (Ashcraft & Scheflen, 1976; Goffman, 1971). It is nevertheless (perceived as) an invasion (Goffman, 1971) to join the group or stand in the trajectory of participants' gazes and hence "block the free exchange of glances" (Goffman, 1963, p. 161) usually taken for granted during face-to-face interaction. This is similar to the invasion of the space of a person (Felipe & Sommer, 1966), and people in organizations are annoyed when someone invades their territory, and act in ways they presume will restore their rights (Brown & Robinson, 2011). Non-participants and arriving participants are sensitive to these risks and knock or use other signals to announce their arrival as a means to request attention in order to enter an existing encounter or initiate another one (Pillet-Shore, 2008). Non-participants also show reluctance to enter the boundaries of the space that is shared by people discussing (Efran & Cheyne, 1974; Lindskold, Albert, Baer & Moore, 1976). Participants are "entitled to defend and protect their conversational territory from entrance by newcomers." (Pillet-Shore, 2010, p. 172). But they not always deal with the intrusion and sometimes prefer to ignore it (Pillet-Shore, 2008).

Participants in the encounter have to coordinate their actions as the interaction proceeds (e.g., Clark, 1996; Kendon, 1990). This process is vulnerable to perturbations, such as demands competing for attention with the current activity (e.g., someone entering to room, a non-participant's request, the ringing of the phone). A particular type of perturbation, which we call 'non negligible' occurs when a participant whose availability is required is fully diverted from his previously dominant activity. When non negligible perturbations arise, participants are faced with the dilemma of dealing with simultaneous involvements (Goffman, 1963). Simultaneous involvements can be described on two dimensions (Goffman, 1963). A first dimension is related to the degree of attention that is given to an activity at specific moments of the encounter. A second dimension is related to the priority given to the activity during the encounter. When at least one participant is fully diverted from the dominant activity, i.e., when she or he cannot attend that activity anymore, a cooperative breakdown (Bardram, 1998) occurs. In face-to-face interactions, participants can mark the suspension of a topic before the switch to a verbal activity not directly related to previous talk using discourse markers (Bolden, 2009). Diversions that do not require a high degree of attention still can provoke perturbations of the dominant activity, but to a lesser extent and hence do not usually lead to cooperative breakdowns.

Resuming interactions.

Participants to meetings signal they are ready to resume after having switched to other activities (Deppermann, Schmitt & Mondada, 2010). Indeed, in resuming joint activities, there is a requirement that all participants are available (Chevalley and Bangerter, 2010), i.e., ensure copresence. In order to establish copresence, participants rely on implicit cues such as gaze (Goffman, 1963) or more explicit verbal statements (Chevalley & Bangerter, 2010). Longer suspensions lead to more politeness statements and more collaborative effort when resuming (Chevalley and Bangerter, 2010). As joint activities are composed of hierarchies of coordinated individual actions (Bangerter & Mayor, 2011; Clark, 1996), it is interesting to discuss how people resume their individual tasks after a suspension. A suspended activity can only be resumed when what triggered its suspension has been dealt with (Miyata & Norman, 1986; Szymanski, 1999). Cues (Altman & Trafton, 2004) and reminders (Miyata & Norman, 1986) can help in the recovery process. Being able to prepare for the suspension also helps in the recovery process and the beneficial effect of preparation is related to the encoding of prospective tasks it helps creating (Dodhia & Dismukes, 2009). The resumption is also facilitated by the explicit mention of the boundaries of the perturbation (Dodhia & Dismukes, 2009). People do not resume their activity right after the end of an interruption but only after a resumption lag and actions performed after a suspension take longer than if performed without suspension (Altman & Trafton, 2004). Chevalley and Bangerter (2010) argue that the commitment of the partners to interact might serve the role of reminders in their joint activity, and that when commitment is low, participants are less likely to resume. The onset of resumption can be the verbatim reproduction (recycling) of talk preceding the interruption (Chevalley & Bangerter, 2010). Researchers in conversation analysis have shown that participants can use markers when resuming their topic after parenthetical sequences (e.g., Mazeland, 2007). Resumptions are often marked as such by the recycling of the preceding utterance (Schegloff, 1987) or explicit statements (Schefloff, 2002). Participants also can use prompts to request from a speaker the resumption of an suspended talk (Lerner, 2004), as well as ‘questions’, ‘noticings’ (observations) and ‘announcements’ to re-engage talk after a suspension in a collaborative activity (Szymansky, 1999, p. 3).

Ending interactions.

The way participants end their interactions has been a focus of research in conversation analysis and psychology. Again here, participants need to achieve coordination. Schegloff and Sacks (1973) have shown that the end of casual conversation is usually preceded by a preclosing section which serves to signal the imminence of the end of the conversation, and a closing section which serves to coordinate the exit of the interaction (suspend the pertinence of the turn-taking machinery). Doing this might be a way in which participants protect each other's face (Goffman, 1967). This view is somewhat similar to Albert & Kessler's (1978) and Clark & French's (1981) who consider that the end of conversations serves the function of prefacing the continuation of the relationship between participants. Conversation endings are often composed of several kinds of statements that focus either on the current interaction, on further interactions, or on the well-being of the participants (Albert & Kessler, 1978; O'Leary & Gallois, 1985). Clark and French (1981) have also shown that the end of interactions are composed of 'topic termination', 'leave taking' and 'contact termination' (p. 16), the leave taking part being focused on the social relationship. This focus on social relationships can also be found in meetings. For instance, Bales & Strotbeck (1951) observed that joking frequently accompanied the end of meetings. Participants ending their interaction use different verbal (Bangerter, Clark & Katz, 2004) and non-verbal (O'Leary & Gallois, 1985) conduct in ending interaction than during the interaction. Participants in meetings orient toward the timely ending of their contribution when specific time lots are specified (Arminen, 2001) and to their surroundings (people and artefacts) in the closing of encounters. The role of assessements (Antaki, 2002), address terms (Jefferson, 1973) and rhythm (Auer, 1990) in ending conversations have also been investigated.

THE AIM OF THIS STUDY

The aim of this study is the examination of the way participants collaboratively manage the boundaries of their interactional territory during nursing handover meetings. In the above literature review we have shown that the boundaries of interpersonal territories need to be actively managed by participants in order to maintain the integrity of interactions. Studies have investigated the processes by which participants achieve such coordination, but have only investigated some aspects of the process, for instance boundary management at the beginning of interactions (e.g., Mondada, 2009), the request of proof of availability to interact (e.g., Heath, 1984), and the manifestation of such availability (see Schegloff, 2004)

without investigating a larger range of aspects. Moreover, these studies seldom investigated the management of the boundaries of interactional territories in meetings (for an exception, see Mondada, 2006a). We do so by exploring a variety of specific coordination problems participants collaboratively deal with in meetings: their establishment, maintenance and suspension in the face of perturbations, reestablishment, and their end. While these aspects are worth investigating in their own right, we also relate boundary management to the accomplishment of the institutional aim of meetings in the face of perturbations. Below we present our research questions which detail the aim of the study into specific points of interest.

Research Questions

The focus of this study is on how perturbations of meetings affect the way participants interact with one another and with their environment. Handover meetings usually happen in multi-use rooms. Prior, during and after the handover, nursing personnel and other professionals, such as physicians, go in and out of the room, and perform activities of their own, comment on the content of the meeting and ask questions. We examine who are the sources of perturbations, what their types are, and how these perturbations are dealt with.

Investigation of Quantitative Aspects.

The relevance of a qualitative analysis of perturbations is to be related to preliminary quantitative questions which are:

1a) *how often do perturbations arise in nursing units?* Our first step is to quantify the perturbations in our data. The result of such analysis allows to better assess the relevance of our subsequent questions. If perturbations occur frequently, it is not only of theoretical interest to examine who is the source of perturbations, what their type is and how perturbations are dealt with. In this case, there is also a practical interest, for the design of handover meetings, in examining perturbations in such a detailed way.

1b) *Who and what are the sources of perturbations in meeting?* We are interested in knowing the sources of perturbations (e.g., people, phones, pagers ?) and quantifying the perturbations occasioned by each type of source. Handovers are performed in the nursing station. Several professions have access to the nursing station in order to perform different types of activities. We will quantify how often the different sources produce perturbations of the interactional territory and examine potential differences between nursing units in this respect.

1c) *What are the types of perturbations of meetings?* We are here interested in the way the handover is disturbed. Some types of disturbances, e.g., those involving verbal interactions might be more of a nuisance than others, e.g., entering the room. We will quantify the sources and types of perturbations in the units and ask whether these are different across settings.

Investigation of Qualitative Aspects.

Our main aim is to investigate how participants deal with the boundaries of the interactional territory of their meetings with a focus on the collaborative management of perturbations in meetings. The approach we will pursue is to investigate these aspects in detail, examining the interaction closely, in a variety of situations involving boundary management, in order to derive conclusions about the way the boundaries of the interactional territory are actually dealt with (i.e., we seek to ascertain the validity of our claim about our object of study, Yin, 1993). We will seek to answer the following questions:

2a) *How do participants begin their meetings and how does this contrasts with activities preceding the meetings (how is the transition performed)*? The handovers are accomplished in multi-use rooms where several activities can be carried out simultaneously. Some of these are of interactional nature (e.g., people discussing clinical or organizational topics). We will first describe the variety of these activities and then examine the way participants get to coordinate the transition to the beginning of the handover, our main point of interest here.

2b) *How do participants end the meeting and how do they perform the transition to other activities?* Ending a collaborative activity involves coordination issues for participants (Clark, 1996), as all of them have to agree on the moment at which the activity is over in order to switch to other activities (individual or collaborative). We will explore how participants get to agree on the moment of the ending of the meeting and how they perform the activity transition to subsequent tasks.

2c) *How do participants manage the boundaries of their interactional territory in the face of perturbations in order to maintain the integrity of the meetings (minimize the impact of perturbations)*? Perturbations of the handover meetings are frequent. It is probable that participants get to develop strategies that allow them to actively manage the boundaries of the interactional territory in order to ensure the continuation of the meeting. We will examine how they are accomplished by participants. We will also examine how participants deal with recurrent perturbations from a person (marginalizing stratagies).

2d) *How do participants manage to momentarily exit the boundaries of their interactional territory (suspend the meeting) in order to deal with perturbations*? When perturbations require to be addressed by participants (e.g., an urgent question of a non-participant), the people who address the perturbation temporarily exit the boundaries of the interactional territory of the meeting and manage the transition to the other activity (e.g., answer the question). We will examine how this is accomplished by participants.

2e) *How do participants put an end to the perturbation and re-enter the boundaries of meetings (resume the activity)?* Once the perturbation has been dealt with, the participants need to coordinate the reestablishment of the interactional territory of the meeting in order to pursue. This requires that participant each shows an orientation to the interactional territory so that they know when they are ready to resume. We will explore how participants show such availability and how the meetings are reinstated after a suspension.

In dealing with these questions, we will also show that there are common elements in the management of the boundaries of the interactional territory in all of these cases, i.e., the resources participants use to manage the interactional territory. We will provide descriptions of how nurses accomplish their reports, for instance before, during and after perturbations.

Methodological Strategy

Our investigation of the management of boundaries of the interactional territory during meetings draws upon case study methodology. "A case study is an empirical inquiry that investigates a contemporary phenomenon within its real-life context" (Yin, 2003, p. 13). We will answer our research questions on quantitative aspects (1a to 1c above) using simple descriptive statistics as this requires counting the number of perturbations fitting in each category. This part of our study relies on coding of notes of perturbations taken in each unit. We coded the notes for the sources of interruption. The categories are Mixed groups (Nursing personnel + Physicians), Nursing personnel, Physicians, Phone, Patient, Other. We also coded the notes for the types of interruptions. Categories are Entry (someone enters the nursing station), Entry with verbal interaction (someone enters the room and engages in a verbal interaction with the nursing personnel), Exit (someone exits the nursing station), Exit with verbal interaction (someone exits the nursing station and engages in a verbal interaction with the nursing personnel), Verbal interaction (someone engages in a verbal interaction with the nursing personnel without entering or exiting the nursing station) and Other. Two coders coded 40% of perturbations for source and type in order to assess interrated agreement, which was good (both kappas > .78).

