INTRODUCTION

Theorizing on organizational routines has grown rapidly as an area of organization research (Nelson, and Winter, 1982; Pentland, and Rueter, 1994; Feldman, and Pentland, 2003). Modern societies depend on routines for safety, health, transportation, transaction processing, and entertainment. Routines are defined as “the habitual or mechanical performance of an established procedure” (Webster, 1992). Other definitions focus in a similar vein on consistency, orderliness, repetitiveness, predictability, knowledge, and regularity.

In this paper, we take a slightly different angle by focusing on routine coordination, i.e., routine as an adverb rather than a noun (Pentland, and Rueter, 1994). By selecting coordination as a primary organizing principle for this study, I can bring in new and relevant literature, and bridge these literatures. Routine coordination is a more operational topic than routines (the noun) and it has not yet received the attention it deserves. Usually coordination is perceived as a (beneficial) side effect of organizational routines (Feldman, and Pentland, 2003). This paper repositions – particularly routine – coordination as a central object of study.

Coordination has been defined as the achievement of concerted action (Thompson, 1967), or the management of dependencies (Malone, and Crowston, 1994). Routine coordination then refers to situations where two or more individuals work together on a collective task.
that can be characterized as repetitive over time. A few examples include sports teams practicing the same techniques and tactical maneuvers over and over again, collaboration in fast food restaurants between front and back office personnel (Leidner, 1993), military aviation demonstration teams (Thunderbirds, 1996), standard surgeries in medical teams (Edmondson, et al., 2001), a Formula 1 (F-1) pit stop team executing tightly orchestrated refueling and tire replacement activities, a group of parachutists displaying a standard figure, and theatre or music troupes executing a pre-fixed script (Weick, 2001). As these examples suggest, routine coordination situations encompass a major portion of daily activities in society. It therefore deserves attention of scholars in the organizational routines area.

However, the conceptualization of routines as a phenomenon still remains problematic and debated in literature. Theoretically it is still not clear how routine coordination is achieved. The traditional view tends to follow a dichotomous thinking style: routine (mechanistic) versus nonroutine (organic) organizations. The formers is at times perceived in negative terms (deskilling, boring, mindless, Weberian, old fashioned), while the second would be more interesting, dynamic, and ‘current.’ The traditional view supposes that ex ante structures sufficiently inform people to perform activities in a concerted manner without further communications (March, and Simon, 1958). Structure (in the form of procedures, plans) would substitute for mutual adjustment as a coordinating mechanism (Thompson, 1967; Van de Ven, et al., 1976; Mintzberg, 1979). While there is some truth in this perspective (for instance the importance of ex ante coordination practices), the answer seems incomplete. And some reasoning based on these notions is problematic, such as the idea that routine performance is mindless, and that it leads to deskilling.

Recent work suggests a more complete explanation that sketches a more interesting picture. Researchers point at the duality of structure (Weick, 1993), the dedication and attentiveness of professionals (Weick, and Roberts, 1993), the interaction between structure and process (Feldman, and Pentland, 2003), knowledge intensity, and the role communications (Edmondson, et al., 2001).

What remains unclear is how these emerging insights interrelate and could inform an extended theory of routine coordination. We must know how people use structures before, during and after routine performances; how they adapt to slight deviations; and how they can economize their communication processes.

The objective of this paper is to explore these questions. By doing so, I contribute to an emerging theory of routine coordination. The study is demarcated in the following ways. First, the focus of this work is on routine coordination in professional contexts. I use the example of a musical to illustrate concepts throughout the paper. Second, I focus on groups, i.e., between the individual and (large) organizational level, while recognizing that individuals perform coordinated actions. Third, I limit myself to the routineness of coordination, not on routines as an autonomous phenomenon. The paper is structured as follows: after introducing an example of a musical, I explore the genesis of the traditional view. After presenting the contribution of this perspective, I introduce some limitations that lead to new propositions. Next, I expand on literature relevant to formulating a new theory of routine coordination. The paper concludes with a brief discussion and conclusion.
AN EXAMPLE OF ROUTINE COORDINATION: THE MUSICAL “HELLO DOLLY”

In order to illustrate some of the concept in the remaining of this paper, I use the musical Hello Dolly\(^1\). Musicals offer a good example of routine coordination because they are usually played several hundreds or even thousand times, often in multiple countries. Hello Dolly was written by Michael Stewart, based on *The matchmaker* by Thornton Wilder. The music for Hello Dolly was composed by Jerry Herman and resulted in American evergreens with songs like *Hello Dolly*, *Before the Parade Passes* by and *It only takes a moment*. The musical opened at the St. James Theatre on January 16, 1964 and ran for 2,844 performances. It was filmed in 1969 with Barbra Streisand en Walter Matthau.

In 2004 and 2005, the musical will be performed 70 times in the Netherlands and Belgium, involving the same cast (Figure 1 shows a moment in the musical). Jamai Loman – Dutch actor – reported: “It’s strange to do every evening the same thing. Actors often say that every time is different; I do not yet see it that way. But it’s OK, because every time you got the chance to improve different aspects” (Engels, 2004).

![Figure 1 Routine coordination in the musical "Hello Dolly" (actors Willeke Alberti and Jamai Loman)](image)

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\(^1\) The choice for this musical as an example is random. The author did not nor intends to attend a performance.
The paper will illustrate the different readings of this and similar examples of routine coordination.

