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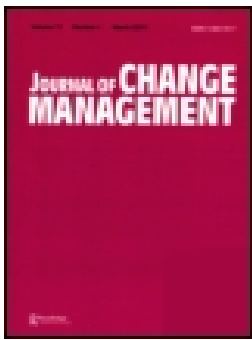
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A storm is coming? Collective sensemaking and ambiguity in an inter-organizational team managing railway system disruptions

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ABSTRACT

This paper studies the ways in which members of inter-organizational teams collectively make sense of unexpected events and how they decide upon engaging in action. Frequently, ambiguity dominates such change processes aimed to create common understanding. Using the notion of the duality of intrinsic and constructed ambiguity, a detailed analysis of the collective sensemaking efforts of an inter-organizational team of railway coordinators in the Operational Control Center Rail was conducted. Building on team meetings observations during the days preceding a large and potentially disruptive winter storm in December 2013, the case study describes the process of collectively making sense of the disruptiveness of the storm. The findings show that contextual and temporal factors determine whether collective sensemaking unfolds as either a shared or a negotiated process.

KEYWORDS

Collective sensemaking;
ambiguity; change;
disruption; sense of urgency

Introduction

This paper studies the ways in which members of inter-organizational teams collectively make sense of unexpected events and decide upon engaging in action. Earlier studies on collective sensemaking in organizational teams have demonstrated that a shared sense can be accomplished among team members with diverging orientations (Bergeron & Cooren, 2012; Brown, Stacey, & Nandhakumar, 2008; Morgeson, DeRue, & Karam, 2009; Patriotta, 2003; Silva et al., 2014; Vlaar, van Fenema, & Tiwari, 2008). While some scholars have an almost implicit assumption of shared sensemaking (Arnaud & Mills, 2012; Boyce, 1995) others problematize this concept (Brown et al., 2008; Kaplan, 2008; Marshall & Rollinson, 2004). Recent literature reviews show that the dynamics of creating common understanding in an inter-organizational context remain unclear (Holt & Cornelissen, 2013; Maitlis & Christianson, 2014; Sandberg & Tsoukas, 2015). It is not yet clear how exactly team members collectively categorize unexpected events in order to engage in collective

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action (e.g. Maitlis & Sonenshein, 2010; Morgeson, 2005; Van Marrewijk, Veenswijk, & Clegg, 2014; Weick, Sutcliffe, & Obstfeld, 2005).

During the creation of a common understanding team members of an inter-organizational team have a dual loyalty, due to their commitment to both team and home organization (Cooper & Slagmulder, 2004; Jørgensen, Jordan, & Mitterhofer, 2012; Kajüter & Kulmala, 2005). While the respective home organizations make sense of unexpected events in diverging and contrasting ways, the team members have to reach a common understanding in order to engage in collective action. Such tensions will increasingly occur as inter-organizational collaboration is a prominent feature of the contemporary networked society, which is characterized as complex, ambiguous, and sometimes even paradoxical (Koppenjan, 2005; Smith & Lewis, 2011).

In the conceptualization of inter-organizational team dynamics that take place when common understanding is created, ambiguity plays an important role (Abdallah, Denis, & Langley, 2011; Jarzabkowski, Sillince, & Shaw, 2010; Smets, Jarzabkowski, Burke, & Spee, 2014; Van Marrewijk et al., 2014). In this paper ambiguity is understood to be a vague and multi-interpretable meaning of a situation (Abdallah & Langley, 2014; Eisenberg, 1984). In the academic debate on ambiguity two distinct analytical perspectives can be found (Sillince, Jarzabkowski, & Shaw, 2012). First, ambiguity can be perceived to be intrinsic, resulting from the inherent vagueness of situations. Second, ambiguity can be seen as constructed, resulting from the fact that different actors may give different meanings to the same phenomenon (Sillince et al., 2012). Intrinsic and constructed ambiguity form a duality (Graetz & Smith, 2009; Smith & Lewis, 2011), meaning that they complement each other (Sillince et al., 2012). However, in specific situations, a relative dominance of one of either kind of ambiguity may be discerned.