We will explore our research questions on qualitative aspects (2a to 2e above) using microanalyses of interactions inspired from conversation analysis. The microanalyses of interactions allow to investigate the detail of the collaborative actions participants mobilise in order to manage the boundaries of their interactional territory, which is necessary to answer our research questions.

THE SETTING OF DATA COLLECTION

We will investigate the boundaries of interactional territories of nursing handovers meetings in hospitals. Nursing handovers are meetings during which nurses who finished their shift describe the treatment and care of patients to nurses arriving in the unit. Care assistants can also be present during the handover meeting. What is particular to this type of meetings is that perturbations, such as interruptions, are frequently embedded within the activity (Meissner, Hasselhorn, Estryn-Behar, Nézet, Pokorski & Gould, 2007). Moreover, disruptive behaviour is not infrequent in hospitals (see Rosenstein & O'Daniel, 2006). Participants' efforts to create and maintain their interactional territory are hence more visible here than in other meetings. This affords us with the opportunity to study how these are dealt with by meeting participants.

Hospitals are organizations that feature a high degree of specialization and role diversity. Hospitals are organized by wards which usually relate to a specific medical speciality (e.g., surgery, intensive care, traumatology; Van der Geest & Finkler, 2004). There are broadly 3 main categories of healthcare professionals: physicians, nursing personnel, and allied professionals (British Medical Association, 2009). Each category is further divided in different statuses (e.g., in the case of nursing personnel, usual statuses include: healthcare assistant, registered nurse, ward manager). There are supplementary roles for the handover: outgoing and incoming nursing personnel. Outgoing nurses have taken care of patients during the previous shift. They also have coordinated with physicians, laboratory personnel and other professionals. Outgoing nurses are thus in possession of up-to-date information about the condition of the patients and their treatment. When incoming nurses arrive in the unit to begin their shift, their knowledge of specific patients can be recent (e.g., from the previous day), more ancient (e.g., after 2 days off) or inexistent (the patients have arrived after the nurses last left the unit). The incoming nurses are hence relatively ignorant of the patient status and condition and need to be informed by their outgoing colleagues. This is achieved collaboratively (Bangerter, Mayor & Pekarek-Doehler, 2011). They also need to consult the documentation for more specific information in order to deal with their clinical activities. We will show that these roles also have their importance in dealing with perturbations, as they can organize the distribution of labour in this respect.

Participating Units

The nursing units in which we collected our data are two general surgery units (hereafter surgery units) and two intensive care units of surgery (hereafter ICUs) from a public and a private hospital. These units participated in a first interview-based study about such meetings (Mayor, Bangerter & Aribot, in press). Parts of the descriptions of the units below are based on these interviews in which we asked head nurses about handovers and work in their unit, some months before collection of observational data for this study. We will also qualitatively analyze video recordings of handovers that were quantitatively exploited elsewhere (Mayor & Bangerter, 2011a). In the case of both institutions, we first contacted the nursing direction and explained that we were interested in filming handovers in two nursing units of the mentioned types in order to analyze discourse processes while these are performed. Our request was accepted with interest. We then contacted the head nurses of the selected units and explained our project. Again, this was accepted. We gave the head nurse of each unit a poster to display in their unit. The poster presented the study in detail, and included the schedule for the study as well as our phone number and e-mail addresses. Below, we describe each of the units.

The Units of the Public Hospital.

The public hospital has a capacity higher than 500 beds. It has several sites, each with a dedicated specialty. The surgery unit in which we collected data has a capacity of 16 beds. A total of 18 persons serve as nursing personnel in the unit. The nurses work on average 38 hours per week in the unit, usually in shifts of 12 hours. Handovers occur 3 times a day. Scheduled times are 7 AM, 7:15 AM and 7:15 PM. The 7:15 morning handover serves to transfer patient information to personnel who have been absent for several days. The other two handovers serve to transfer information from shift to shift. This unit features the most handovers, and the participants are more visible in the videos of this unit. It was hence selected for a thorough analysis of perturbations (see research questions 2a to 2e below). In this unit, the day starts with the administration of drugs, collection of blood samples, delivery of breakfast, grooming of patients, lifting of patients, cleaning of beds and planned admissions. Then the personnel performs the change of dressings, treatment and care and accompanying administrative activities, mostly for traceability reasons. Around 11 AM, the care assistants distribute patient meals. The personnel take their meal in two groups, at 11:30

and 12 AM. In the afternoon, patients requiring surgery go to the operating room and return from the recovery room and other patients are transferred. Medical rounds occur in the afternoon. They are followed by treatment and care according to medical orders. At 16 PM, the nurses prepare the material and treatment for the first round of the night nurse and her assistant and continue to administer treatment and care. Care and treatment is continued throughout the night by the night nurse.

The ICU has a capacity of 5 beds. A total of 20 persons serve as nursing personnel in the unit. The nurses work on average 39 hours a week, usually in shifts of 12 hours. Handovers occur twice a day. The scheduled times are 7 AM and 7 PM. Both handovers serve to transfer patient information from shift to shift. The handovers in this unit are composed of two parts. A first part is a group report. The second part is itself composed of several simultaneous one-to-one reports (each outgoing nurse giving a report on her patients to each incoming nurse). In order to maintain comparability with the surgery units, we only considered the first part (the group handover) in our analyses of perturbations in this unit. Technical problems rendered the recordings of one handover in this unit unusable. The day in the unit begins with the delivery of the breakfasts of conscious patients, the nursing rounds and the administration of drugs. It is followed by the administration of care of the morning, hygienic care, and patient exercises. During that time, the healthcare assistants clean the beds and the material. The physicians' rounds occur around 9 AM. Planned transfers of patients occur approximately at 11 AM and patients eat approximately at noon. Nursing personnel eat in two groups at 12:15 AM and 1 PM. The admission of patients who have undergone surgery occurs at 1 PM. At that time, the team which is not eating begins providing care and treatment according to the medical rounds of the morning, which continues to be performed until 18:45 PM. At that time, conscious patients receive their evening meal. Care and treatment continues to be administered throughout the night, according to medical orders and upcoming contingencies. Patients are monitored day and night by means of frequent rounds as well as screens in the nursing station which display vital functions.

The Units of the Private Hospital.

The two remaining units, of the same types as in the first institution are part of a large private hospital which also featured different hospital sites. We collected our data in one site dedicated to surgery. Its capacity is 150 beds. The surgery unit in which we collected data has

a capacity of 28 beds. A total of 22 persons work as nursing personnel in the unit. The nurses work on average 37 hours per week in the unit, usually in shifts of 12 hours. Some months prior to data collection, this unit has switched from 3 handovers a day, like in the surgery unit of the public hospital, to 2 handovers per day. The handovers take place around 7:30 AM and 7:15 PM. Both handovers serve to transfer patient-related information from the outgoing team to the incoming one. In this unit, evening handovers are simultaneously performed in 2 groups. In each group, the nurses who have taken care of patients during the day discuss their treatment and care with their arriving colleague. In this unit, the day starts around 6 AM with the last rounds of the night nurses who take notes of vital signs, collect blood sample, and greet the patients. After the handover, patients requiring surgery are transferred to the operating room. Patients recently admitted are taken care of, medication is distributed or injected. Patients eat around 8 AM, after which grooming care is performed. Around 9:30 AM, the dressings are made and patients are transferred back from the operating room or the recovery room, depending on the procedure they have undergone. At 10 AM, the physicians come in for their rounds and give their orders. The catering personnel distribute the meals at 11:30. At 2 PM, groups of two nurses perform their round in each patient room. They verify the vital signs and administer personalized treatment. Then then fill in documentation regarding the upcoming discharges of the day and prepare the medication for patients discharged later in the afternoon. Around 3 PM, other patients return from the operating room and are closely monitored. Nurses perform the transcriptions of medical orders of these patients in their patient files. Around 4 PM, the patients who will undergo surgery the next day are welcomed and installed. Blood tests, radiographies and other anamnesis-related activities are performed. Other care activities continue. Nurses perform the last day-rounds around 6 PM, controlling vital signs, performing post-surgery examination and say good-bye to patients leaving the unit. The evening medical visit occurs at 6:30 PM. Around 8 PM, the night nurses perform their first night rounds and prepare the medication for the next day around 10PM. Care and treatment continues throughout the night

The ICU has a capacity of 7 beds. A total of 29 persons work as nursing personnel in the unit. The nurses work on average 39 hours per week in the unit, usually in shifts of 12 hours. The handovers occur twice a day, at 7:45 AM and 8 PM. The handovers in this unit are also composed of two parts. A first part is a group report. The second part is also composed of several simultaneous one-to-one reports. In this unit, one outgoing nurse is briefed on all the

patients by her outgoing colleagues prior to each handover. This person then gives the report on all patients to her incoming colleagues, while the other outgoing nurses are outside of the handover room and take care of patients and of perturbations. In order to maintain comparability with the surgery units, we only considered the first part (the group handover) in our analyses of this unit. Technical problems rendered the recordings of one handover in this unit unusable. The day starts with the lifting of patients, the sending and reception of laboratory samples and results, and the grooming of patients. It continues with the care of patients (such as physiotherapy, injection of drugs, making of dressings), the medical rounds and different medical examinations around 9 AM. The patients eat around noon. Next, the nursing personnel continue to give patients treatment and care until their next meal at 7 PM just before the handover. Care continues at night, and patients requiring physiotherapy receive it around 2 AM. Nurses constantly monitor patients by sitting in front of the patient room, taking note of changes in their vital functions and act upon contingencies.

FREQUENCY, TYPES AND SOURCES OF PERTURBATIONS

Before we proceed to the analysis of the management of boundaries of the interactional territory, we propose some descriptive statistics related to the frequency of the perturbations in the four units where we collected the data, the types of perturbations and who (role) or what produces the perturbations, thereby answering our quantitative research questions (1a-1c).

In the public hospital, there were 103 perturbations in the surgery unit (during 340 analyzed minutes, 1 interruption each 3.30 minutes) and 37 in the ICU (during 90 analyzed minutes, 1 interruption each 2.43 minute). In the private hospital, there were 117 perturbations in the surgery unit (during 390 analyzed minutes, 1 interruption each 3.33 minutes) and only 1 perturbation in the ICU. This unit presented an efficient protective strategy against perturbations: The handovers here didn't occur at the nursing station but in a break room. As discussed in the presentation of this unit above, nurses were posted outside the room where the handover occurred and took care of perturbations. There was hence no need to manage the boundaries of the interpersonal territory of the handover, as the area in which the handover occurred was protected from intrusions. This strategy was very efficient, as it allowed handovers to occur smoothly, with only one perturbation during the week of observation.

Figure 5. The outgoing nurse gives the report crouching in front of the door because of the lack of seats and space.

In this unit, participants were quite sure that no perturbation of the handover would occur and thus dispatched in all the space of the small break room during the handover. For instance, in Figure 5 the outgoing nurse gives the report crouching in front of the door because of the lack of space and seats in the break room. Incoming nurses are on his right and in front of him. Patients' breakfasts have previously been prepared on the table and will be delivered after the handover.

Other units dealt with perturbations in an ad hoc manner. We will explore the use of these ad hoc strategies in the remaining units. Before this, we first present the sources of perturbations and the types of perturbations in these units.

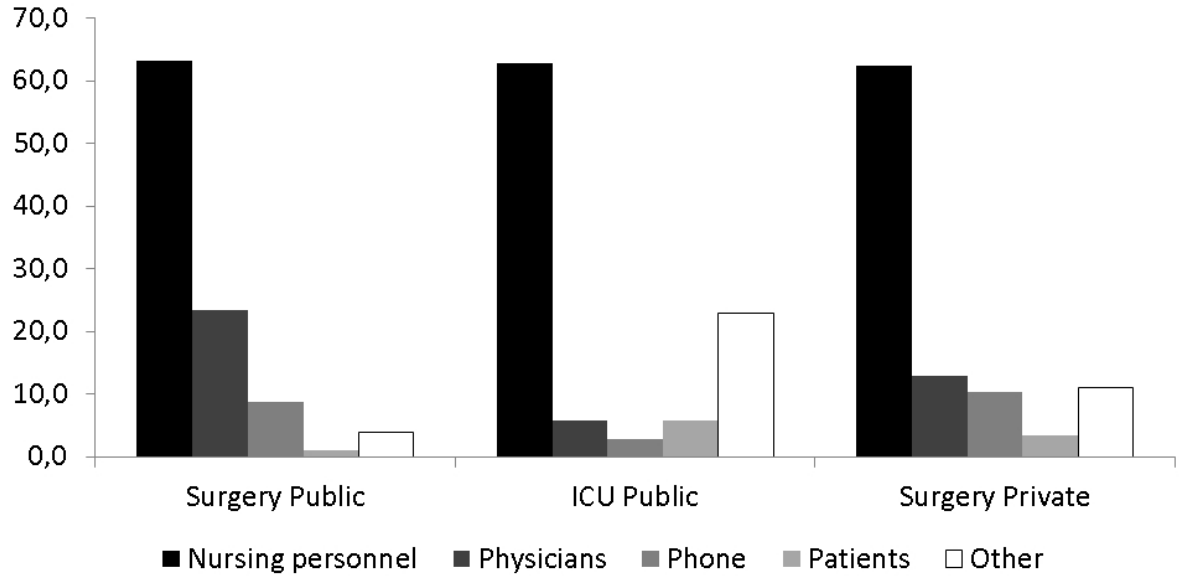


Figure 6. Distribution of sources of perturbation (percentages add to 100% within nursing unit).