**COORDINATION, COMMUNICATION, MEANING**

Organizations exist for performing tasks that exceed individual capacities (Penrose, 1959; Kogut, and Zander, 1996) or can be performed more efficiently by involving multiple persons (Smith, 1973). This performance materializes in actions that are achieved in a concerted fashion, i.e., they are coordinated (Thompson, 1967; Clark, 1996). A question that is raised time and again is how orderly action emerges. Tsoukas (1996: 90) writes at the end of his article on the firm as a distributed knowledge system: “What needs to be explained is … how … in a distributed knowledge system coherent action emerges over time”. Thompson’s (1967) defines coordination as the process of achieving concerted action. Contingency theorists have contributed to this field of inquiry with their introduction of coordination mechanisms with varying information processing capacity (hierarchy and plans versus mutual adjustment) (Galbraith, 1973; Van de Ven, et al., 1976). In the 1990s, the MIT Center for Coordination Science has expanded these ideas to include various forms of dependencies (Malone, and Crowston, 1994), and suggestions for designing organizational procedures (Crowston, 1997; Malone, et al., 1999).

Hutchins (1990: 209) refers to “the global structure of the task performance will emerge from the local interactions of the members.” Donnellon, Gray and Bougon (1986) prefer the word equifinal meaning over shared meaning, because research suggests that even though people do not ‘share’ meaning they can coordinate their actions. Equifinal implies a more modest notion. It communicates the idea that minimal overlap suffices. Meaning at the individual level may be very different, but sufficiently similar for coordination (Donnellon, et al., 1986; Weick, 1995).

In Cramton’s (2001) study on international teams, she refers to Blakar’s research on communication (Blakar, 1973; Hultberg, et al., 1980; Blakar, 1984) and his concept of ‘shared social reality’. The following description clarifies the idea of (here: absence of) shared social reality in Blakar et.al.’s research setup: ‘In the studies, pairs of family members are given maps of a city. One subject’s map contains arrows that mark a route through the city. This subject is told to describe the route to his or her partner so that the partner can follow the route on his or her own map. Unbeknownst to the subjects, their maps differ in key respects, making it impossible for them to carry out the task successfully’ (Cramton, 2001). According to Polanyi (1975: 208), people must mutually adjust to ‘move(s) to higher and higher levels of meaning’ (Polanyi, 1975).

Miranda and Saunders (2002), building on (Schutz, 1967), claim that meaning must be socially constructed, in the sense of intersubjective interpretation. According to them, meaning is not the same as agreement. Weick and Roberts (1993: 357) develop the idea of a collective mind which consists of a pattern of heedful interrelations of actions in a social system. Collective mind is not the same as collective meaning, but it is manifested when individuals construct ‘mutually shared fields’, a concept borrowed from Asch (1952). Weick (1993) ties meaning to structuration theory in his paper on the Mann Gulch disaster. He distinguishes two forms of structure. A first interpretation of structure points at frameworks, roles and configuration (Weick 1993, 644). Second, structure can be interpreted as meaning (or shared provinces of meaning, or social construction). Poole
(1996: 250) describes meaning construction as “a dialectic process in that previous constructions of reality influence interpretations of new experiences and these new experiences influence the construction of reality” (Poole, 1996). Boyce (1995) introduces the idea of a centering process. Shared meaning results from organizational story (Boyce, 1995).

We can summarize the above in two propositions. First, coordination is achieved when activities relate in a concerted or orderly manner. This activity order requires shared meaning, a mental phenomenon. The actual ordering of activities during a Hello Dolly performance depends on real time construction of meaning, and prior training and meaning construction.

Proposition 1. Social ordering of activities depends on social construction of meaning.

Second, for collective meaning to emerge, communications suffice, not necessarily involving action. Collective meaning (i.e., at a social level, not as an individual level phenomenon) differs from the idea of mutual knowledge (Krauss, and Fussell, 1990) and common knowledge (Clark, 1996). It is a fleeting and situational phenomenon (Polanyi, 1975), being created and recreated all the time as long as people are functioning socially. Collective meaning depends on social construction in the sense of two or more individuals drawing upon structures (rules, resources) and creating mutual shared fields (Weick, 1993). This social process includes any form of verbal and nonverbal communications between people. Literature suggests that interaction builds a collective understanding of a task situation and co-workers (Weick, 1979). This leads in turn to coordination as Hutchins (1990: 207) proposes in his research on ship navigation: “coordination among the actions of the members of the team … emerges from the interactions among the members of the team,” and “the global structure of the task performance will emerge from the local interactions of the members” (Hutchins 1990: 209). Interaction implies confirming, negotiating, adjusting and extending individual notions of reality. It may include narrating and story telling as a vehicle for eliciting contributions and centering on a joint story (Boyce, 1995). This translates enhances the likelihood of coordinated (organized) action.

Weick (1993: 644) in his study of the Mann Gulch disaster asserts that “nonstop talk, both vocal and nonverbal, is a crucial source of coordination in complex systems that are susceptible to catastrophic disasters.” Analyzing the grounding of the Exxon Valdez oil tanker, Roberts and Moore (1993: 245) suggest that “tight interconnections (between crew members – author) would have been represented by continuous feedback and checking with one another about the meaning of orders, placement of warning lights” (Roberts, and Moore, 1993). Bigley and Roberts (2001) point out that communication in a fire department unit contributes to normalizing individually held representations. People co-construct elevate their reality to a social level when they communicate (Berger, and Luckman, 1991). One could suggest that collective meaning erodes or is not built when communication is absent. Polanyi (1975) stresses the broad participation of people contributing to a social task. He calls these polycentric, meaning that multiple centers (actors – author) must interact – in his mind continuously. Hello Dolly ceases to exist when one or more actors stop enacting their roles and interacting with their colleagues (of
course, the potential social order and meaning of Hello Dolly structures persists). All this suggests the following proposition:

Proposition 2. Developing and sustaining collective meaning depends on interaction between two or more individuals.

It seems likely that with routine work, collective meaning tends to be stable, and interaction minimal. This does not imply, however, that routine meaning is not constructed and reconstructed. Nor does it suggest that interaction is absent. The next sections elaborate on these notions.