Based upon the discussion above, the central research question in this paper is: *how do members of an inter-organizational team make sense of an unexpected event, reaching a collective understanding that is either commonly shared or negotiated*. To answer this research question we present the temporal unfolding of the collective sensemaking efforts of an inter-organizational team of railway coordinators in the Operational Control Center Rail (OCCR) in the days preceding a large and potentially disruptive winter storm. Two of the authors were present in the field of study during the storm. The case study is part of a larger qualitative field research on disruptions in the Dutch railroad network. This case was selected because of the interesting tension between mobility – transporting as many passengers as possible – and safety – working within acceptable safety limits. Some of the home organizations of team members value mobility over safety and vice versa, which might influence how these team members collectively enact common grounds for action. As Jarzabkowski et al. (2013) notice, such an inter-organizational setting, in which a paradoxical tension between competing organizational objectives arises, is well suited to study how collective meaning is enacted over time.

Our study contributes to the debate on collective sensemaking in inter-organizational teams in the context of change management studies in a twofold way. First, our findings show that whether collective sensemaking unfolds as a shared or a negotiated process depends on contextual and temporal factors that influence which kind of ambiguity is dominant. In the context of change management, this entails that commonly acknowledged triggers for sensemaking and change – as for instance a sense of urgency (By, 2005; Van Marrewijk, Veenswijk, & Clegg, 2010) are in fact understood divergently by

different actors. Second, our conceptualization of ambiguity as a duality explains the shifts from shared to negotiated sensemaking during change processes. This entails that people sometimes attempt to *dissolve* ambiguity, for example when they make common sense, while in other instances people *enact* ambiguity, for example when they make collective sensemaking possible.

The remainder of this paper is structured as follows. We first briefly review sensemaking literature, especially on the notion of collective sensemaking as either shared or negotiated. After this, we focus on the essence of ambiguity (either constructed or intrinsic) and relate this to different modes of collective sensemaking (negotiated or commonly shared). In the methodological section, this analytical scheme and the way in which the different temporal phases are construed will be further explained. After presenting our findings, our analysis will show how the ongoing dance between intrinsic and constructed ambiguity played a constitutive role in the collective sensemaking efforts of this inter-organizational team. Understanding this ‘dance of ambiguity’ could help change agents to develop a change strategy that anticipates upon the potential tensions among different members within the same team.

Sensemaking as enactment in an ambiguous reality

Generally, scholars understand sensemaking as the process of turning ambiguous situations into concrete and actionable categories. Sensemaking has been studied in a great variety of fields and situations, such as reorganizations (Gioia & Thomas, 1996; Maitlis & Lawrence, 2003) or crisis situations (Maitlis & Sonenshein, 2010; Mills & Weatherbee, 2006). What these situations have in common is that they are characterized by some sense of vagueness, as they do not have a clear meaning yet. A basic assumption underpinning sensemaking studies is the idea that organizational reality – besides being complex and uncertain – is predominantly ambiguous in nature (Patriotta & Brown, 2011; Weick et al., 2005). This entails that different organizational actors can understand reality in very different ways and that these differences cannot be solved only through rational reasoning or calculation (Berger & Luckmann, 1966). Sensemaking can thus be understood as coping with, or even dissolving, ambiguous events: the notions of sensemaking and ambiguity thus seem closely connected (Hill & Levenhagen, 1995; Teelken & Watson, 2014; Vlaar, Van den Bosch, & Volberda, 2006; Weick, 2011; Werkman, 2010). In the words of Weick et al. (2005, p. 419), making sense of ambiguity concerns those moments in which ‘interdependent people search for meaning, settle for plausibility, and move on’. People’s sensemaking thus deals with the enactment of a specific, rationalized image of an ambiguous reality which makes this reality tangible and understandable (Weick, 1995). Moreover, sensemaking and acting happen in tandem, as it involves capturing circumstances explicitly and plausibly in words that serve as a springboard into action (Weick et al., 2005, p. 409).

Organizational sensemaking is triggered by ‘cues’ or ‘events’ that interrupt routinized organizational practices, creating uncertainty about how to act (Maitlis & Christianson, 2014). Sensemaking can be seen as categorizing cues or events into existing categories, thereby triggering specific activities and expectations among organizational members (Housley & Fitzgerald, 2002, 2007; Morgeson et al., 2009; Whittle, Housley, Gilchrist, Mueller, & Lenney, 2014). Placing cues in existing categories is a way to simplify an

ambiguous world into a more comprehensible one (Weick et al., 2005), thereby facilitating (collective) decision-making. For instance, when an imminent or emerging event is interpreted and categorized as a specific disruption or crisis situation, organizational members can opt to switch to alternative practices and routines that fit this specific disruption or crisis, which are, nonetheless, quite different from the everyday routine organizational practices.