Figure 6 illustrates the distribution of sources of perturbations in these units. In the 3 units, Nursing personnel is the modal category, accounting for two-thirds of the perturbations. Physicians produced more perturbations in the surgery unit of the public hospital than in the ICU of the public hospital where it was anecdotic. The surgery unit of the private hospital lies in between these two units regarding the frequency of Physician as sources of interruption. The category Phone accounted for more perturbations in both surgery units than in the ICU where it was scarce. Perturbations caused by patients were rare in all units. Other sources (e.g., noises from the environment) were rare in the surgery unit of the public hospital, but frequent in the ICU and moderately frequent in the surgery unit of the private hospital.

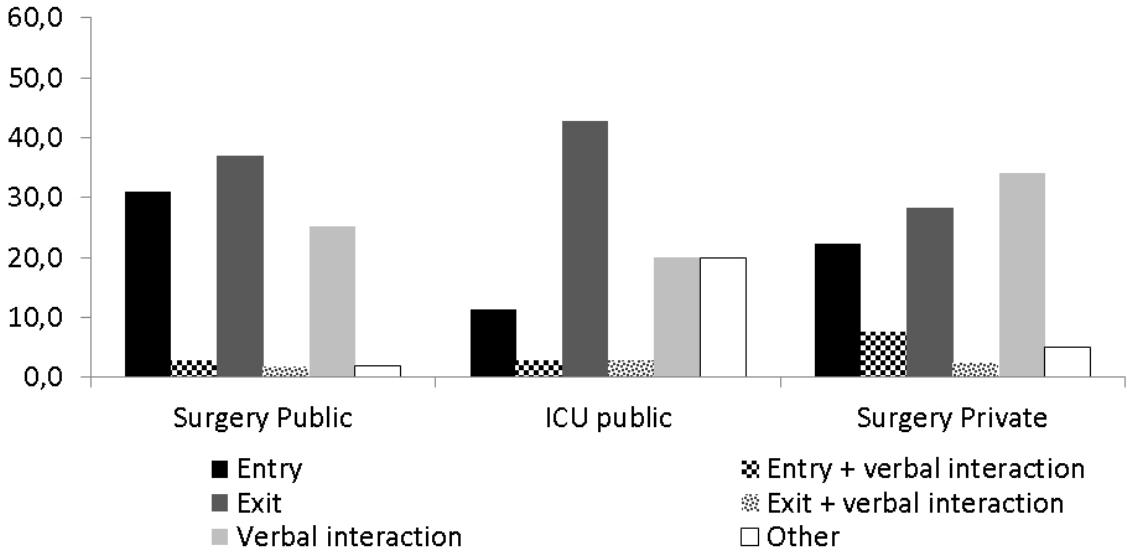


Figure 7. Distribution of perturbation types (percentages add to 100% within nursing units).

Figure 7 presents the distribution of types of perturbations in the 3 units. As Entries and Exits with verbal interaction are rare in all units, we will not further comment on these categories and focus on differences in the other categories between the 3 units. Entry accounts for much more perturbations in the surgery unit of the public hospital than in the ICU of the same hospital. The frequency of this category lies in between the two other units in the surgery unit of the private hospital. The category Exit accounts for less of perturbations in the surgery unit of the public hospital than in the ICU. It is the modal category in both units of the public hospital. The frequency of Exit in the surgery unit of the public hospital is similar to the one found in the public hospital surgery unit. The category Verbal interaction accounts for more perturbations in the surgery unit of the public hospital in the ICU. The unit with the higher proportion of Verbal interaction is the surgery unit of the private hospital. Verbal interaction is the modal category in this unit. In this unit, the category Other is more frequent than in the other 2 units, where its frequency is anecdotal.

MICROANALYSIS OF THE MANAGEMENT OF BOUNDARIES OF THE INTERACTIONAL TERRITORY

The analyses we propose in this section are inspired from conversation analysis. We proceed to sequential descriptions of how participants in the handover deal with the boundaries of their interactional territory during handover meetings. We focus on the management of these boundaries during the maintenance of the handover meeting in the face of perturbations, and during transitions in the handover (entering, exiting, suspending and resuming handovers). This focus on transitions and management of perturbations allows us to relate the patterns of interpersonal coordination with the institutional requirement of information transfer during shift handover meetings. The detailed analysis of the excerpts in the following sections also allows to investigate how nurses perform the handover in the absence of perturbations, or in simultaneity to perturbations.

The Beginning of the Meeting

Starting the handover is always preceded by a prehandover phase (see Grosjean & Lacoste, 1999), as not all nurses arrive in the nursing room at the same time. This is often composed of a discussion between present nurses, and nurses reading and writing in patient files while waiting for the other nurses to come. The handover then starts with a participant (outgoing or incoming) declaring the start of the activity by discourse markers, or more elaborate utterances (like in excerpt 1b below). We describe below the entry in one handover with a detailed analysis of excerpts. These excerpts are taken from a morning handover. The handover starts with the update of a first patient at the end of the excerpt. Before presenting the excerpt, we describe several activities participants are doing before the excerpt begins. This illustrates the diversity of activities that happen in the unit in preparation to starting the handover.

In this excerpt, the first nurse to arrive for the handover is an outgoing nurse we call Paul who is busy consulting and writing in a patient file when the recording begins (see Figure 8A). He is shortly joined by the other outgoing nurse, who we call Pam. Pam comments about a patient's wife who has just called in order to make sure the nurses do not take off his socks as he is sensitive to cold (see Figure 8B). Both nurses discuss the situation with surprise. They then go back to their files, and then discuss a treatment issue. This done, they continue to consult files and write in them. A moment later, Pam complains that no one is coming for the handover. This complaint is validated by Paul. Later still, a physician (who

doesn't talk in next excerpt) enters the room and chats with Pam. They discuss the fact that he has been working in the intensive care ward for some time and that he is back in the surgery unit now. A healthcare assistant (not in the excerpt) then enters the nursing station, followed by the head nurse (called Ema here) who finishes talking with someone while entering. The other person doesn't enter the room, at that time at least, so we don't know whether she or he is a participant in the handover or not. Some seconds later, another nurse enters the room. We call her Sara. The healthcare assistant exits the room and comes back a moment later to take a document in the shelf and then goes off camera. Ema prepares some documents. After this another physician (not in the excerpt) arrives. He greets the first physician and is greeted by Ema. She discusses the present study with him. Paul picks some documents from the shelf. Ema and Sara then discuss the clinical activities displayed on the white board while the second physician picks some document from the shelf. Paul is then included in the discussion (see Figure 8C). He then stands up and goes to the medicine cabinet, picks up something and goes back to his chair. The excerpt starts with Ema asking whether the late nurses have called.

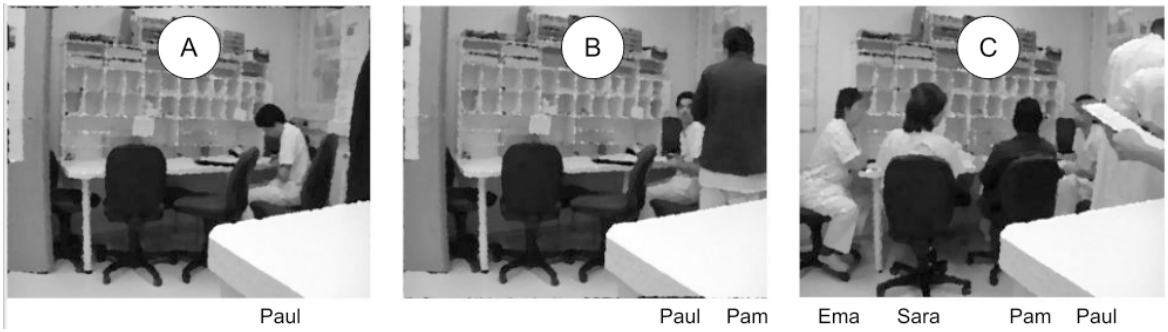


Figure 8. Participants arrive at different moments. Figure 8A: Paul is alone in the room, working on a patient file. Figure 8B: Pam arrives in the room. Both nurses discuss a phone call. Figure 8C: Most participants are present and chat while waiting.

Excerpt 1a

1	Ema	elles ont pas appelé les filles qui manquent? *didn't they call the girls who are missing*
2	Pam	qui c'est qui manque? *who is it who's missing*
3	Sara	non mais Lea elle vient à huit heures elle a dit *no but Lea comes at eight she said*
4	Ema	et Deb *and Deb*
5	Sara	elle est là *she is here*

At line 1 of Excerpt 1a, Ema asks whether the absent nurses have called. She describes these nurses as 'missing'. The choice of wording indicates that the nurses are expected to be present at that time and place, i.e., for the handover. At line 2, Pam initiates a side sequence by asking who is missing. The answer to Pam's question (who is missing) is notably absent, as next turn (line 3) is Sara's answers to Ema's question in line 1. During her turn of talk, Sara first says that the nurses didn't call and then adds that Lea said that she will come at eight. In reference to Sara's turn at line 3, Ema's question (line 4) can be heard as *and Deb, when is she arriving*. A question which is answered by Sara at line 5 (*she's here*).

The previous excerpt shows that nurses orient to the organizational need for the required participants to be present before starting the handover. Organizational rules hence shape the behavior of participants in relation to their interactional territory of handover. The interactional territory (who and what is part of it) is so to say anticipated by the present participants. The way organizations can shape participant interactions has mostly been investigated in relation to turn-taking (see Drew & Heritage, 1992). This excerpt is followed by half a minute of mostly inaudible talk and a discussion about who has seen Deb that day (not transcribed here). In excerpt 1b, the continuation of Excerpt 1a after these 30 seconds, the nurses nevertheless decide to start the handover although Deb has not arrived yet. Participants are the same as in Excerpt 1a.

Excerpt 1b

1	Ema	bon Paul tu veux nous raconter quand même
		well Paul do you want to tell us anyway
2	Paul	oui (6s)
		Yes
	paul	<writes in patient file>
3	Ema	attends ferme la fenêtre parce que comme ça (XXXX)
		wait close the window because that way
4		(2s)
	paul	<closes window>
5	Paul	alors monsieur Roger euh::: mille neuf cent (XXX)
		so mister Roger thousand nine hundred
6		donc au niveau de sa poche ça a donné huit cent trente et puis
		so at the level of his pocket it gave eight hundred thirty and
7		à gauche ça a donné euh:: mille soixante dix
		on the left it gave thousand seventy

At line 1 of excerpt 1b, Ema asks Paul to start the handover *anyway*, i.e. in spite of not all participants being present, and Paul commits to it. From Ema's request and Paul's uptake, the interactional territory of the handover emerges as a relevant aspect for participants, as the official activity is now doing the handover. This moment marks the transition from simultaneous parallel activities in the unit to a common joint activity, the handover. A pause of 6 seconds follows Paul's commitment, during which he finishes an individual activity (he writes information on a patient file; bodily actions are indicated between brackets in the transcriptions). At line 3, Ema asks him to close the window and gives an inaudible reason for her request. The reason is certainly that there is much noise coming from the street at that moment and this would impede proper hearing of the handover for the participants. Ema thereby proposes an action aimed at the protection of the interactional territory. During a 2 seconds pause, Paul closes the window, and starts the report of the first patient at line 4 by identifying him by name. This utterance is marked with Paul's *euh:::* while he looks at the patient file, probably for information regarding the patient. After this, Paul continues with the patient's year of birth, followed by utterances regarding the state of the patient at lines 5 and 6.