TRADITIONAL PERSPECTIVE ON ROUTINE COORDINATION

Traditional work on routine coordination has emphasized the ex ante deterministic role of structures. Skills required to accomplish activities would be taken from workers and translated into impersonal, bureaucratic structures (Weber, 1947). These ‘programs’ – often captured in technologies – then dictate how the work should be done (March, and Simon, 1958). They become standards for shaping and controlling work accomplishment. Movies like Charlie Chaplin’s Modern Times communicate the workers’ experience as deskilled executers of predefined structures.

The consequences of structuring work activities along these lines include, first, independence from specific individuals and their expertise. Second, information processing during execution of activities is virtually eliminated. The ‘program’ pre-defines required behaviors in a comprehensive manner. Third, human work accomplishment is reduced to simplistic behaviors and reduced thinking. Decision making consists merely of applying standard operating rules in the workers’ simplified relationship with environmental stimuli (Cyert, and March, 1963; Stinchcombe, 1990). March and Simon (1958: 122) write: “We will regard a set of activities as routinized, then, to the degree that choice has been simplified by the development of fixed response to defined stimuli.” Fourth, since no feedback exists from program execution to program development, routine coordination is considered rigid and inflexible (Ching, et al., 1992). Ambiguity is precluded in advance. And finally, comparison of structures with the actual performance enables externalized control modes at detailed levels (Snell, 1992).

It would be easy to caricature this stream of literature as a willing strawman. Oftentimes, a negative rhetoric pervades literature on routine work, including words such as boring, de-skilling, impersonal, inflexible, and so forth. A more useful approach is to assess the contributions of this work that still impacts the organization sciences, and to highlight then some limitations. These offer then a starting point for extending our understanding of routine coordination.

One should realize that the traditional perspective emerged in an era of mass production. In the 1920s and later after the second world war, mass production promised wealth at reasonable costs. Similarly, these days, highly structured and partly automated manufacturing facilities result in products of a decent quality and price. Technologies such as Enterprise Resource Planning Systems and supply chain management systems provide instant updates on which activities should be performed, and how these are
coordinated (Scott, and Vessey, 2003). A contribution from this approach is that ex ante structures impact work accomplishment in the sense of reducing interpersonal communications for coordination. If the method for accomplishing work and integrating activities is known in advance, the actual performance simply requires less coordination. Actors knowing the script of the Hello Dolly musical should not be surprised by who says what during a performance. Coordination is achieved at a basic level as long as each individual complies with the ex ante structure.

Proposition 3. Ex ante structures inform individuals how their work should be done. This reduces coordinating communications during work accomplishment.

The incompleteness of the traditional perspective’s explanation of coordination can be shown with the following example from the US Air Force demonstration team (called ‘Thunderbirds’). This team performs a limited number of carefully orchestrated figures at various aviation shows, mostly in the US (Thunderbirds, 1996). The team operates F-16 aircraft that must be refueled during longer trips between show sites. Refueling implies that the F-16 pilots sequentially connect their aircraft to the boom extending from a larger aircraft with gas. About this highly routinized coordination process between the F-16 pilot and crew aboard the gas aircraft, one team member mentions the following:

“It’s called Thunderbird Standard Operating Procedure (SOP) for the way we do air refueling, where we bring up two airplanes to the boom at one time. The communications between the fighters and the tankers is minimal. We don’t need to talk because we practice it all the time. We brief the procedure and then we go out and execute it … these air-to-air refueling require concentration, precision, skills, and sometimes just a little bit of patience” (Thunderbirds, 1996)

The traditional perspective’s reading of this example would be: there is an ex ante SOP which spells out how each individual should perform his or her job. If individuals follow the SOP, coordination will follow.

There are, however, a number of limitations associated with this reading and perspective.

LIMITATIONS OF THE TRADITIONAL PERSPECTIVE

The limitations of the traditional perspective concern the relationship between structure and process, the conceptualization of structure, and the relationship between structure and coordination.

Problems with the relationship between structure and process. According to the traditional perspective, ex ante structure would substitute for coordination by mutual adjustment during the performance. The comprehensiveness of the ex ante script would eliminate the necessity to talk, watch, and adjust. The more organizations rely on structures instead of mutual adjustment (Mintzberg, 1979). Research disconfirms this idea. Studies on routine medical and military activities show that these professionals carefully monitor each other and communicate (Weick, and Roberts, 1993; Edmondson, et al., 2001). The Thunderbird team member sketches the intensity of the actual performance: “these air-to-air refueling require concentration, precision, skills, and sometimes just a little bit of patience” (Thunderbirds, 1996).
As an alternative to the structure-process substitution perspective, structuration and institutional theory propose that people draw on structures and institutional norms to shape their social activities (process) (DiMaggio, and Powell, 1983; Barley, and Tolbert, 1997). This agency enacts structures, and results in modification and development of novel structures and institutes (Barley, and Tolbert, 1997). Structures include resources, and rules (Giddens, 1984) or schemas (Sewell, 1992). This conceptualization of structure extends the contingency viewpoint. There, structure was considered a blueprint that is comprehensive (leaving little unclarity for action), and fixated before action takes place. Structuration theory complement this idea with the notion that structures result from human agency, and that they constrain and enable action (Adler, and Borys, 1996). Von Hippel (1994) provides an example from coordination in software development. Software engineers construct (process) a prototype (structure) of a new system that is then reviewed by users (process) and sent back to engineers for subsequent loops (von Hippel, 1994). The relationship between structure and process (agency) is therefore primarily recursive and not solely characterized by substitution. This has consequences for the role of agency during a routine performance.

Proposition 4. Structure and process relate recursively.