The social dynamics behind collective sensemaking are a topic of debate in which two competing key mechanisms are conceptualized. The first stream of scholars holds the belief that shared sensemaking is accomplished almost without much explicit coordination efforts, as actors are being socialized into expected sensemaking patterns by the cultural and institutional context of organizations (e.g. Harris, 1994; Kaplan, 2008). This context may consist of 'institutional constraints, organizational premises, plans, expectations, acceptable justifications and traditions inherited from predecessors' (Weick et al., 2005, p. 417). This common frame of reference forms the basis for 'bracketing' certain situational cues in order to make sense and to take action. Teamwork is thus a catalyst for collective sensemaking based on a shared frame of reference (Arnaud & Mills, 2012; Vlaar et al., 2006, 2008). The team leader can thereby position himself as catalyzer of collective sensemaking by making sense on behalf of the team as a whole, thereby assuming that the team members automatically share the sensemaking of the leader (Morgeson, 2005; Morgeson et al., 2009; Morgeson & DeRue, 2006).

In contrast, the second stream of scholars views shared sensemaking in organizations *itself* as ambiguous rather than automatic (Bechky, 2003; Hardy, Lawrence, & Grant, 2005). These authors stress that common meaning is not automatic or self-evident but, rather, that it is an accomplishment; creating collectiveness is hard work and requires much effort and interaction. In this view, organizational actors each have their own individual frames of reference which may differ significantly from each other, consequently leading to diverging sensemaking. This leads to tensions between actors committed to different organizations who compete with each other, even though they simultaneously engage in collaboration (Das & Teng, 2000). Since collectiveness needs work, several authors focus on the ways in which specific boundary objects are used to produce and facilitate a common understanding of events (Hsiao, Tsai, & Lee, 2012; Wolbers & Boersma, 2013). Especially during inter-organizational collaboration, the creation of, for instance, a common picture of a situation can help to establish shared meaning to a certain workable extent (Wolbers & Boersma, 2013). In this view, the process of 'collective' sensemaking seems to resemble a so-called framing contest (Gurses & Ozcan, 2014; Kaplan, 2008; Merkus, De Heer, & Veenswijk, 2014b), also called frame dialectics (Blackburn, Brown, Dillard, & Hooper, 2014) or frame disputes (Goffman, 1974). Collective meaning in this perspective is based on a negotiated common ground, a necessary truce between competing actors based on competing interpretations of reality (Bryant & Stensaker, 2011; Hope, 2010; Koppenjan & Klijn, 2004).

In the context of inter-organizational collaboration, we see a subtle but significant shift in terms of the connection between sensemaking and ambiguity. Whereas sensemaking traditionally is conceptualized as a way to rationalize an ambiguous world into an orderly, comprehensible one, recent work (Cornelissen, Mantere, & Vaara, 2014; Wolbers & Boersma, 2013) has, at least implicitly, highlighted that the process of sensemaking itself is based on negotiations and can in itself be highly ambiguous. It thus seems

appropriate to review the concept of ambiguity, keeping in mind the focus on sensemaking in an inter-organizational context.

Understanding collective sensemaking through an ‘ambiguity as duality’ lens

Ambiguity is increasingly regarded as a core concept for understanding processes of organizing (Alvesson & Sveningsson, 2003; March, 2010). March (1994, p. 179) claims that, in order to make decisions and take actions, one first needs to make sense of a multi-interpretable reality:

Students of ambiguity argue that extra information may not resolve misunderstandings of the world; that the ‘real’ world may itself be a product of social construction, thus not so much discovered as invented; that interpretations of experience and desires may be fundamentally ambivalent rather than simply uncertain; and that ambiguity may be used to augment understanding through imagination.

Ambiguity is thus an inherent aspect of social reality and not necessarily something to be resolved in order to make sense and act (March, 1994). Based upon Eisenberg’s (1984, p. 228) notion of ‘strategic ambiguity’ others state that ambiguity not only constrains collective action but, at the same time, may also enable it (e.g. Davenport & Leitch, 2005; Denis, Langley, & Cazale, 1996; Sillince et al., 2012). For example, Alvesson (2001) shows that ambiguity in knowledge-intensive firms may open up innovative space for identity construction. In another example, creating an intentionally ambiguous vision is claimed to be helpful during paradoxical situations on a strategic and abstract level during which the practical consequences of the paradox are not yet tangible (Gioia, Nag, & Corley, 2012). In a similar vein, Sonenshein (2010) explains the role of strategic ambiguity for strategic change managers who intentionally tell equivocal narratives using discourses of both transformation and stability. Strategic ambiguity, then, is used to rhetorically cope with competing meanings *on purpose*: keeping things vague in order to allow multiple interpretations to exist together and, consequently, to enable collective action (Abdallah et al., 2011; Alderman & Ivory, 2015; Eisenberg, 2007; Jarzabkowski et al., 2010).