To sum up, Excerpts 1a and 1b show the orientation of the nurses to the establishment of the joint activity and the interpersonal as well as organizational requirements for this process to be initiated. These requirements are the presence of all members of the team, and the timely beginning of the meeting. In excerpt 1a, Ema in particular is repeatedly attempting to obtain information about when the handover can be started, for instance by asking if the absent nurses have called, and when they will arrive. Doing this displays her orientation to the organizational context of their soon to be started joint activity: the need for all participants to be present (for a discussion on this topic see Levinson, 1984) for the handover. In contrast to this, Excerpt 1b has shown that despite all participants are not present, Ema, approximately 30 seconds later, orients towards the organizational need to start the handover roughly in time. Doing this, she relates to the organizational priority which is patient treatment and care and avoids delay in these activities, which her actions demonstrate to be potentially more important than the participation of all members of the team to the handover. This contrast between the need for the presence of all participants and the requirement to start the handover roughly on time shows the potentially conflicting nature of different organizational priorities: While starting the handover on time limits participation as not everyone is present, delaying its beginning uses resources that could be better (in an organizational sense) used for taking care of patients. Once participants agree that it is time for doing the handover, the interactional territory of the handover is to be protected by appropriate management of its boundaries.

The Ending of the Meeting

In our data, ending the handover is also often performed by marking the official end using e.g., *that's it*, and/or marks of gratitude towards the accomplished tasks with incoming nurses thanking the outgoing nurse for the report, and the outgoing nurse thanking the other nurses for attending. This is always followed by activities in the nursing room, such as the preparation of patients' medication or further talk about the patients and logistic or organizational topics. This excerpt is the end of the last patient report discussed during a handover. At the beginning of the excerpt, the outgoing nurse Pam explains the reasons of the changes of treatment and concludes the handover by stating that she has finished talking about the patient. It is followed by a logistics-related discussion.

Excerpt 2

1	Pam	son traitement habituel a juste été changé un petit peu
		his usual treatment has just been changed a little bit
2		dans l'sens où normalement il reçoit
		in the sense that he normally receives
3		deux cent milligrammes de Tramal deux fois par jour à domicile
		200 milligrams of Tramal twice a day at home
4		on lui a pas remis à cause de sa péridurale
		we didn't put it again because of his peridural
5		et puis de la morphine (1s) il le sait
		and of the morphine he knows it
6		mais peut-être qu'il leur posera la question s'il a mal
		but maybe he will ask them the question if he's in pain
7		faut lui dire qu'il a bien assez de trucs à côté
		he must be told that he has enough stuff on the side
8		et puis qu'on peut pas euh:: tout mélanger (1s)
		and that we cannot mix everything
9		et (1s) c'est tout pour lui
		and that's all for him
	pam	<browses through patient file>
10		(il aura) des labos demain
		he will have laboratory analyses tomorrow
	pam	<looks at document------->
11		et pis voilà
		and that's it
12		(5s)
	pam	**closes file
13	Sara	t'as les clés le téléphone
		do you have the keys the phone
14	Deb	oui oui j'ai
		yes yes I have

On line 1, the outgoing nurse Pam introduces the topic of the changes of treatment for the patient. On lines 2 and 3 she describes the usual treatment. On lines 3 to 5, she discusses the change of treatment. Then she states the possibility that the patient might ask for his usual treatment in case of pain (line 6). She continues saying that the patient should be told that he is already receiving enough medication (line 7) and that he cannot receive more because of possible interactions between different drugs (*and that we cannot mix everything*, line 8). She initiates the closing of the patient's report on line 9 (*and that's all for him*) while browsing through the patient file. Next, she adds a precision about laboratory analyses to be performed the day after, probably reading that information from the file (line 10). She then again initiates the closing of the patient's report on line 11 (*and that's it*) and closes the patient file (line 12; (very short movements are indicated by 2 asterisks in the transcription). This shows that the ending of the meeting is not simultaneous to the ending of the topic[6]. The ending is followed by a 5 seconds pause after which another nurse asks the incoming nurse Deb whether she has the keys and the phone. Simultaneously, a nurse gets up, goes to the sink and washes her hands, preparing herself for clinical activities. This logistics-related exchange is continued after the end of the excerpt.

The closing of the handover occurred after the outgoing nurse has stated that the report of the last patient was finished. The nurses then switched to the topic of the logistics for the next shift, i.e., ensuring that the required objects (the keys and the phone) were in possession of the incoming nurse. The mention of the end of the handover through the use of discourse markers is quite similar to the request to begin the report that we have discussed in the previous excerpt as both serve to coordinate the establishment and dissolution of the interactional territory of the handover, and the entry and exit of the joint activity (see Grosjean & Lacoste, 1999; Mondada, 2006a), as these are not otherwise 'salient' (Clark, 1996, p. 85). These patterns can be observed in most handover meeting beginnings and endings. The activities that precede and follow the handover are indeed (composed of) verbal interactions and the boundary between the handover and these activities is explicitly, verbally, marked. It is noteworthy that the ending of the report of most patients are also marked in a similar way (see lines 1 and 10 of Excerpt 5), but are followed by the description of the next patient. Participants commonly use discourse markers (e.g., okay) or explicit statements (e.g., that's it) to coordinate their joint activities (see Bangerter & Clark, 2003). Participants can also exploit the long pause at the end of the description, and the ordering of the patients by room as signals of the potential end of the handover. Patients are usually discussed by room number and nurses can rely on the fact that all patients have already been discussed to understand the handover is finished. Finally, changes of topics from patient-related matters to logistic matters display that the closing of the

[6] We thank Lorenza Mondada for suggesting this point.

handover has been achieved (see Mondada 2006b for an investigation of the closings of turns and sequences), i.e., another interactional territory (different participants, different aim and topics discussed) has emerged.

In the remainder of our analyses, we will discuss the organization of handovers in relation to the management of perturbations.

Maintaining the Joint Activity in the Face of Perturbations

It is frequent that nurses maintain the handover without suspension in the face of external demands (perturbations such as phone rings, and verbal or non-verbal requests). This can be done, in part, by nurses accomplishing bodily actions related to the perturbation while attending, and more rarely giving, the report. In the following excerpt, Pam is discussing the case of a patient for which the usual procedure regarding morphine administration couldn't be followed. During this discussion, the phone starts ringing. Such perturbations usually solicit participants' attention and might lead to a suspension in the joint activity. In this excerpt, the perturbation is collaboratively dealt with (minimized) by the nurses, allowing them to maintain the integrity of the interactional territory.

Excerpt 3

```
1  Pam      donc euh c'qu'on avait fait parce que::
            so       what we have  done because

2           l'anesthésiste disait que des doses de sept virgule cinq
            the anesthetist said that     doses of seven dot    five

3           de morphine peuvent faire faire l'effet contraire peuvent
            of morphine could   do          the opposite effect could
   phone                                       <rings---------->

4           faire faire des contractions (.) ça c'est madame truc muche
            make            contractions     that is  mrs    so-and-so
   pam      <looks at phone-------------------------><looks at Ema--->

5           pour euh euh::: peuvent faire [plus des contractions] (..)
            for             can     make   more     contractions
   phone     <rings-------->

6  Ema                                  [passe-moi le téléphone]
                                         give me   the phone
   ema               <outstretch hand> <maintains hand position-----/

   pam                                                <looks at <takes
                                                         phone>  phone>

7  EMA      au niveau (..) des voies biliaires et pis au contraire
            at the level of the hepatic ducts  and on the contrary
   pam         <leans fwd>  <gives phone>  <back to home
                                            position>

   ema      *--holds hand>  <takes phones> <leaves room +
                 + stands>                 looks at phone>
   phone                          <rings-------->

8           ils avaient baissé à cinq et pis ils ont carrément arrêté
            they had lowered   at five and   they have bluntly stopped
```

Lines 1 and 2 feature handover conversation during which the outgoing nurse Pam starts explaining why morphine has not been administrated to a patient. This explanation continues throughout the excerpt. At the end of line 3, the phone rings. Pam starts looking at it at the beginning of line 4, while pursuing her explanations. Only at the end of her utterance does Pam explain who is calling, which she is manifestly able to tell from her quick glance at the phone. Just after this at line 5, Pam continues her explanation by recycling (Schegloff, 1987) part of the utterance she produced before talking about the caller. This is preceded by disfluencies probably linked to the second phone ring which occurs in simultaneity with the beginning of her utterance (line 5). The recycling is accompanied by a) another ring of the phone, and b) Ema's request for the phone which she performs both verbally (in overlap to Pam's talk), and bodily by outstretching her own hand (line 6; a slash indicates that a gesture continues after the end of the line, a single asterisks marks the continuation of a gesture). At the end of line 6, after Ema's request, Pam looks briefly again at the phone and takes it, still discussing the case of the patient. At line 7, the nurses perform the preparatory activities necessary to the exchange: Pam leans forward, and Ema gets up her hand still outstretched. This done, they exchange the phone. Then Ema leaves the room while Pam returns to her seat.

The performed joint actions (the preparation of the exchange, the exchange itself, and the described subsequent activities) are parts of a larger joint activity: the termination of the perturbation of the handover by the transportation of the source of the perturbation (i.e., the phone) outside the extended territory of the handover (the room where it occurs). We underline the fact that this has been accomplished simultaneously to the main business in the unit at that moment, the handover. By exploiting available physical resources (gestures) and by an ad hoc division of labor according to their organizational roles during handover, the nurses managed to carry on the two joint activities: the handover and the phone exchange and thereby maintained the integrity of the handover in the face of the perturbation.

Protecting the interactional territory of the handover often requires a division of labor when dealing with perturbation: In the previous excerpt, the incoming nurse, not the outgoing one, ends dealing with the phone. The next excerpt illustrates the management of boundaries by division of labor when dealing with a non-participant's requests (here a healthcare assistant, Amy). In this excerpt, an unessential participant to the meeting, the outgoing nurse Pam (who is not currently giving the report), coordinates with a non-participant without producing a suspension of the meeting. The other outgoing nurse, Deb, is presenting the case of a patient to her colleagues, when Amy enters the room.

Excerpt 4

```
1  Deb      juste cette dame le souci qu'on avait
            right this woman the concern we had

            c'est qu'elle a pas encore de transit
            is that  she  has no          bowel movement yet

2           aujourd'hui toujours rien
            today still nothing

3           mai::s euh elle se sent plutôt bien
            but        she  feels   quite  good
                            (closing door noise)

4           elle se mobilise euh
            she can move
                   (s.o. knocks)
   pam      <looks at door---/
   sue        <looks briefly>

5           elle a encore une sonde vésicale
            she still has a   vesical catheter
   pam      *------------------------------/
   sue      <looks at documents------------/

6           alors sonde vésicale on enlève demain
            so    vesical catheter we take off tomorrow
   pam      *---------------> <nods><looks at door-/
   amy                                  <one step in the room>

   (handover talk below)              (side activity below)

7  Deb   PCA on a fait                | Amy   le monsieur il a laissé tomber
         PCA we have done             |       the mister  he has let  fall
                                      |
8  Sue   et la toilette demain matin  |       dans les toilettes
         and the wash tomorrow        |       in   the toilets
         morning                      |
                                      |
9        ou plutôt pendant la journée  |       le suppositoire
         or rather during  the day    |       the suppository
```

On lines 1 to 3, the outgoing nurse Deb explains that the patient hasn't been able to move her bowels since her operation. On line 3, someone opens the door, which is hearable by the sound of the moving door knob, but is off camera. After this (beginning of line 4) the outgoing nurse Pam starts looking in the direction of the door. She will maintain this gaze direction during the remaining of the excerpt thus showing her continuous availability to an interaction with the person entering the room. The non-participating person then knocks during Deb's utterance about the mobility of the patient (line 4). This is followed by Sue acknowledging the presence of that person by briefly looking at the door. She then rapidly refocuses on her documents, thereby displaying her unavailability to a potential interaction at

that point. On line 5, Deb starts discussing the equipment of the patient. She was thus finished with the previous topic (the patient's mobility) and this moment would have been the most appropriate for dealing with the non-participant's entry (Chevalley & Bangerter, 2010), but instead of this she proceeds with the handover. It is notable that Amy doesn't initiate her request at this particular moment either. At line 6, Pam nods while still looking at Amy, simultaneously to Deb's continuation of the discussion of the equipment of the patient. This intervention is provided by a non-speaker and is manifestly understood by Amy as an invitation to proceed with her request, which she does in simultaneity to Deb's description of a performed activity, and Sue's question about another activity to be performed. This moment is hence characterized by the superposition of two interactional territories: one dealing with the handover, and the other with the secondary activity, i.e., Amy's request.