The task enactment is a collective responsibility with each person influencing the final performance. An individual’s contribution is in part determined by the specific way co-workers execute their tasks, and not only by the script. The combination of task interdependence (Wageman, 1995) and actual performance idiosyncrasies forces people to function not like pre-scripted machines but as attentive humans. If someone suddenly slows down during his role performance in a Hello Dolly performance, others will undoubtedly follow. Routine coordination is therefore elastic, particularly in “show time” situations (theatre, team sports, military teams, emergency etc) (van Fenema, 2003). Without elasticity routine coordination would simply breakdown. The traditional perspective, on the other hand, assumes structure-centric, pre-defined collaboration.

Problems with structure. The structure is assumed to be overt and rather fixed (Adler, and Borys, 1996). In practice, structures – here interpreted in the usual sense of rules and resources (Sewell, 1992) – are only partially overt; they are usually not comprehensive because they require professional know-how to interpret them (Stinchcombe, 1990), and they are not necessarily fixed (although sometimes they are at the core, like the original text of the Thunderbird refueling SOP, or the script of Hello Dolly). Recent work, building on (Latour, 1986), distinguishes between the ostensive (idea) dimension and the performative dimension (enactment) of routines (Feldman, and Pentland, 2003). Feldman and Pentland extends structuration theory’s distinction between on one hand agency (Giddens, 1986), social construction (Weick, 1993), human behavior (Barley, 1986), and on the other hand structures, and institutions (Barley, and Tolbert, 1997). Structure and process relate in a recursive manner. Structures have a dual role in this relationship. They enable and constrain processes, while these processes result in, confirm, and extend structures. Organizations keep enacting and often refining their scripts. Even when some underlying structures remain unchanged (the original Hello Dolly script), the interpretation and execution of scripts will change. Actual Hello Dolly performances always require interpretation and enactment, and they are slightly adapted for local audiences in different eras.
Proposition 5. Structure and the enactment of structure (agency) are conceptually distinguished. The two are recursive related.

Proposition 6. The recursive relationship between structures and process implies that structures are re-created with every performance. While underlying scripts may remain unchanged, recreated structures differ from the predecessors.

Problems with the relationship between structure and coordination. While the SOP—such as the one in the Thunderbird case—predefines how each actor should behave, it does not coordinate per se. It is a passive idea with ordering potential, captured in a documented format, and to some extend in peoples’ heads. People must first activate these structures, and develop a common understand of the SOP. They must translate the SOP into actual behaviors.

The traditional perspective mixes structure and its meaning in practice. It assumes that structures are self explanatory, and can be interpreted in only one way. Structure would determine action. While this might be the case, hermeneutics and structuration theory distinguish two dimension of structure (Weick, 1993; Ngwenyama, and Lee, 1997). On one hand, structure consists of frameworks and role systems. On the other hand, people, drawing on and enacting these structures, create temporary structures in the sense of meaning. In a Hello Dolly performance, the original script is interpreted by a particular troupe’s leadership in a particular time-space configuration, then discussed, interpreted, tried out, performed, and adapted over time. The linkage between structure and action is therefore multilayered and stretched over time, depending on multiple individuals. The Hello Dolly text may be translated differently in today’s English, and it may be differently interpreted by the theatre community these days. An actual troupe and even individual actors may have their own interpretation and meaning (Donnellon, et al., 1986), all based on the same text. Similarly, the refueling procedure of the Thunderbirds requires a briefing to get everyone involved on the same page again, prior to execution. Actual coordinated performance consists of people activating, drawing upon, interpreting, enacting, and adapting structures.

The musicologist Nicholas Cook from Southampton University suggests that scripts—here a Beethoven symphony—inspire new performances over time.

“When we talk about classical music, we talk about it in a very composer centric way. If you look at the books in the bookshop: the great composers … and you would think that our musical culture was really just about endlessly reproducing Beethoven. I don’t believe that’s why people go to the concert hall to hear a Beethoven symphony that they have heard so many times that there is nothing new in it. Except that because there is something new. I think it’s the Beethoven symphony as a vehicle through which you hear performance. You hear performance that has never been before, performance that is different from other performances, performance that itself involves lots of different musicians interacting with one another.”

2 Emphasis in original recording.
Each performance is on one hand a replica of its predecessors, and it that sense ‘routine’ and directly traceable to the Beethoven’s original manuscript. At the same time, the script (a passive structure) has little to do with the performance (a lively performance involving numerous musicians and a director). Moreover, as even amateur music listeners will confirm, performances differ substantially in terms of speed, nuance, atmosphere, ‘color’, sensitivity, mood, balance, coordination, tone, coherence, quality and so forth.

Proposition 7. Structures with ordering potential require agency to result in coordinated activities (instead of the traditional substitution argument).

In the next paragraphs, we elaborate on the genesis of an extended theory of routine coordination. As it appears, the conceptualization of structure and its relationship to agency must be reconsidered to explain routine coordination.

AN EMERGING THEORY OF ROUTINE COORDINATION

Extension 1 Multiplicity of structures

Traditional literature on routine coordination considers structure in terms of a program (March, and Simon, 1958), a standard operating procedure (Cyert, and March, 1963), or “the precise definition of rights and obligations and technical methods attached to each functional role” (Burns & Stalker, 1961: 121). This bureaucratic system of rules would then unequivocally inform people about their activities, and result in coordination. The Hello Dolly script would suffice for people’s performances.

More recent work extends this view in two ways. First, from a structuration theory perspective, structures are considered mental traces that recursively interact with agency (Giddens, 1986). Structure and agency are not substitutable mechanisms (Van de Ven, et al., 1976) as the traditional perspective suggests. In terms of the example, the Hello Dolly script (structure as constituting agency) enables and constrains the initial director’s development (through agency) of a fixed interpretation (structure is constituted by agency) for an actual series of performances. This fixed interpretation (structure as constituting agency) is then used to inform (agency) the actors, leading to their interpretation (structure is constituted by agency). Actors then go out and actually play the piece, leading to new meanings in the audience. In short, structure and agency relate and are adapted over time.