Following this line of reasoning, it can be concluded that ambiguity consists as both an inherent property to organizational reality as well as a social construction of organizational actors. One could stress that reality *is* ambiguous, creating the need to make sense of an event in order to act: an event is just ambiguous in itself. On the other hand, one could claim that different actors give different meanings to the same event, thereby actually *making* the event ambiguous: this view on ambiguity explains the focus on collective sensemaking as negotiated common ground. Following Giroux (2006), Alderman and Ivory (2015, p. 178) claim ‘that “ambiguity is not solely in the message”, but also arises through the interpretation of the message by recipients in different contexts’. Aptly captured by Sillince et al. (2012, p. 647), ambiguity then has to be regarded as a duality, as ‘it is a property of action that actors encounter as well as one that actors actively shape’.

Treating ambiguity as a duality or ongoing dance (Sillince et al., 2012) helps us to understand the sensemaking of a disruptive event as a change process. A perceived sense of urgency can trigger the change of daily working routines of an inter-organizational network. This might potentially also lead to more structural attempts to change the

constitution and functioning of such an inter-organizational network. This idea of perceiving or creating a sense of urgency as a trigger for change has been studied by several authors within change management literature (e.g. By, 2005; Kotter, 2007; Staudenmayer, Tyre, & Perlow, 2002; Van Marrewijk et al., 2010). For instance, both Kotter (1996) and Moss Kanter, Stein, and Jick (1992) mention a sense of urgency as an important phase or step during a change attempt. Moreover, a sense of urgency is also an important recurring factor in the debate about readiness for change (Amis & Aïssaoui, 2013; Armenakis, Harris, & Mossholder, 1993; By, 2007).

In this paper, we claim that the sense of urgency is an ambiguous concept since people belonging to different home organizations make sense of the urgency of a situation in diverse or even contrasting ways (e.g. Maitlis & Sonenshein, 2010; Merkus, 2014). Organizational leaders can try to frame the context as being urgent (Gioia & Chittipeddi, 1991; Morgeson, 2005), but the urgency of a situation can also be an outcome of negotiation among team members (Lüscher & Lewis, 2008; Merkus, De Heer, & Veenswijk, 2014a). According to Ridder, Bruns, and Spier (2005) and Howard, Wrobel, and Nitta (2010), particularly within public organizations actors make sense of change urgency in diverging ways, leading to idiosyncratic outcomes of change implementation. According to Denis et al. (2009), in large public service systems – such as the railway network – change agents need to focus on and be prepared for the complex sensemaking challenges during change processes. In sum, the sense of urgency, which is perceived to be an important trigger or condition for change, can be ambiguous and thus a topic of negotiation.

Methodology

Site selection

We conducted a detailed analysis of the collective sensemaking efforts of meetings of an inter-organizational team of railway coordinators in the OCCR in the days preceding a large and potentially disruptive winter storm in December 2013. The site was selected because in the OCCR the different railway organizations were co-located, which proved valuable for studying inter-organizational collaboration. The OCCR, created in 2010, houses amongst others the main service provider Dutch Railways (NS) and government-owned ProRail, the manager of the railway infrastructure. This inter-organizational centre has to enable fast and good decision-making processes when disruptions occur. On a 24/7 basis and twice every shift, with each shift lasting eight hours, each railway organization sends a 'representative' to an inter-organizational meeting (henceforth, IOM) to inform each other and discuss operational particulars and evaluate the current shift. These representatives are called coordinators, and the IOMs are led by a National Coordinator Rail (NCR) who is an independent actor not attached to any of the individual organizations. The IOMs can be categorized according to the following three types: (1) at the start of each shift the coordinators meet to discuss the operations for the day ahead; (2) at the end of each shift coordinators meet to evaluate and discuss encountered issues; and (3) in cases of anticipated extreme weather to make sense of the weather reports and collectively decide which – if any – measures have to be taken in regard to the train service of the next day.