In this excerpt, Pam didn't require listening to Deb's report as she was leaving the unit too. She hence was able to nonverbally solicit the request of Amy, and thereby extracted herself from the boundaries of the handover in order to deal with Amy's request while Deb and Sue dealt with the business of the handover. This tacit division of labor permitted the unsuspended continuation of the handover up to that point.

The Suspension of the Meeting Because of a Perturbation

In several excerpts, nurses have to suspend the handover in order to deal with unexpected perturbations that they cannot minimize. It is notable that nurses first look at the source of the perturbation. A brief look can be understood as discouraging the source to produce subsequent perturbation (by manifesting unavailability), whereas a longer look can be understood as an encouragement to explain the reason of the perturbation (by manifesting her availability), or more basically the acceptance of an interaction with the source of the perturbation at that moment. It happens that when the activity restarts, one or several nurses do not refocus on the joint activity. Hence, perturbations can lead nurses to exit the interactional territory.

These two points are illustrated in next example. Here, the nursing assistant Adda knocks at the door at the end of the discussion of the update of a patient. She is looked at during a reasonably long time. Next, she asks for information she needs in order to continue performing her clinical activities. After her intervention, the incoming nurse Lea doesn't refocus on the handover but instead starts performing independent activities in the nursing station. It is unclear whether or not these activities are performed in relation to Adda's intervention.

Excerpt 5

```
1  SARA     le sept c'est bon
            the seven it's done

2           (4s)
   sara     <turns and stores the patient file>

3           (3s)
            s.o. knocks
   sara     <look whiteb.>
   deb         <look door-/
   pam                <look door-/


4  Adda     j'vais (juste dire) la pompe au sept c'est fini
            I'm just going to say the pump in 7 it's finished
   deb      *-------------------------------------------/
   sara           <look door-----------------------------/
   pam      *----------------------->

5           je peux l'arrêter complètement
            can I     stop it completely
   deb      *---------------------------/
   sara     *------------------>

6  Lea      oui j'arrive j'finis
            yeah I'm coming I finish
   deb      *------------------>
   lea      <look door---------/

7  Adda     ouais?
            yeah
   lea      *-----/

8  Lea      j'arrive tout d'suite
            I'm coming right now
   lea      *------------>

9           (1s)                  (3s)
                                    noise of closing door
   lea      <starts to stand up> <turns back to table and takes documents>

10 Sara     au sept voilà
            in 7    that's it
   lea      <look file on lap>
```

On line 1 of this excerpt, the outgoing nurse Sara terminates the discussion of the current patient. This is followed by a long pause during which she turns and stores the patient file in the cabinet (line 2). Just after this, during a three second continuation of the pause on line 3, Sara starts looking at the white board. At the same moment, someone knocks. Deb, Pam and Sara then reorient their gaze towards the door. After recruiting the attention of most participants, Adda explains, on line 4, that the infusion pump of patient in Room 7 has no more fluids in it. She then asks, on line 5, whether she can stop it completely (as it is already

partially stopped from the lack of fluids). During her two utterances, Adda has lost the majority of her audience as only Deb maintains copresence by looking at her at the end of line 4. It is Lea, who hasn't looked at Adda until that moment who answers her question at line 6. Lea is an incoming nurse, and it appears she will take care of the patient during the next shift. She gives permission to stop the pump, but specifies that she is coming. The sequential placement of *I'm coming* just after *yes* makes it recognizable that she is willing to be present for that activity. She adds that she finishes (her current activity is attending the handover), which can be heard as a precondition to her going with Adda. This shows that at this moment, Lea is oriented towards the handover as a joint activity to which she is a required participant. At that moment, the exchange is re-framed as an interaction between Lea and Adda. Deb displays her unavailability to this exchange by withdrawing her gaze. At line 7, Adda says *yeah* with a rising intonation. This is construed as a request for confirmation by Lea who recycles her statement (*I'm coming*) of which the timing is respecified as *right now*. This closes the exchange between Lea and Adda and is followed by a four seconds pause during which Lea is getting up and turning towards documents on the table which she takes on her lap while sitting again. At line 9, Sara resumes the handover by restating that the discussion of patient in room 7 is now finished. At that moment, Lea is looking at the documents, which is an indicator that her attention is not refocused on the handover, but on another activity she is performing independently.

In this excerpt, Adda has shown deference towards the interactional territory by achieving her intervention during a pause in the handover, and not at another moment. This has been followed by the reorientation of the gazes of most participants who have thereby extracted themselves from the boundaries of the activity to display their noticing of the perturbation and/or obtaining information about its source. The focus of most of them has rapidly returned to the pending continuation of the handover, while Adda's self-designated interlocutor Lea has dealt with her request. This seems to be a tacit form of division of labor, as Lea appears to be the next to take care of this patient, and the case of the patient has already been discussed. Once this has been done, the handover is resumed by a recycling of the utterance that preceded the perturbation. The collaborative negotiation of Adda's intervention has been followed by Lea not refocusing her attention on the handover, but on documents.

We have seen that members of the team show deference towards the interactional territory. For instance, in the previous excerpt, Adda has produced the perturbation during a pause and Lea has at first manifested her interest in remaining a participant. This deference is

also shown by allied professionals (physicians). Such attempts to preserve the interactional territory do not always succeed. In the next excerpt, the physician John bodily requests the incoming nurse Deb for a document (touches her shoulder, draws a square and then points to the shelf) while the outgoing nurse Pam is giving her report of a patient. This nonverbal production allows him to request the document without overlapping the handover speech, but his intervention nevertheless is followed by a suspension of the handover. Before the beginning of the excerpt, Pam has just described the patient's stay at the ER.

Excerpt 6

```
1  Pam      et puis depuis ben voilà
            and     since then well
   kim                     <moves to table-/

2           il a (passé) sa son week-end euh::
            he has spent his his week-end
   kim      *------------------------------>
   john                    **touches       **iconic+points to shelf
                            Deb's shoulder

   deb                            <look John>   <look shelf>
   pam                               <look John>

3           (3s)
   deb      <leans to shelf>
   pam      <look shelf>

4  Pam      avec sa sonde
            with his catheter
   pam      <takes document>

5           les urines légèrement [rosées]
            the urine  slightly    reddish
   pam      <oriente arm twd john><orients doc twd Kim>
   kim      <accompanies movmement>     <takesdocument>

6  Kim                            [merci]

7  Pam      pas d'nouvelles sur l'week-end
            no news         over the week-end
   Kim      <goes in direction of trolley>
   Deb      <back to home position>
```

On lines 1 and 2, Pam starts discussing the equipment of the patient. At the middle of line 1, the physician trainee Kim who is near John, goes in direction of the table where the nurses do the handover. Near the end of line 2, John touches the shoulder of Deb, thereby recruiting her attention and, certainty unintentionally, Pam's. Pam's next utterance is suspended at a point of syntactical completion (*he has spent his week-end*) and Pam adds the disfluency *uh::*. During the disfluency, the physician nonverbally requests a document from

Deb by a) first looking at her, b) pointing in direction of a particular spot on the shelf, and c) tracing a square with both hands while looking at her. This is followed by a 3-second pause in the handover (line 3), during which Deb leans forward in direction of the shelf and Pam looks at the shelf. After this, Pam continues the handover by finishing her previous utterance (line 4: *with his probe*) and Deb takes the document. At line 5, Pam qualifies the urine of the patient as *slightly reddish.* During this utterance, Deb moves her arms in the direction of John. Kim accompanies her gesture with her own arm. Deb manifestly understands this as a request for the documents as she finally gives the document to Kim and not John. At that moment, Kim takes the document and thanks Deb (line 5) in overlap to Pam's talk. At line 7, Pam says that there is nothing new to report for the week-end. During this utterance, Deb goes back to home position (the initial, or resting position; Sacks & Schegloff, 2002) and Kim goes back near to John.

In this excerpt, the physician John has entered the boundaries of the handover by touching a participant. This summon has recruited the attention of that particular participant and incidentally of the participant giving the report. It is probable that John aimed his intervention to be as least intrusive as possible: He didn't ask for the document verbally but nonverbally only, and touched a participant who wasn't speaking at that moment. He nevertheless produced a breach in the interactional territory as the following event is the suspension of the handover. This shows the orientation of Pam to the handover as an activity that must be collaboratively performed. In this context, a suspension might be better than continuing as the attention of an outgoing nurse is recruited for another activity. It is also notable that Kim didn't neither verbally ask for the document, but did so by accompanying Deb's gesture. Doing this minimized the perturbation of the handover.

The Resumption of the Meeting after a Suspension

Reentering the interactional territory is a different process than entering it. It requires less preparation from nurses and can be done in seconds. This is nevertheless performed gradually, with participants displaying their readiness to resume the activity at different times. The following excerpt is part of an evening handover. It illustrates the gradual reestablishment of the primary joint activity. At the moment of the interruption, both nurses look at its source. Pam is the first to address the perturbation and does this minimally (displays her impossibility to help the source with her problem). She then swiftly returns her attention to her documents. The second nurse then proposes the source of the interruption to help her out. Once this is done, she returns her attention to the documents as well, before the source of the interruption

has finished thanking her. The focus of the excerpt is the reestablishment of the joint activity, but a portion of prior interaction is provided as it shows the lack of involvement of Pam, the outgoing nurse, to the secondary activity which is an indicator of her orientation towards the primary activity, the shift handover. Prior to the excerpt, Pam and Sue have suspended their task focused interaction after Deb entered the nursing station (see Excerpt 5 and 6 above for a description of suspending the interaction). The excerpt starts with Deb explaining what she needs. At that moment, Sue is already looking towards the door, in the direction of Deb whereas Pam starts looking at her at that particular moment.

Excerpt 7

```
1   Deb     je cherche Amy
            I'm looking for Amy
    pam     <looks at door-/
    sue     *looks at door-/

2   Pam     j'sais pas
            dunno
    pam     *--------/
    sue     *--------/

3   Deb     parce que j'ai pas mes clés pour les (autres filles)
            because I don't have my keys for the  other  girls
    pam     *-------------------------------------------------/
    sue     *-------------------------------------------------/

4   Pam     pas d'bol
            unlucky
    pam     *------->
    sue     *------->

5   Sue     ben prends les miennes tu veux les miennes
            well take      mine    if you want mine
    pam     <looks at documents----------------------/
    sue     <leans back, look on side----------------/

6   Deb     ah volontiers j'm'excuse j'ai interrompu
            oh with pleasure I'm sorry I  interrupted
    sue     *-------><takes key in pocket>

7   Sue     tiens
            here you are
    sue     <gives keys, look Deb>
    deb     <takes keys>

8   Deb     merci: merci beaucoup
            thank you thank you very much
    sue     <looks forward back to home pos>

9   Pam     et puis aux six heures euh les autres un peu rosées
            and every   six hours      the others a little reddish
    sue     <looks at documents-------------------------------/
    pam     *-looks at documents-------------------------------/

10          sur les sondes euh::: urétérales
            on  the ureteric catheters
    pam     *--------------------------//
    sue     *--------------------------//
```

At line 1, Deb says that she is looking for Amy, an assistant nurse. This is laconically but efficiently replied to by Pam (*dunno*) on line 2. On line 3, Deb explains why she needs to find Amy. This is related to Amy being depicted as in possession of Deb's keys, which she needs *for the other girls*'. The final purpose of this seems to be understood by Pam, who doesn't ask why the other girls need the keys. Instead she just says *unlucky* (line 4) as a reply and then rapidly looks back at her documents, thereby exhibiting she is no longer available for an interaction with Deb and is ready to restart the handover. Sue's turn at line 4 shows she has been attending to the exchange between Deb and Pam. In this turn, she proposes to lend Deb her own keys. And simultaneously leans forward, a preparatory action to her picking of her keys in her pocket. Deb takes up the proposal at line 6. By providing an apology for having interrupted the handover (Deb's construal of her own actions), Deb displays deference to the interactional territory. Simultaneously to these apologies, Sue takes the keys out of her pocket. This happens just after Deb's acceptance of the keys. Next action is collaboratively performed by Sue and Deb at line 7, where they proceed to the exchange of the keys. This is accompanied verbally (Sue's *here you are*). Just after this, Sue withdraws her gaze from Deb displaying her unavailability for further interacting with Deb, a moment at which Deb's manifestation of gratitude is sequentially relevant, thereby exhibiting her orientation to the boundaries of the interactional territory of the handover. She thereby manifests that she will disregard further talk, such as the sequentially relevant thank-yous Deb provides at line 8. This is substantiated by her notably absent reply to Deb's manifestation of gratitude. Instead, the next action consists of the resumption of the handover.