Second, recent work has started to explore the complexity and multi-layer ness of structures. If structures are defined as rules and resources (Sewell, 1992), the concept encompasses more than just formalized programs. Grant (1996) introduces multiple forms of common knowledge in his contribution to a knowledge-based theory of the firm:

- language (for verbal communication, and reading),
- other forms of symbolic communication (e.g., the music score of Hello Dolly),
- commonality of specialized knowledge (actors, director and staff in a musical must have overlapping knowledge to coordinate their work),
- shared meaning (people share common experiences, stories, metaphors and analogies),
recognition of individual knowledge domains (individuals know who knows what (Wegner, 1987)).

Related conceptualizations of structures include redundant knowledge (Hutchins, and Klausen, 1996), frames (Walsh, 1995), mental models (Klimoski, 1994), scripts (Gioia, and Poole, 1984), conventions (Becker, 2000), frameworks (Barrett, 1998), and schematas (Bartunek, 1984; Harris, 1994). Routine performance is knowledge, skill, and information intense. Kogut and Zander (1992: 386-387) offer the following distinction between the traditional idea of a program or blueprint on one hand, and knowledge on the other hand:

“A routine is in itself an insightful but incomplete characterization of knowledge. Because of the broad coverage of the term routine, an appeal is often made to the analogy of a blueprint (...) but a blueprint favors much more a description of information than know-how. Knowing how to do something is much like a recipe; there is no substantive content in any of the steps, except for their capacity to produce a desired end. The information is contained in the original listing of ingredients, but the know-how is only imperfectly represented in the description.”

While blueprints as recipes do play an important role in routine performance, they must be backed up by knowledge.

The multiplicity of structures also returns in sociological and anthropological research on infrastructures. Bowker and Star (2002) show how numerous (mental) infrastructures impact modern living. They expand on medical classification systems that pervade education and practice, and shape discourse (Bowker, and Star, 2002). In the same vein, most communities around a particular activity have developed their own concepts, constructs, language, and acceptable methods. Weick (1993) in his analysis of the Tenerife air disaster proposes that under normal conditions, coordination depends on such community structures:

“… speech exchange and social interaction is an important means by which an organization is built or dismantled. This is not so say that social interaction is a local, self-contained production that is unaffected by anything else in the setting. There clearly are ‘noninterpretational foundations of interpretation in social interaction’ (...). The interpretation process itself is shaped by shared language, authority relationships that assign rights of interpretation, norms of communication, and communication. The meanings that actors co-construct are not self-created” (Weick, 1993).

Giddens points at three dimensions of structures: signification (resulting in meaning), domination (power aspects), and legitimation (moral dimension) (Giddens, 1986). As professionals draw upon multiple structures and (re)create structures, they deal with these dimensions of structure. The structural dimension of routine collective performance seems therefore more complicated than just a single program. Professionals have been socialized in a particular community and acquired a way of thinking and working that includes multiple skills, methods, and techniques. Getting back to the US Thunderbird example, it would be too simplistic to assert that pilots simply enact a program. In fact, they draw upon countless rules, skill sets, and knowledge areas for their performance. On a general level, these people have been socialized and trained for decades in acceptable behaviors in that particular community. On a specific level, they prepare meticulously for
a particular season and performance. This becomes evident when we look at the answer at the Thunderbirds’ website to the question “Why are there no spare pilots?” If we followed the traditional perspective on routine coordination, the question would not be asked. A single program would adequately inform pilots. The actual answer, however, is:

“Given the number of practice hours required to safely fly a safe demonstration, spare pilots would simply not be prudent. Each pilot must complete 120 training flights during winter training in order to perform a public demonstration safely. The teamwork required for high-speed low altitude flying in very close formation and opposing solo maneuvers takes hundreds of hours to develop. Substituting a spare pilot would not be prudent.”

One should realize that these Thunderbird trainings extend the careers of already seasoned pilots with years of training and experience. The routine coordination these people display reflects an incredible depth of (shared) experience, a clear departure from the de-skilling view on routines (Stinchcombe, 1990).

Along these lines, we can now investigate how routine coordination differs from less routine examples. If we take the multiplicity of structures as a starting point, we argue that these structures are more ex ante (1) adjusted, (2) shared, and (3) centered. First, if practice involves multiple structures, these must somehow be adjusted. Research extensively documents the impact of new structures in a given organization (Barley, 1986; Orlikowski, 1993; Orlikowski, 1996; Yates, et al., 1996; Majchrzak, et al., 2000; Edmondson, et al., 2001). These studies illustrate the complex adaptation required for implementing new protocols, methods, and technologies. Routine coordination implies that the multiplicity of structures have been more adjusted in advance. People experience less slippages between structures (Barley, 1986) because these have already been sorted out. Organizations have stabilized the adjustment of inter-individual and organizational structures. In Hello Dolly, adjustment implies that the director’s script interpretation has been checked with the actors, the support crew and so forth. Elaborate schemes have been prepared for movements, music, light, timing, transportation and so forth. After tens or hundreds of performances, one could imagine that these aspects have been fine-tuned.