For this research, we studied the OCCR as a boundary organization (O'Mahony & Bechky, 2008) to understand how different organizations are able to achieve mutual goals while preserving each idiosyncratic interests in the IOMs. IOMs allowed us to zoom in on the different ways that ambiguity shaped collective sensemaking in this team. We were able to observe and interpret both routine meetings (types 1 and 2 IOM) as well as more extreme cases involving a larger degree of uncertainty (type 3 IOM). As others have shown before us, meetings are relevant sites to provide an in-depth analysis of how organizational events unfold temporally (Karreman & Alvesson, 2001; Thomas, Sargent, & Hardy, 2011).

Data collection

The data presented below consist of an account of a decision-making process of railway coordinators in the days preceding an anticipated extreme winter storm. A larger longitudinal research on collaboration in and between railway organizations acts as background information for the empirical material in this paper. The second author conducted an ethnographic study by participating in the daily life at (amongst others) the OCCR for approximately two days a week for a period of two years; and the third author conducted a research that focused on the larger network and patterns of interaction in and between railway organizations. The two researchers conducted about 50 formal interviews and had numerous informal conversations with railway employees.

In total we observed 40 IOMs lasting somewhere between 10 and 30 minutes, and two training sessions lasting a full day. For this specific paper, we focus on meetings in the days preceding the storm. Although we focus on only one specific event in this paper, we analyse this specific event while keeping the background of the larger research in mind. In fact, we believe that this background understanding was *necessary* to write the current paper. We thus provide a detailed description of collective sensemaking efforts in an inter-organizational team, illuminating the minutiae of how this process took place. In a sense, we chose for 'accuracy' at the cost of 'generality' (Weick, 1989), although it has to be stressed that 'some situations in organizations may be seen as the organization in miniature (...) and (...) we can learn a lot about organizational processes through the detailed study of a specific situation' (Karreman & Alvesson, 2001, p. 61). Thus, like other studies (Karreman & Alvesson, 2001; Thomas et al., 2011), we provide detailed descriptions of one event that is, however, contextually embedded into our broader understanding of collaboration in the Dutch railways.

Although the composition of the team of coordinators was different per shift (the afternoon shift took over the coordinators of the morning shift, and there were also some slight changes in the composition between the days), the functional roles remained the same. The two researchers observed these meetings and carefully wrote down general observations as well as specific quotes, as they were not allowed to record them. Afterwards, notes of the two researchers were compared and differences discussed. Two weeks after the storm, there was an evaluation that was attended by some of the same coordinators. We recorded this evaluation, which we transcribed and analysed. Furthermore, reports about the IOMs were sent out by the NCR, summarizing and covering the most important decisions of the coordinators. An internal evaluation of the storm was written

some days later, and we used this as an additional data source for our analysis and reconstruction of the collective sensemaking efforts by the team of coordinators

Data analysis

Analysis followed the grounded theory approach of travelling back and forth between the data and our emerging theory (Locke, Golden-Biddle, & Feldman, 2008). That is, we assigned meanings (codes) to units of data, analysed the codes for themes and emerging theoretical insights, and then returned to the data for further coding and analysis in light of these emerging theoretical insights. First, we triangulated the different data sources (field notes, evaluations, and other documents) to construct a chronologic narrative to understand how the event unfolded (Langley, 1999). In doing so, we further finalized this narrative according to the following guidelines provided by Pentland (1999): focal actors (who are the central actors or objects in the narrative?), voice (what are the different point of views in the narrative?), moral context (what are the cultural values and meanings that narrators attach to the story?), and other indicators (are there any other important aspects that make up the story?). We eventually ended up with a very detailed story describing the sensemaking process of the inter-organizational team in the days preceding the storm.

In order to go beyond mere description and to explain how ambiguity enabled or constrained this sensemaking process, we applied the 'temporal bracketing' strategy as explained by Langley (1999). We 'bracketed' the event into three separate episodes: (1) 'Let's manage this storm!' (2) 'When is a storm a storm?' (3) 'A hurricane is coming...'. Each episode had to have some internal consistency and continuity, while being different from other episodes. So, these temporally bracketed episodes became our main unit of analysis as this 'enables the explicit examination of how actions of one period lead to changes in the context that will affect action in subsequent periods' (Langley, 1999, p. 703). After bracketing the different episodes, all authors gathered to interpret their meaning; any dissimilarity in interpretation was discussed until we reached agreement. Finally, we interpreted the different episodes in terms of our relevant theoretical topics (potential cues, essence of ambiguity, collective sensemaking and decisive action) to gain further insight into how collective sensemaking in the inter-organizational team unfolded.