In the previous excerpt, the nurses performing the handover have displayed that their interaction with the source of the perturbation was secondary and that their primary focus is the handover (e.g., very brief verbal productions, withdrawing their gaze from the source of interruption before the end of the interaction).

This treatment of perturbations as secondary is also exemplified in the next excerpt. Here, the outgoing nurse Lea starts the discussion of a patients' case. The report is suspended after the intervention of Paul who needs a sticker of that particular patient. Stickers provide name, date of birth, date of admission and a bar code for further identification of patients, tracking of samples, and billing of medication. Paul seems to need it for an activity he is performing on his own in the nursing station during the handover. Here again, the nurse withdraws her gaze from the source of interruption before the completion of the interaction (thank-yous) after the source's request is fulfilled.

Excerpt 8

```
1  Lea      et après j'sais plus (vraiment) (1s)
            and then I don't really know anymore
   lea      <looks at white board--------------/

2           ah oui (1s)
            oh yes
   lea      *----->><leans toward cart>

3  Paul     (un liquide euh) (1s)
            a liquid

   lea      <looks for file><takes file>

4  Lea      au deux cent sept Roger Roger
            in 207            Roger Roger
            <turns back>             <looks whiteb>

5  Paul     Roger (1s)
            Roger
   lea             <opens file>

6           tiens donne-moi une étiquette s'te [plait un petite] (XX)
            so    give me   a   sticker   please      a small one

7  Lea                                          [ouais justement]
                                                 yeah exactly

8           c'est c'que j'allais faire
            that's what I was gonna do

9           (6s)           (2s)
   lea      <looks in file><turns+gives sticker>
   paul                          <takes sticker>

10 Inf5     merci
            thank you
   lea      <turns back to desk>
   paul     <NA>

11 lea      donc madame madame Lambert elle va bien
            so   Mrs    Mrs    Lambert she is doing fine
```

At the beginning of the excerpt Lea has just finished talking about a patient and prepares to continue with the next patient. On line 1, she utters *and then I don't really know anymore* and then looks at the white board. Her change of state token (Heritage, 1984) of line 2 *oh yes* suggests she has identified the patient at that moment by looking at his name on the whiteboard. After this (same line) she leans forward on the cart which contains the patient files and looks for the file and takes it on line 3. At that moment, Paul (here off camera) talks about a liquid, which is not related to previous talk and hence might be related to his parallel activity. On line 4, Lea starts the patient report by uttering his name. Paul intervenes at line 5 by repeating the name of the patient. This is followed by a pause of 1 second after which Paul

asks for a sticker probably in order to complete his individual activity (line 6). This is replied to by Lea's acceptation of the request and the observation that it is indeed what she was going to do (lines 7 and 8). She then searches for the sticker in the patient file for 6 seconds, which displays her understanding of *a sticker* as *a sticker of this patient* because of the sequential placement of Paul's request. After this she takes the sticker and turns towards Paul and then extends her arm in the direction of Paul and holds it. At that moment, Paul takes the sticker and then thanks Lea (line 10). Lea simultaneously turns back to the desk. This, in combination to her not replying to the thank yous of Paul shows that she is at that moment oriented to the continuation of the handover and considers her exchange with Paul as external to its boundaries. It is noteworthy that when resuming the handover at line 11, Lea doesn't discuss the case of the previously mentioned male patient, but instead talks about another patient, a female whose condition is assessed (Pomerantz, 1984) as good. The discussion of the patient of line 4, it seems, has been omitted by the nurse. This shows the potential impact of perturbations on the discussion of patients during handovers.

In this excerpt, the resumption of the handover is performed by the nurse by first orienting bodily in the direction of the table, which is the center of the interactional territory of the handover. She proceeded to the verbalization of the identification of a patient, which coincides with her activity previous to the perturbation (line 4). What is different is that it is not the patient of line 4 whose report starts at that moment, but the report of another patient. The attention shift triggered by the perturbation has potentially lead the nurse to lose track of the progress of the handover. The outgoing nurse discussing another patient after a suspension than before occurred several times in our data.

Marginalization strategies Against Repeated Perturbations

It may happen that physicians attend the handover, although this is non-routine. They also sometimes ask brief questions during the handover. When this happens, nurses briefly respond and the handover usually continues without much further interventions from the physicians. In contrast, in the following excerpts, the physician Tim repeatedly asks questions during the handover. This suggests he is considering himself as entitled to contribute to the handover. This construal seems different from the outgoing nurse's, who, after some of his subsequent interventions, marginalize the physician using several strategies such as not looking at him when he is talking and answering his questions with delay. Excerpts 9a and 9b provide an analysis which contrasts nurses' cooperative treatment of the first question to the uncollaborative one of a subsequent question. Excerpt 9a can be considered as the usual treatment of a physician's question, whereas Excerpt 9b can be viewed as a deviant case

where the nurse acts in ways that here restore the interactional territory, whose boundaries are repeatedly crossed by the physician Tim. Before the beginning of Excerpt 9a, the outgoing nurse Sue has started reporting on the case of a patient.

Excerpt 9a

```
1  Sue      qui avait un souci hier
            who had an issue yesterday
   ema      <look docu><looks at Sue--
   sue      <looks forward----------/

2           qui arrivait pas à uriner depuis euh depuis hier matin
            who couldn't       urinate since     yesterday morning
   ema      *-------------------------------><looks at Tim-------
   sue      *---------------------------------------------------->

3           ben il a uriné hier soir
            well he has urinated yesterday night
   ema      *------------><looks at Sue--------/
   sue      *-----------------------------------/

4           et puis il a été à selles
            and     he had a bowel movement
   ema      *------------------------/
   sue      *------------------------/

5           euh: afébrile toute la nuit et pis ce matin
                 afebrile all  the night and this morning
   ema      *-----------><looks at documents----------->
   sue      *-----------------------------------------/

6           et puis il va bien
            and he's doing fine
   ema      <looks at Sue----->
   sue      *-----------------/

7  Sue      [j'sais pas si    ]
            I don't know if

8  Tim      [Monsieur Pascal?]
             Mister   Pascal
   ema      *--><looks at Tim--/
   sue      *------><look Tim--/

9  Sue      oui
            yes
   ema      *-/
   sue      *-/

10 Tim      il n'a #9A pas uriné hier
            he hasn't urinated yesterday
   ema      *------------------------>
   sue      *------------------------/

11 Sue      si le matin mais pas depuis l'matin
            yes the morning but not since the morning
   ema       <looks at Sue---------><look hand>
   sue      *-----------------------------------/

12          après il avait pas uriné
            after he didn't    urinate
   ema      <looks elsewhere--------/
   Sue      *-----------------------/
```

On lines 1 and 2, the outgoing nurse Sue describes the problem of a patient regarding his past inability to urinate. She continues on line 3 by describing the progression of his state, namely that he could finally urinate in the evening. She adds on line 4 that he also had a bowel movement. On line 5, Deb starts talking about the temperature of the patient: He didn't have fever during the night and the morning. She then proceeds to a general assessment of the state of the patient (*and he's doing fine*). On line 7, Sue is about to express doubt (*I don't know if*) on an issue she finally will not develop, as the physician Tim intervenes on line 8 by uttering the name of the patient with a rising intonation, displaying he has been listening to the handover at that time. Ema and Sue start looking at him (see Figure 9A). A gaze direction she will maintain during several turns of talk. Doing this she momentarily includes Tim in their interactional territory and displays the interaction with Tim is acceptable or legitimate at that moment. In response to Tim's question, Sue confirms (line 9) it is this patient she is talking about. Tim then asks for confirmation about the patient's diuresis, which manifests he heard her say *who couldn't urinate since yesterday morning* (line 2) but not *well he has urinated yesterday night* (line 3). Sue then promptly provides a precision on lines 11 and 12. It can be noticed that there is no delay in Sue's answers. Sue doesn't repeat that the patient has finally urinated, which leads to subsequent interventions from Tim (not presented here).

Figure 9. Differentiated treatment of two questions of a physician by the group of nurses. Figure 9A: Lea and Ema look at Tim while he asks his first question (see arrows). Figure 9B: Lea and Ema do not look at Tim while he asks a subsequent question.

Excerpt 9b occurs approximately 24 turns of talk after the end of excerpt 9a. In these turns of talk, the physician has intervened by asking questions and providing observations that prolonged the suspension of the handover. This excerpt starts when Sue is discussing the state of another patient than during Excerpt 9a. In this excerpt, Sue will first display that she disattends the physician's interventions by not looking at him and not answering. After several

turns of talk she finally answers the question under the physician's insistence. The marginalization strategies she employs are efficient ways in protecting the interactional territory of the handover from further interventions: In the approximately 3 minutes that separate the beginning of Excerpt 9a from the end of Excerpt 9b, the physician Tim has talked 15 of the 40 turns of talk that occurred during that time frame. He will still attend the handover but will not intervene during approximately 10 minutes after the end of Excerpt 9b.

Excerpt 9b

```
1  Sue     le pansement est propre (2s)
           the dressing is clean
   ema     <looks at documents---------/
   lea     *-------------------------/
2  Tim     le transit ça a [été chez monsieur] #9B George ou bien?
           the bowel movement went fine for mister George or
   ema     *--->><looks at Tim----------------------------><looks elsewh>
   lea     *-----------------------------------------------------/

3  Sue                     [bonne diurèse    ]
                            good  diuresis

4  Ema     il a repris le transit lui hein?
           he's had bowel movements again him
   ema     <looks at Sara-----------------/

5  Tim     il a repris?
           he has again
   ema     *---------->

6  Sara    ben il a eu un practo hier soir
           he's had    a  practo yesterday evening
   ema     *----------------------------->

7  Sue     ouais non
           yeah  no
   ema     *------->
   sue     <look Tim-

8  Tim     rien du tout? depuis l'intervention rien? du tout
           nothing at all since the surgery    nothing at all
   ema     <looks at Tim----------------------------------/
   sue     <looks at Tim----------------------------------->

9          (4s)
   ema     *-->
   sue     <shakes head+looks elsewhere>

10 Tim     bon
           alright
   ema     <looks at documents-
   sue     <looks elsewhere-

11         (8s)
   ema     *->
   sue     *-/

12 Sue     monsieur Maurice (1s)
           mister   Maurice
   ema     <looks at sue--------//
   sue     *--------------------//
```

On line 1, Sue discusses the state of the patient's dressing, which she assesses as *clean*. After a long 2-second pause in Sue's report, Tim asks whether the patient has had bowel movements (line 2). On line 3, Sue assesses the diuresis of the patient overlapping Tim's turn of talk (*good diureses*). She doesn't further answer Tim's question and doesn't look at him (see Figure 9B). Thereby, Sue orients to the maintenance of the boundaries of the interactional territory of the handover, and its unsuspended continuation. By talking in overlap, long after the beginning of Tim's statement (and despite Tim's higher status), she further acts as if the physician's intervention didn't occur, which displays her construal of Tim's intervention as an invasion of the interactional territory. On line 4, Ema, the head nurse, also asks whether the patient has had bowel movements again. She selects Sara, not Sue, as next speaker by looking at her. Ema asking about the bowel movements too legitimizes Tim's question, which he reiterates on line 5. Sara states which drug (Practo-Clyss, a laxative) the patient received the previous evening on line 6, which addresses the patient's constipation issue, but doesn't answer the question. Sue finally answers Tim's question ('yeah no') on line 7 and starts looking at him. The delayed placement of her answer shows her disalignment with Tim. Tim reiterates the question two more times on line 8, manifesting his construal of Sue's answer as unclear. On line 9, Sue shakes her head and starts looking elsewhere, but doesn't provide any verbal answer to the repeated question. By withdrawing her gaze, she displays her lack of further availability and thus puts an end to her interaction with Tim. After a long pause (4 seconds) Tim says *well* without any further statement (line 10) and thus acknowledges the end of the interaction. Indeed, "a lapse in talk in activity is the byproduct of the recognizable completion of a course of action" (Szymanski, 1999, p. 14). Ema simultaneously starts looking at her documents, and thereby reorients to the boundaries of the interactional territory of the handover. This is followed by another long pause (8 seconds) after which Sue starts discussing another patient on line 12.