Second, routineness implies that structures are shared. People have similar knowledge about the collective performance, their individual performance, and interdependencies with others’ contributions. They can build mutual expectations and thus reduce surprises during routine performance. And third, interpretation structures, and meanings have been ‘centered’ (Bartunek, 1984). Within a group of people involved in a routine performance, meanings of actions, language, and other structures are known (Weick, 1993). When Jamai (Figure 1) starts a particular act, Willeke, other actors, and crew members for light, special effects know exactly what his contribution means, and what comes next. On the flip side, alternative meanings have been excluded, so there is a tendency of a closed interpretation system that enacts and processes stimuli in a channeled (and highly efficient) manner. All this can be summarized as follows:

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4 Centered and shared meaning does not imply that everyone thinks the same. Literature suggests that people develop equifinal meanings that suffice for achieving coordination Donnellon, A., et al.
Proposition 8. Routine coordination involves multiple structures. The more coordination is routine, the more structures are (ex ante) mutually adjusted, shared, and centered.

The three aspects of routine coordination – inter-structure adjustment, sharing of structures, and centering of meaning – do not necessarily imply that a group of people can just perform a single program (traditional perspective). Rather, the multiplicity and depth of structures enable multiple performances. An experienced Hello Dolly crew can easily embark on a new performance program, say Cats. All they have to do is further fine-tuning and slightly adjusting their already extensive experience base.

Extension 2 Communications before and after routine performance

During a routine performance, no communications between individuals is considered necessary according to the traditional perspective. Ex ante structures would substitute for real-time information processing. The information is in a sense pre-processed. Stimuli encountered during the performance would simply fit ex ante structures.

Recent studies, however, suggest that before and after a routine performance, people interact. This applies in particular to performances that are complex, risky, and that must meet stringent quality criteria.

First, beforehand, people communicate their views on what can be expected, and how the work should be accomplished. A Hello Dolly performance would be unthinkable without elaborate training, socialization, and discussions. In fact, pre-performance communications enable attention and communication reduction during the performance itself. People establish mutual expectations, and response scenarios to various what-ifs. Weick (1993: 649) reports on a captain who communicated the following to his crew: “I just want you guys to understand that they assign the seats in this airplane based on seniority, not on the basis of competence. So anything you can see or do that will help out, I’d sure appreciate hearing about it.” Similarly, in their studies on surgery routines and routine changes in hospitals, Edmondson et.al. (2001) found that ex ante communications played an important role. Some of these communications were required for implementing a new ed extensively before surgeries (Edmondson, et al., 2001). In part, this was caused by the introduction of a new procedure. But in addition it seemed that people pre-talked the surgery. Particularly with complex routine performances, one can imagine that the various expectations, methods, and plans must be aligned in advance.

Second, afterwards, people tend to review and possibly discuss results for quality and learning purposes. The US Thunderbirds team reviews their show meticulously, even though the performance is highly scripted: “During the debrief, the team will refine the show in painstaking detail, looking for the tiniest of imperfections” (Thunderbirds, 1996). At flight deck ships, landings require superior skills from pilots, particularly at night. For this reason, all of them are taped, broadcasted, reviewed and commented upon. In other areas such as routine medical operations (Edmondson, et al., 2001) and university housing allocation (Feldman, 2000), people review and discuss their performance in

order to evaluate the value of routine methods. Reviews seem more likely and desirable when the work or its environment tends to change. This suggests the following proposition.

**Proposition 9.** Routine performance is preceded and followed by communications, the more work must meet stringent quality criteria, and the more work and its environment are complex, risky, and likely to change.

An implication is that routine performances without much risk and complexity – for instance interactions surrounding a transaction at a grocery store – demand less pre and post conversation.

**Extension 3 Communications and attitudes during routine performances: staying tuned**

Traditionally, coordination of routine performance was considered a function of ex ante structures. These would substitute for real-time communications. Recent research, particularly on High Reliability Organizations and medical teams, disconfirms this notion. The accomplishment of routine work – such as serving fast food meals – often demands small adjustment to situational expectations (Leidner, 1993; Pentland, and Rueter, 1994). These demand minimal communications during work. Multiple verbal and nonverbal cues accompany task execution, particularly when work is complex.

Interviewees in Edmondson et.al.’s (2001) study report on the necessity of communications, particularly with advanced procedures and technologies. Actors in a Hello Dolly performance constantly listen and watch each other to confirm and guard the proceeding routineness of the performance (see Figure 1).

During routine performances, people do not perform ‘mindlessly’ as some early work suggests. They heedfully monitor their environment, and construct their contributions accordingly (Weick, and Roberts, 1993). In fact, mindless performance of routine behaviors enhances the risk of forgetting the intention behind the routine (Snook, 2000). When people don’t realize these intentions or act according to them, but merely follow prescriptions, the coordinating potential of routine structures deteriorates. Edmondson et.al. (2001), referring to (Gersick, and Hackman, 1990), mention a case where “accustomed to uniformly warm weather, an Air Florida pilot automatically responded in the affirmative to his team member’s routine question, "Anti-ice off?" despite the heavy snowfall at Washington, D.C.’s National Airport during the January 1982 takeoff. Tragically, this in appropriate adherence to routine led to the flight's crashing into a bridge over the Potomac River, killing all 74 crew members and passengers.” Weick and Roberts (1993) suggest a similar idea in their work on flight deck ships. These highly routine and time-pressed operations demand heedful attention in order to sustain the social system. Heedlessness jeopardizes the organization and contributed to an accident during the researchers’ stay onboard:

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5 DeSanctis and Poole (1994) distinguish between the structural features of technology, and the ‘spirit’ (general intent with regard to values and goals underlying a given set of structural features, p. 126) of technology. Analogously, this notion can be applied to the more general idea of structures (rules and routines). For routine coordination both aspects must be taken into account.
“As heed began to be withdrawn from the system, activities and people become isolated, the system began to pull apart, the problems became more incomprehensible, and it became harder for individuals to interrelate with a system of activities that was rapidly losing its form. (...) One interpretation of this incident is that individuals were smarter than the system, but the problem was more complex than any one individual could understand. Heedful interrelating of activities constructs a substrate that is more complex and, therefore, better able to comprehend complex events than is true for smart but isolated individuals” (Weick and Roberts:373)

Mindful performance is also required to adjust to co-workers’ quirks. In terms of Hello Dolly (Figure 1), the moment Jamai delays or accelerates, Willeke must adapt even though the overall routineness of the situation remains unchanged. Routine coordination usually leaves some room for interpretation and creativity. How actors fill that room impacts their colleagues responsible for interdependent activities.