Findings

Ambiguity in the IOMs

In the IOMs, ambiguity during decision-making presented itself in several ways. Cues from the external environment were often ambiguous and therefore difficult to interpret. It was hard for coordinators to exactly determine the 'what' of situations on which they based their decision. In the case of anticipated extreme weather conditions, coordinators had to cope with weather reports that were inherently ambiguous, as weather is difficult to predict precisely. During one IOM, we observed that, after a detailed analysis of a weather agency, coordinators still had numerous questions to base their decision on; questions that, to frustration of the coordinators, could not (yet) be answered by the

weather agency. These questions (e.g. 'What is the chance on temperature below -10°C ?' or 'What is the chance that this weather report will change?') were important for the coordinators' sensemaking, as it was difficult to decide anything based on ambiguous information. One way the coordinators coped with this fact, was to use the criteria on which cues were interpreted ambiguous as well. At one point, criteria were 'hard criteria' on which black and white decision were made; other moments we saw how these criteria were 'softened' by focusing on expert judgement, creating room for alternative decisions. As one NCR reflected after a training session: 'It's plain guesswork. People put 'their own house' in order by using criteria flexibly'. Although the OCCR developed a weather matrix to ease decision-making by causally relating cues, criteria and decision (i.e. if there is more than X per cent chance on Y, act according to Z), coordinators still allowed some room for interpretation by ambiguously interpreting the matrix sometimes as hard criteria and sometimes only as an indication.

Moreover, coordinators felt the pressure to make the right decision on the right time. Coordinators tended to complain that they were often 'caught by surprise', and one NCR says after an IOM: 'We have learned to act on the basis of facts instead of feeling'. Making decisions based on facts at the cost of 'gut-feeling', sometimes resulted in the consequence that anticipated problems did not appear to the eye as a potential problem until certain thresholds were reached. Because coordinators used flexible criteria in order to cope with ambiguity they also created a sense of ambiguity; as soon as environmental cues were imminent, criteria turned into 'hard criteria' and potential problems into very real ones. Being caught by 'surprise', coordinators quickly had to make decisions. But the 'right' decision in these cases was not only prone to interpretations of ambiguous weather cues in a correct way, but was also influenced by stories about previous and similar events. Coordinators were well aware of the impact of their decisions and, especially, the impact an inadequate decision would have. There were several examples of earlier years in which coordinators had decided to cut the train service in parts of the country because of anticipated extreme weather while, in retrospect, these measures were deemed inappropriate as the anticipated snowstorm turned out to be a mild breeze with just a few snowflakes scattered around the country. We observed several times how 'the outside' entered the IOMs, shaping the way coordinators made sense of cues. Once, for example, a coordinator raises the question 'What will the minister think of this?' after a doubtful decision on train cuts. Another time, a coordinator mentions that 'we have suffered some serious reputational damage lately' and the coordinators collectively realized that a 'good' decision on the 'right' time was even more important than ever.

The interplay between intrinsic and constructed ambiguity

Episode 1, 3 December, 13h 30 until 5 December, 8h00: 'Let's manage this storm'

On 3 December, around the clock of half past one in the afternoon, the weather agency tells the IOM coordinators that there is a possibility of a westerly gale in the Northern provinces on 5 December. He tells there may be wind gusts up to 130 km/h. In the next IOM at the start of the afternoon shift, this weather report is shared with the new coordinators of that shift. In the IOM, the storm is baptized 'the *Sinterklaas*-storm', referring to the important Dutch traditional festivity that is celebrated by a large part of the population. People

tend to go home early, in order to celebrate *Sinterklaas* in the evening with their families. The coordinators realize that this makes their decision-making especially important, as decisions about train cuts could affect the *Sinterklaas* festivities. At 22h00 that night, managers of the OCCR decide to officially start the decision-making procedure for the next day, meaning that on 4 December a decision has to be made by the coordinators for the following day.

The coordinators meet again at 8h00, 4 December. They have to prepare an advice for their management, as the managers have the final say on which measures ought to be taken based on this advice. The NCR decides to use a new decision-making structure: first form a common operational picture and, based on this, define a collective decision. However, since the coordinators never used this structure so explicitly before, soon discussions arise as it is unclear whether the common operational picture concerns today or tomorrow.