There is a contrast between the treatments of the way Tim's questions are dealt with: Sue has collaborated to the exchange started by the question of the physician in excerpt 9a. She has looked at him throughout the exchange, and has answered the question promptly, providing the precisions Tim required. But in Excerpt 9b, Sue has shown reluctance to answer the question, by not looking at Tim for several turns of talk, by speaking in overlap long after the onset of the Tim's turn, by delaying her answer, as well as providing precisions only nonverbally and withdrawing her gaze rapidly, thus manifesting her unavailability to her interaction with Tim and her orientation to the boundaries of the interactional territory of the handover. The long pauses in the interaction also reveal the misalignment of the participants in the interaction.

CONCLUSION

In this paper, we have shown that participants actively and collectively manage the boundaries of their interactional territory during handovers meetings. They tend to limit the impact of the perturbations that continuously occur during meetings, and do so exploiting both bodily and verbal resources. We have also shown that there are many parallel activities before the handover, and that even during handover meetings parallel activities (perturbations) solicit participants' attention. At the end of handover, parallel activities get the upper hand again. The reason is that the nursing station is usually a multi-use room, where multiple individuals' project trajectories (Fussell, Kiesler, Setlock, Scupelli & Weisband, 2004) converge and where it is not possible to avoid perturbations. Nurses hence have to deal with changes in boundaries that result from this convergence of project trajectories, in an ad hoc manner. The setting of the handovers in this unit hence creates the necessity to protect the interactional territory of the handover against perturbation by the management of its boundary. This contrasts with the intensive care of the private hospital, where gatekeepers where posted, who took care of perturbations such as patient alarms, the phone, etc. In this unit there was only one perturbation of the handover because of this efficient, but costly design of handovers. This focus on the perturbations of the handover has permitted us to observe that participants, and also to a certain degree non-participants (the sources of interruptions), display recognition of the boundaries of the activity.

Perturbations are dealt with according to a division of labor. The roles during handover (outgoing and incoming) form the basis of this division of labor in dealing with perturbations: As outgoing nurses who are not doing the report do not need to listen to it, except for providing precisions, they are more able to deal with perturbations. Incoming nurses need the information discussed during the handovers, but they still can to a certain extent deal with perturbations because their other incoming colleagues can repeat the missing information after the handover. The outgoing nurse doing the report is the less likely to handle perturbations, as that person is indispensable to the continuation of the meeting, thus that person dealing with the perturbation would cause a suspension in the meeting which we argued participants tend to avoid.

We also show that the orientation to the boundaries of the interactional territory of the handover not only has an impact on what actions are performed, but also on the timing of such actions, i.e., what is done acquires meaning from the temporal configuration of actions (e.g., we examined the interactional import of actions like delaying one's answer). Participants can exploit such aspects in designing their responses to perturbations as a means to render these more efficient in preserving the interactional territory.

Previous research has shown that people generally do not have a good image of meetings (e.g., Rogelberg & al., 1996). This might be due in part to the large amount of interpersonal coordination that is necessary during meetings. This is heightened by the occurrence of perturbations such as interruptions (Chevalley & Bangerter, 2010). We have shown that nurses do indeed a lot of interactional work when maintaining, suspending and restoring the interactional territory of nursing shift handovers. It is highly probable that this work is also necessary in other types of meetings.

Chapter 8 – General Discussion and Conclusion

In this dissertation, I studied handovers from meso and micro perspectives. Under the meso perspective, I have shown the impact of uncertainty on handover communication at the level of the nursing unit. Under the micro perspective, I highlighted strategies in dealing with unexpected events at the level of the interaction prior to (reports of non-routine situations) and during (management of perturbations) the handover. These are important areas of study, especially considering that the current drive to standardization of nursing handovers doesn't take into account inter-unit differences, such as the level of work-unit uncertainty. Furthermore, this streamlining approach is silent on the management of non-routine situations to report on, which require different kind and structure of information than routine situations, and the necessity for a management of contingent events such as perturbations. Under the streamlining approach, handovers should be standardized irrespective of context (Adamski, 2007). This contrasts with contingency theory, according to which coordination mechanisms, in all industries, including hospitals (see Argote, 1982), should be related to the level of uncertainty in the unit. As Grote (2009, p. 62) puts it, standardization "(…) involve[s] the risk of not realizing the need for explicit coordination, especially in non-routine situations".

In this dissertation, I reported on four studies in which I analyzed the way uncertainty and unexpectedness are dealt with in nursing units during handovers. The approaches used in this dissertation have, so to speak, never been enlisted in the study of nursing handovers, but have proven fruitful in the study of work in other settings, including coordination activities. In studies 1 and 2 I investigated uncertainty management at the unit level. I have shown that handovers are adaptively performed by nursing personnel in relation to work-unit uncertainty. In studies 3 and 4, I relied on a collaborative activity approaches and examined discourse processes in the interaction. I investigated the management of unexpectedness in clinical situations to report on, and in perturbations to deal with. I have shown that nursing personnel jointly construct the meaning of non-routine situations through narratives, and that they have strategies to deal with unexpected perturbations of the handover activity. The results of all 4 studies suggest that if standardization is to be performed, it should be with extreme caution, and should focus on maintaining the adaptability of handovers, as the title of Patterson's (2008) article suggests: "Structuring flexibility: the potential good bad and ugly in standardization of handovers".

Below, I will provide a summary of the results of each study and remind the reader of their methodological specificities. I will then discuss the theoretical contributions of this

dissertation. Next, I discuss the applied contribution of our work, in relation to the current drive to handover standardization in most countries and present its limitations. Finally I examine the possibilities for further studies.

SUMMARY OF RESULTS

In Study 1, I examined the impact of uncertainty on reports of handover contents using interview methodology, content analysis and multilevel regression modeling. I have shown that the content of handovers, as described by head nurses, is related to uncertainty: Higher uncertainty leads to fewer contents discussed during handovers. This is due to a systematic reduction in specific contents with increasing task uncertainty (*Treatment and care* and *Organization of work*). I have also shown that the only function of handovers that was impacted by uncertainty was *Sharing emotions*, with less sharing of emotions in high uncertainty units. Other functions occurred in nursing units irrespective of the level of uncertainty. Finally, I have shown that handover duration per patient was also related to uncertainty, with on average more time devoted to each patient in units facing more uncertainty (e.g., ICUs). These results led me to conclude that uncertainty in handovers is managed by a reduction in contents which although important, are not required for the performance of handovers in these units. What is particularly interesting, is that the contents that do not vary with uncertainty are thus discussed for more time when uncertainty is high, as they 'benefit' from both the lengthening of handover duration per patient with high uncertainty, and the reduction of other contents.

In study 2, I analyzed the content and the structure of handovers using observational methodology and content analysis coupled with lag sequential analyses. I have shown that profiles of contents of handovers do not vary as a function of uncertainty, contrary to what could be expected from Study 1. The main result from Study 2 is the identification of adaptation patterns in relation to work-unit uncertainty. These are related to more flexibility of handover performance in units facing high uncertainty than in units facing lower uncertainty. Communication was less patterned in high uncertainty units: Results from lag sequential analyses (Gottman & Roy, 1991), have shown that low uncertainty units featured more structured handovers than high uncertainty units. These results led me to conclude that the units adapted their communication processes to the requirements of their environment: The diverse nature of cases reported in high uncertainty units lead to flexibility and the more predictable nature of cases in surgery units lead to more structure.

From studies 1 and 2, it can be noted that uncertainty affects discourse processes in nursing care unit during handovers. From both studies, it can be argued that handovers are

naturally different in low uncertainty units compared to high uncertainty units. Study 1 suggested adaptability through a higher diversity of handover contents in low uncertainty units compared to higher uncertainty units. Study 2 suggests that high uncertainty units show higher flexibility than low uncertainty units.

In studies 3 and 4, I examined the way uncertainty is dealt with in low uncertainty units in relation to specific events, using observational methodology. In study 3, we investigated the use of direct reported speech (DRS) during handovers and related it to non-routine care situations. Relying on content analysis, we have shown that there is a sequential buildup of narratives until the occurrence of target DRS: Speakers depict the situation, the performed actions and produce one or more occurrence of DRS. DRS is often used in stories recounting non-routine events (events subverting expectations or deviating from everyday practice). We investigated this more thoroughly using conversation analysis and presented selected excerpts which were transcribed in detail. We have shown that non-routine situations are reported in vivid narratives, in which direct reported speech occurs at the climax of the stories as previously reported in the literature (e.g., Drew, 1998). In such situations, DRS can be used as a means to exemplify deviant conduct, justify unwonted clinical action or simply depict reactions to the non-routine situations. The process of reducing uncertainty related to these aspects is performed jointly with participants co-constructing the narrated event, allowing for the elaboration of sensemaking (Weick, 1995). Sensemaking is especially important in non-routine situations and orients further action (Grote, 2009). Our results led us to conclude that DRS is an interactional device which, when used in narratives, allows teams to develop a common understanding of non-routine situations and coordinate care upon a shared understanding.

In Study 4, I examined how units reduce uncertainty related to unplanned perturbations in the unit. Results from coding of perturbations show that nurses are the main source of perturbations in all units, and that the distribution of types of perturbations varies across units. One unit had gatekeepers posted outside the room where the handover took place. They dealt with perturbations (and the resulting uncertainty) thereby isolated the handover from perturbations. This ‘no perturbation policy’ allowed the unsuspended continuity of handovers (with one exception) during the week of observation. I used micro-analyses of interactions inspired from conversation analysis to inform the main part of my investigation: I analyzed excerpts of handover featuring perturbations in order to understand how these are dealt with. I have shown that handover participants manage the uncertainty

originating in such perturbations by protecting their interactional territory: Nurses tend to rely on strategies that permit to deal with the perturbations in an ad hoc manner. I identified strategies for maintaining the interactional territory, for suspending it and for reentering it when perturbations occur, I have also shown how participants begin and end the meetings, by marking its boundaries. These results lead me to conclude that the interactional territoriality of participants in the handover allows them to protect the handover and thereby to reduce the unexpectedness related to perturbations during the meeting, by signaling a predictable trajectory for the next action.

THEORETICAL CONTRIBUTION

Nursing shift handovers are institutional routines that are aimed at patient information transfer. In Chapter 2, I have reviewed the different types of handovers: the verbal (the most common form), bedside, recorded, written and computer based. This thesis focused on the verbal form (also called the nursing station handover). Below I review the contribution of my dissertation to handover research, concentrating on the two focuses of study: a meso approach where I relied on contingency theory and routine flexibility in the study handover communication; and a micro approach where I used detailed analyses of interactions in the examination of the resolution of uncertainty and unexpectedness at the interpersonal level.

Bridging Research on Contingency Theory, Routine Flexibility and Handovers.

In Chapter 2, I have described how the recourse to contingency theory and the recent views of routine as flexible were useful in studying handovers. Uncertainty must be absorbed through coordination for work to be performed appropriately (March & Simon, 1958). Contingency theory has examined the use of various types of coordination mechanisms in relation to the reduction of uncertainty (e.g., Perrow, 1967) and work-unit efficiency (e.g., Argote, 1982). Studies have relied on the examination of the most appropriate coordination devices in relation to the amount of uncertainty the unit is subjected to (e.g., Van de Ven, Delbecq and Koenig, 1976). A general finding is that coordination devices that allow more flexibility (coordination mechanisms using high capacity media; see Daft & Lengel, 1984) should be used in high uncertainty work units (e.g., Van de Ven, Delbecq and Koenig, 1976).