Minimal communications and a heedful attitude sustain the ongoing routineness (i.e., in accordance with routine practices) of work accomplishment, and they guard against potential deviations from routines. This implies a departure from the mechanistic (as opposed to organic) metaphor (Burns, and Stalker, 1961) commonly used for routine performance.

**Proposition 10.** Routine performance is accompanied by minimal communications, and requires heedful behaviors that take the intentions behind routine structures into account. These interactions and attitudes gain importance when work must meet stringent quality criteria, and when work and its environment are complex, risky, interdependent, and likely to change.

**Extension 4 Experience and communications**

While communication is virtually absent in traditional theorizing, the above suggests an alternative view. Before, during and after routine performances communications support processes of selecting, appropriating, and confirming how people contribute. What needs further exploration is how minimal communications can suffice for achieving complex coordination. Research on medical surgeries points at the role of knowledge intensity and knowledge sharing (Geer, 2000; Edmondson, et al., 2001). In organizations, people develop common codes that economize communications (Arrow, 1974; Williamson, 1975; Williamson, 1994). Common knowledge activates ex ante fabricated meanings (Weick, 1993; Spender, and Grant, 1996). For Schein (1992), this relationship between knowledge, communication and meaning functions as follows:

“To function as a group, the individuals who come together must establish a system of communication and a language that permits interpretation of what is going on. The human organism cannot tolerate too much uncertainty and/or stimulus overload. Categories of meaning that organize perceptions and thought, thereby filtering out what is unimportant while focusing on what is important, become not only a means of reducing overload and anxiety but also a necessary precondition for any coordinated action” (Schein, 1992).

Dougherty (1992), extending Fleck’s (1979) work, points at the role of thoughtworlds. She describes difficulties of communicating across thoughtworlds (departments) (Fleck,
If one reverses her argument, people socialized in the same thought world can draw upon similar mind sets. This results in similar information filtering processes, meaning creation processes and meanings. In terms of Boland and Tenkasi’s (1995), similarity knowledge would imply a conduit mode of communications, rather than a narrative mode. The former mode simplifies exchanges to a rational process where communications represent an objective knowledge base. Language and knowledge are thus separated. In the second mode, meaning is more equivocal, and language embodies knowledge. As people are interacting, they develop new insights, and negotiate meaning. As a more developed community, interaction between people engaged in routine coordination follows the first mode (Boland, and Tenkasi, 1995). Bechky’s (2003) research suggests that diversity of people’s backgrounds leads to a transformative process of knowledge integration: “… if an expression of knowledge means something different to the receiver than it does to the communicator, then it is not clear what knowledge is being transferred” (Bechky, 2003: 313). Individual thought processes must be reconciled (Bechky, 2003). Inversely, similarity of knowledge – with routine coordination – implies that knowledge can be transferred. This matches Carlile’s (2002, 2004) work on knowledge processes across organizational boundaries. He suggests that knowledge processes across organizational boundaries can be characterized as transfer, translation, and transformation (Figure 2). The more diverse the backgrounds are of people on both sides of a boundary, the more knowledge processes become transformational. He suggests for instance that “the transition from a syntactic to a semantic boundary occurs when novelty makes some differences and dependencies unclear or some meanings ambiguous” (Carlile, 2004: 558). The transition to the third category (transformation) is described as follows: “At a semantic boundary, a process of learning about and translating domain-specific knowledge establishes common meanings that become adequate for the actors involved to share and assess their knowledge. If a semantic response does not resolve the problem, then a pragmatic boundary is faced” (Carlile, 2004: 560).
With routine coordination, the familiarity of semantic and syntactic systems imply a transfer more of communications. Similarly, Gabarro’s (1990) research on working relationships suggests that more developed relationships (i.e., more collective experience bases) leads to higher efficiency of communications: “intended meanings are transmitted and understood rapidly, accurately, and with sensitivity to nuance” (Gabarro, 1990: 82). Relational knowledge increases predictability of responses, and a more extensive repertoire for conveying the same meaning (Gabarro, 1990). Furthermore, he proposes that “… speech and nonverbal responses become synchronized; flow of interaction is smooth; cues are quickly and accurately interpreted” (Gabarro: 82). Finally, from a mediated communications point of view, Channel Expansion Theory introduces a similar relationship between experience and communications. The theory introduces four categories of experiences: with the channel, with the messaging topic, with the organizational context, and with communication co participants (Carlson, and Zmud, 1999). More experience in these categories equips people with “(…) knowledge bases that may be used to more effectively encode and decode rich messages on a channel” (Carlson & Zmud, 1999: 155). Knowledge bases thus make people perceive channels as rich, since they are able to exploit minimal cues (“half a word is enough”).