The National Coordinator persists a few more times but, when he notices the dissatisfied faces of the coordinators, he gives in: 'I don't know about you guys, but this [new structure] is not making me happy at all'. They continue using their routine decision-making procedure, but throughout the rest of the meeting the coordinators mention that it is still unclear what is being discussed. (Observation during morning meeting of 4 December 2013)

Also the weather matrix is of little help that morning, as it does not clearly differentiate between wind gusts and wind speeds. The expected wind speed on 5 December does not seem to exceed any criteria as defined by the matrix, although this is not the case for wind gusts. The matrix, thus, does not help coordinators' interpretation of the cues on which they can act. The potential impact of the *Sinterklaas*-storm is highly ambiguous and it is hard to make clear decisions based on the available information.

However, coordinators' sensemaking does not seem hampered by this, as they soon start formulating a decision that is shared amongst all members. It is concluded that no preventive train cuts are necessary; they do advice to take some precautionary measures, such as extra availability of 'tow-away locomotives' and more personnel in the regional control rooms. The coordinators decide that the criteria on the weather matrix can be used flexible in this case, and are to be interpreted as follows: wind gusts are less important than wind speed, as gusts only last for a second; therefore, no measures are deemed necessary. Someone adds that, due to maintenance activities on the tracks, there will be less trains tomorrow, something which would be beneficial during a storm as the train schedule will have some more 'air'. In fact, the coordinators decide that the motto should be: 'Let's manage this storm'. The NCR attempts one more critical look at the decision, asking if nothing has been forgotten. One of the coordinators answers:

'The coordinators of the OCCR have decided that the *Sinterklaas* festivities can continue as planned. That must make nice headlines in the paper!' Everybody laughs and leaves the room to go back to their own workplace. (Observation IOM, 4 December 2013)

In the end, nobody has a clear idea what the expected storm will be like: this feeling of ambiguity is shared among everyone involved and can therefore be understood as intrinsic to the phenomenon they try to make sense of. It is remarkable that, although the intrinsic ambiguity of the storm is high (i.e. it is still very unclear what the storm will be like), the coordinators seem resolute that their decision is the right one.

Episode 2, 5 December, 8h00–12h00: ‘When is a storm a storm?’

In the morning meeting of 5 December, everybody enters the room in a cheerful, energetic mood. One of the coordinators tells they have a problem with the functioning of a workstation on one of the regional posts. This may be especially problematic as this post falls within the area of where the storm is expected, so the workload for this post is already more than normal. Another coordinator adds that there is ‘an annoying technical failure in one of the computer systems’. The ICT coordinator shrugs and tells he will have a look at it. However, the coordinators do not seem to notice these two messages as cues that may potentially have an impact on the way the storm will be managed. The meteorologist gives a weather update and the coordinators stick to the original decision of the previous day.

At 11h00 the coordinators meet again to receive an update from the meteorologist. He says that, whereas the storm was framed as ‘Code Orange’ up till that point, it has now evolved into a dramatic ‘Code Red’, the highest alert. His colleague of the weather agency takes a large map of the Netherlands and draws the exact lines of the wind forces. The meteorologist tells that the most important difference with earlier that morning is the fact that the heaviest wind has moved further to the south: this means that some criteria will be exceeded in some train-regions. Furthermore, Schiphol Airport announces to cancel flights because of the storm. Similarly, the railway organizations of Germany and Denmark have decided to stop all train traffic in the period that the storm is expected to reach its peak. These three cues (Code Red, wind moving south, and measures by other organizations) are noticed by the coordinators as cues. They start discussing and agree that, in retrospect and with this information, measures and cuts in the train service should have been taken. It is important here to note that the intrinsic ambiguity of the storm decreases: it becomes more and more clear what the impact of the storm will be like.

However, on the background of this imminent storm, the way that coordinators use or construct ambiguity actually *increases*. This pivots around the notion of the diverging goals of safety and mobility. The decision for national cuts always has to be appointed a day ahead so is out of the option for today. However, regional cuts are still possible, although there is little time left to do so. We observed the following discussion about what is the right decision on the right time between the NCR and coordinator rolling stock and personnel.