The recent views of routines (e.g., Feldman, 2000; Pentland, 1995) suggest that participants adapt their routines to the situated activities they perform. Routines are composed

of different steps which can be performed in relatively varying orders (Pentland & Reuter, 1994). People induce flexibility in the routine they perform as a means to adapt to the variety of situations they encounter (Howard-Grenville, 2005). Routine flexibility is a way to reduce uncertainty (Grote, 2009). This has seldom been examined in routines of other industries (see Grote, Weichbrodt, Günter, Zala-Mezö & Künzle, 2009) and has never been investigated in studies of handovers.

Here, I proposed to study nursing handovers using this approach, contrary to previous research on handovers which has consisted on case studies without theoretical foundations in organization science. Handovers are ordinarily performed by means of interactive meetings: The same coordination mechanism is in use, irrespective of the level of uncertainty. Flexibility is the means by which nursing units are able to absorb varying levels of uncertainty: In Study 1, I found that handovers indeed featured flexibility (or adaptability), operationalized as the variations in terms of contents of handovers in relation to the uncertainty in the unit. In Study 2, I found differences in the structural flexibility of handovers, operationalized as the significance of transitions between topics. These naturally occurring mechanisms allow units to adapt to the level of uncertainty even though the coordination mechanism remains the same across settings. Such systematic adaptability patterns have never been identified in research on handovers.

A Collaborative Approach to Handovers.

In Chapter 5, I examined how the approaches to the study of collaborative activities could be used in the study of handovers. I have shown that collaborative approaches, such as ethnomethodology, conversation analysis and Clark's theory of language use, were required in the study of handovers because they are joint activities, as well as the role of multimodal action. This is overwhelmingly *not* taken into account in other studies of handover which most often consider it as a one way process in which the outgoing nurses are the emitters of information and the incoming nurses the receivers. I further argued in favor of workplace studies of handovers. This has been grounded in the recent critique addressed to contingency theory of being decontextualized (in the sense that it doesn't consider the way people perform their daily activities; see Barley & Kunda, 2001).

Ethnomethodology (see Garfinkel, 2002) provides methods for studying work (Rawls, 2008) and focuses on the way members of a collectivity (e.g., nurses) understand and make visible the reasons of their actions to their peers. This visibility allows the informed examination of work practices. Ethnomethodology stresses the importance of people doing and understanding together in an accountable manner, and the contingent aspects of their

activities, a focus which is shared by several concepts in organization science (Rawls, 2008) such as *sensemaking* (Weick, 1995) and *heedful interrelating* (Weick & Roberts, 1993) in organizations. Conversation analysis is part of ethnomethodology and focuses on the identification of regularities in conversation by studying how participants sequentially accomplish interactional actions through the inspection of their verbal productions (e.g., Sacks, Schegloff & Jefferson, 1974) and more recently bodily conduct in interaction (e.g., Goodwin, 2000). Ethnomethodology and conversation analysis consider communication as an eminently collaborative activity, and so does Clark's theory of language use (Clark, 1996). Clark considers that collaborative (or joint) activities, like working together or talking together, are composed of two tracks. There are activities related to the content of the collaborations: participants' individual actions (the basic activity track) and activities related to the coordination of such actions (the coordinating activity track). Collaborative approaches have often been used in workplace studies (e.g., Orr, 1996) but never in studies of handover communication. Workplace studies (Luff, Hindmarsh and Heath, 2000) analyze work as it is coordinated and performed and draw light on participants's use of coordination with one another and with technology (e.g., Heath, Luff, Sanchez Svensson, 2002).

In Studies 3 and 4, I have approached handovers as collaborative activities. In Study 3, we have shown that nurses performing the handover use DRS mostly in order to create a shared representation of non-routine situation they faced during their work activities in conversational storytelling. This recourse to narratives provides nurses with a mean to report unexpected events in an efficient manner. Examples are nurses' use of DRS in stories focusing on non-routine situations include the demonstrations of professional conduct, the depiction of patients' deviant behavior, and the rationalization of deviations from usual medical protocol. These aspects have not been studied in the nursing handover literature, with the exception of Grosjean (2004). Outgoing nurses coordinated with incoming nurses by means of these stories. The narratives were jointly constructed (see Goodwin, 2007) by the participants which allowed the emergence of sensemaking through coordinated action. In Study 4, I have drawn on a collaborative approach to study the way nurses deal with perturbations during the handover. I have shown that nurses actively manage the boundaries of their interactional territory during handover using strategies that mostly signal their (un)availability by means of verbal and non-verbal actions (see Mondada, 2004). They tend to quickly and visibly refocus on the handover activity in cases where the handover has been suspended. I argued that this was performed as a means to protect the handover from perturbations, thus enabling the seamless continuation of the joint activity.

APPLIED CONTRIBUTION

In this thesis, I analyzed handover using a diversity of approaches that are well established, or in the process of being established, in the study of other organizational coordination mechanisms. Interestingly, they have not, for the most part, been used in past research on handovers. Parts of my results are nevertheless comparable with previous research on handovers, although they extend the existing literature by being more specific and detailed.

Research on handovers can be broadly classified in 3 categories, the managerial perspective, the ethnological perspective, and the 'best practices' perspective (my distinction). The managerial perspective focuses on streamlining and standardizing handovers (e.g., McKenna, 1997; Sexton, Chan, Elliot et al., 2004) for accountability and financial reasons. This perspective suggests that verbal handovers should be standardized, or even replaced by written documentation because people discuss non relevant aspects, do not provide more information than written documentation and are hence a loss of time for healthcare organizations (Sherlock, 1995). Another perspective is the ethnographical view of handovers (e.g., Grosjean & Lacoste, 1999; Lally, 1999) which discusses the ritual or habitual functions of handover and how they relate to the organization of work in nursing units. From this perspective, handovers should remain unstandardized because of the loss of ritualistic properties (Lally, 1999) that ensues standardization. The third perspective is concerned with the design of handovers following best practices identified from the analysis of processes in healthcare or other industries (e.g., Cook, Render & Woods, 2000; Patterson, Roth, Woods et al., 2004). Following this perspective, formulating best practices is related to a prior understanding of the processes that lead to communication errors (Riesenberg, Leitzsch & Cunningham, 2010). Researchers following this perspective are critical of handover standardization protocols (e.g., Patterson & Wears, 2010) but do not condemn it, as long as handovers remain interactive. My position is in line with this last perspective. I also think the other approaches have raised some valid points. Standardization is not good or bad per se, and advocating in favor or against it is to be done on the basis empirical data. Results showing its efficiency or inefficiency should be given high priority, but these are lacking (Cohen & Hilligoss, 2009). Moreover, after 40 years of study of handovers (since Lelan, 1973), "surprisingly little is known about what constitutes best [handover] practice" (Riesenberg, Leitzsch & Cunningham, 2010, p. 24). In the absence of such knowledge, the potential effect of standardization on handovers can be uncovered indirectly, by examining whether adaptation patterns naturally exist in handovers. If this is the case, it could be argued that standardization (the limitation of diversity) would impede these adaptable patterns.

The studies composing this thesis have examined adaptation during the nursing handover under a task contingent perspective (Studies 1 and 2) and a collaborative activity perspective (Studies 3 and 4). Study 1 has shown that contents of communication vary between units as a function of uncertainty. This suggests that units facing different levels of uncertainty have different communicative needs. Relating these results to the debate on standardization, one could argue that standardization could be performed within unit types, i.e. be specific to the organizational context of the unit. This study also reports the existence of different functions of handover, like others previously (e.g., Grosjean & Lacoste, 1999; Kerr, 2002). This suggests a need for the comparative study of handover functions between units featuring standardized and units featuring unstandardized handovers. A result of such a study could well be that the identified functions of handover disappear in standardized communication. If this is found, standardization should be accompanied by the emergence of other devices (e.g., group meetings, see Meum, Wanfensteen, Soleng & Wynn, 2011) in order to maintain these important functions. In Study 2, I have found that handovers in high uncertainty units are more flexible than handovers in low uncertainty units. This suggests that high uncertainty units would benefit from standardization to a lesser extent than low uncertainty ones as flexibility is necessary to absorb high levels of uncertainty (Grote, 2009). Taking into account the results of this study, one could argue in favor of standardization in low uncertainty units, and no standardization in high uncertainty ones.

From Study 3, we know that nurses make an intensive use of narratives featuring DRS when reporting on non-routine situations. Storytelling allows them to transfer important information in a compact form (see Patterson & Wears, 2000) and hence to inform their colleagues of important deviations from expectations. Standardization of handovers would preclude such narratives and should hence include procedures specifically aiming at dealing with non-routine events. Results from Study 4 indicate that perturbations occur very frequently in nursing units when the handover room is not protected from unexpected arrivals and departures. Perturbations often require ad hoc management and often lead to the suspension of the handover. Perturbations cannot be planned and differ in their features. It follows that participants have to deal with them on the fly. The management of perturbations is hence not standardizable. Perturbations can be signals of important parallel activities that require priority attention from participants and are rarely ignored or postponed (see Gonzalez & Mark, 2004; O'Conaill & Frohlich, 1995). Standardized handover protocols should allow the management of perturbations during handover, or be combined by protective devices, e.g. posting one or several gatekeepers outside the handover room during the meeting. In one unit in which I collected data, the handover was performed in a break room. Some nurses didn't participate to the handover and attended clinical priorities and perturbations during the handover. This provided protection to the handover by limiting the possibility for perturbations.

LIMITATIONS

In Study 1, we interviewed head nurses as representatives of their care units. Interviews are subject to what participants recall or want to tell the researcher, but still are sufficiently reliable and are widely used in research in psychology (Ericsson & Simon, 1984). Nevertheless, in Study 2, I rely on filmed observation of handovers during a prolonged time. Because of the long time necessary to analyze the data (e.g., transcription and coding of hours of material) I only could afford collecting data in a sample of four nursing care units. This small sample however provided sufficient data for the between-unit analyses I have performed (see Eisenhardt, 1989). Valid theoretical insight can nevertheless be gained from multiple case studies of this sample size, as this has been repeatedly advocated in the literature (e.g., Eisenhardt, 1989; Yin, 2003). Furthermore, my design is an improvement on published studies of nursing handover, which rarely rely on comparative data, and have mostly consisted on the analysis of handovers in only one nursing unit. In Study 3, we analyze the use of DRS during handovers. We discussed the recurrent use of DRS in reporting non-routine situations. Our approach has been to identify the DRS episodes and then what characterizes their use through qualitative and quantitative approaches. The possibility remains that narratives of non-routine events that do not feature DRS certainly exist during handovers. While this possibility doesn't question the validity of our findings, a comparison of narratives featuring DRS to those which do not might be informative on the specificity of use of DRS in these circumstances. In Study 4, I examined the way nurses deal with perturbations of handovers. While I quantified the sources of perturbations and the types of perturbations, I only analyzed the treatment of perturbations in a qualitative way. A quantitative analysis of the management of perturbations might draw light on other aspects of their management. For instance, the efficiency of management strategies could be assessed by comparing the duration of the perturbations managed by different strategies.

FURTHER STUDIES

The literature has highlighted the lack of studies measuring patient outcomes of handovers, and more problematically the positive or negative impact of standardized handovers on patient safety (Cohen & Hilligoss, 2009). This is important, as standardized nursing handovers are not only advocated, but are also frequently compulsory, for instance, in all accredited hospitals of the US territory (Adamski, 2007). It follows that decision of modifications of handover designs without appropriate understanding has been critiqued (e.g.,

Van Eaton, 2010). In Chapter 2, I argued in favor of studies of handover that compared a) efficiency of standardized and unstandardized handovers b) under high and low uncertainty work-units c) and that included outcome measures, such as error rates which are increasingly reported in studies of physicians' handovers (e.g., Maughan, Lei & Cydulka, 2011).

CONCLUSION

I have shown that systematic differences exist between handovers occurring in contexts differing in uncertainty. Handovers in high uncertainty units feature less reported contents, and a more flexible topical organization. I have also shown that handovers are opportunities to sensemaking through jointly constructed narratives and the use of direct reported speech. Handovers are also subjected to frequent perturbations for which management strategies exist. These allow the protection of the interaction and the minimization of the impact of perturbations. I have related my findings to the recent trend to standardize handovers and have discussed the difficulties of such standardization in the case of handovers.

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