Proposition 11. With routine coordination, people’s common knowledge base (thoughtworld; semantic and syntax system) leads to a transfer model of communications (communication triggers pre-existing meaning, rather than creating new meanings), constituted by coherent filtering and meaning creation processes. This economizes communications.
Extension 5 The role of supporting structures during performance

Finally, the traditional perspective on routine coordination assumes that an ex ante program informs participants, who then go out and make their contribution. When one follows a structuration perspective, however, structures must be recreated all the time. This implies that during a routine performance, structures are required that support routine performance. For instance, a symphony orchestra does not just turn up and play without a director and sheet music. It requires these structuring devices to stay on course. People rely on structures to sustain the routineness of their collective performance. Pilots use checklists for departures to ensure their compliance with corporate guidelines. In flight, they use a range of instruments and representations to guide their behaviors. While landing, a myriad of external markers support their perception of the correct landing pattern. Similarly, the US Thunderbirds rely on a show line as a reference point for the execution of their specific maneuvers. Actors – such as those in Hello Dolly – depend to an extent on markers on the floor to know their position. The multiplicity and intensity of structures thus extends to the whole performance. This deviates from the traditional idea of a pre-existing program that informs people once of their supposed contributions.

Proposition 12. During performances, multiple structures support the ongoing accomplishment of routine coordination.

DISCUSSION AND CONCLUSION

The following table restates the 12 propositions introduced in this paper.

<table>
<thead>
<tr>
<th>Proposition</th>
<th>Statement</th>
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<tbody>
<tr>
<td>Proposition 1.</td>
<td>Social ordering of activities depends on social construction of meaning.</td>
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<tr>
<td>Proposition 2.</td>
<td>Developing and sustaining collective meaning depends on interaction between two or more individuals.</td>
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<tr>
<td>Proposition 3.</td>
<td>Ex ante structures inform individuals how their work should be done. This reduces coordinating communications during work accomplishment.</td>
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<tr>
<td>Proposition 4.</td>
<td>Structure and process relate recursively.</td>
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<tr>
<td>Proposition 5.</td>
<td>Structure and the enactment of structure (agency) are conceptually distinguished. The two are recursive related.</td>
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<tr>
<td>Proposition 6.</td>
<td>The recursive relationship between structures and process implies that structures are recreated with every performance. While underlying scripts may remain unchanged, recreated structures differ from the predecessors.</td>
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<td>Proposition 7.</td>
<td>Structures with ordering potential require agency to result in coordinated activities (instead of the traditional substitution argument).</td>
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<tr>
<td>Proposition 8.</td>
<td>Routine coordination involves multiple structures. The more coordination is routine, the more structures are ex ante adjusted, shared, and centered.</td>
</tr>
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Proposition 12. During performances, multiple structures support the ongoing accomplishment of routine coordination.

Table 1 Routine coordination theory propositions

An emerging theory of routine coordination could be compactly formulated as follows. Coordination of individual contributions to an organized performance implies that some form of order/concertedness/coherence between activities is achieved. This activity order interacts with a mental ordering process, implying that people construct collective (equifinal (Donnellon, et al., 1986)) meanings concerning their collective performance. This social meaning construction process must be sustained in order to maintain activity order.

How is this accomplished? At the basis lies a recursive loop between structures and agency. They are both needed even though some substitution will occur. Structures inform practice (agency), and are reconstituted and changed by practice. There is a time dimension involved: structures created in the past inform current performances. In this process, some structures remain stable (original Hello Dolly text), while others change (new interpretations, adaptation to specific audiences). Routine coordination involves multiple structures (not a single performance program) that are mutually adjusted, shared among people, and centered in terms of meanings. Communications precede and follow routine performance, particularly under conditions of risk, pressure, and change. Attentive performance at the individual level sustains collective meaning and activity order. During routine performances, minimal communications and supporting structures are often required. Shared experience make cues of minimal communications sufficient for sustaining collective meaning and activity ordering.

What emerges is a theory that supposes knowledgeable professionals with similar expertise, who engage attentively in structure intense behaviors. Some consequences are worth noting. The distinction between routine (mechanistic) and nonroutine (organic) performance becomes less relevant6. There seems no reason to assume that people capable of knowledgeable routine performance could not perform other performances and deal with uncertainty. In fact, literature on jazz improvisation tends to point at the multiple structures that underpin these adaptive performances (Zack, 2000; Bastien, and Hostager, 2001). From a knowledge point of view, we must point at the multiple realities people can create while exploiting their common base as a resource (Penrose, 1959). When people contain the routineness of their performance, they can also release that containment.

6 One could also revisit the following continuum of organizational performances: routine, interpretation, embellishment, variation, and improvisation Weick, K.E.
At the same time, there are limitations to adaptation by routine groups. First, the depth of structures may be limited, leading to an inability to appropriate to new circumstances (Weick, 1993). Second, the interlocking of multiple structures may introduce constraints. Research suggests that introducing new structures (e.g., new medical technology or procedure) in groups used to a routine performance leads to elaborate restructuring processes (Barley, 1986; Edmondson, et al., 2001). Fine-tuning multiple structures and deep knowledge bases may require additional effort. Change thus depends on the relationship between on one hand knowledge bases (multiplicity of structures), and on the other hand inter-structure adaptation and centering of meaning (Table 2).

<table>
<thead>
<tr>
<th>Knowledge bases extensive</th>
<th>Inter-structure adaptation and centering of meaning difficult</th>
<th>Inter-structure adaptation and centering of meaning feasible</th>
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</thead>
<tbody>
<tr>
<td>New technology and protocols in medical teams (Edmondson, et al., 2001)</td>
<td>Groups with multi-skill, multi-scenario training. Extensive repertoire for assemblage (Bigley, and Roberts, 2001)</td>
<td></td>
</tr>
</tbody>
</table>

| Knowledge bases limited | Fire fighters with limited experience and repertoire (Weick, 1993) | Simple performances |

Table 2 Routine coordination and change

The contours of an extended theory sketched in this paper invite further research. First, theoretical research that strengthens the embeddedness of these ideas in organization theory. This line of inquiry may lead to formulation of new propositions. Second, empirical research, or reinterpretation of current empirical findings, is required to falsify these statements, and contribute to the emerging body of research on routine coordination.

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