In the IOM of 11h00, the NCR asks quite seriously: ‘Shouldn’t we act pro-actively? Better do something now than wait for the ‘shit’ ahead of us?’ He suggests it would be wise to lean towards the safe side and opt for cuts in train service. The coordinator rolling stock and personnel replies: ‘Let me pop that bubble for you. This cannot be prepared’. He states that regional cuts in train service (implying less mobility) make little sense as it would be difficult to do so in a controlled way. Not just because this decision seems too late for him, but also because ‘his people’ are already busy with two other disruptions that happened earlier that morning, and it would be difficult for them to cope with additional measures in the train schedule. Another coordinator states that doing nothing at this point does not feel like being in control, something that is ignored by the previous coordinator who persists: ‘We don’t have a solid plan and we’re not going to make any cuts purely decoratively’. (Observations IOM, 5 December 2013, 11h00)

Although the storm becomes more like a real storm (i.e. it becomes less and less ambiguous), the coordinators only now start discussing about possible options. We interpret this as an increase in constructed ambiguity; the coordinators use certain expressions to strategically protect each individual goal or persuade others into a particular direction. One coordinator wants to choose for service cuts in order to be on the safe side, by suggesting that the storm will cause a lot of upheaval ('the "shit" ahead of us'). Another suggests that doing so will only cause more problems as the cuts are impossible to prepare in orderly fashion at this late stage ('Let me pop that bubble for you' and 'We don't have a solid plan'); he strategically puts the goal of mobility on a more important level than safety, as service cuts would be an impossible goal to attain now anyways. Discussions are no longer focused on the ambiguity of the storm; the ambiguity now concerns the 'storm as disruption'. The storm is no longer ambiguous, but whether it should be regarded as a disruption that needs to be acted upon is now ambiguous. Between the lines, the coordinators question whether this unplanned disruption is more important than planned maintenance which already hampers mobility. The coordinators do seem to feel that this constructed ambiguity hampers their collective sensemaking and decision-making as, in fact, the conclusion of the meeting is to do nothing while a storm is approaching.

At the end of the meeting, there is a long and awkward silence. One coordinator breaks the silence, mumbling: 'It feels like we're going to get wet guys. It sounds as if we're going to drown slowly today'. His remark echoes through the room for just a second, after which some of the coordinators nervously start moving on their chairs. One of the coordinators mentions he wants go back to work, after which all the coordinators stand up, leave the room and go back to their computer screens. (Observation IOM, 5 December 2013, 11h00)

Episode 3, 5 December, 12h00–14h00: 'A hurricane is coming...'

At 12h00, everybody enters the meeting room. We see the NCR and meteorologist already discussing something. The NCR whispers: 'That's a very unpopular measure. But it is important so it should be said. Expect some resistance but tell them loud and clear'. One of the coordinators senses the tension in the room and grabs a sign that says 'Do not enter' (mostly used during calamities and people in the OCCR do not want to be disturbed): 'I guess I better put this in front of the door already?' he asks. When everybody has taken seat, the meteorologist starts with a serious tone: 'the situation has changed'. He explains that it seems the wind will have hurricane-like proportions in the Northern provinces, and that there will be extra high risks of trees falling on the overhead wires or, worse, on trains. His advice is to cancel all train traffic in the Northern provinces from 14h00 until 16h00. In terms of ambiguity, the intrinsic ambiguity is close to zero as from this moment on it is no secret what the storm will be like: it is right at the doorstep and framed as one with hurricane-force.

Although the coordinators seem surprised that the storm has evolved into such a severe one, they quickly agree to follow the advice of the meteorologist. The coordinator, who, in the previous meeting, was against taking any measures, says: 'This is a very clear signal. Let's use the rest of our time to decide where we should stop the trains'. The coordinators have to decide about the exact area in which the railway service shall be suspended. With the help of the weather map, the coordinators decide to advice management and directors to stop all rail traffic in the area north of the line Amsterdam

– Zwolle after 14h00. The NCR asks if it is still possible to provide some sort of shuttle service safely, but the Information coordinator interrupts: ‘Safety first! If it is not safe for trains it is also unsafe for shuttles’. Someone else adds: ‘Safety. Perhaps we should frame it in that perspective’ upon which another coordinator mentions: ‘They [the public] have to understand it that way, don’t they?’

Although the weather has not changed significantly in the last hour, it is the meteorologist’s claim that the storm is like a hurricane that makes it impossible for the coordinators to ‘play’ with some form of constructed ambiguity; the intrinsic ambiguity of the storm is so low (thus the impending hurricane so evident) that it would be difficult to legitimize any other decision than stopping the train service. In fact, the different goals of safety and mobility are not a problem anymore. One coordinator clearly states ‘Safety first’ and all the coordinators agree. The meteorologist, almost acting as a *deus ex machina*, eases and influences coordinators’ sensemaking efforts, allowing them to collectively decide on measures that have a serious impact on the train service.

Discussion

The findings show that when intrinsic ambiguity is high or very low, collective sensemaking seems to be commonly shared and almost automatic. At the start (see Table 1), cues about the *Sinterklaas*-storm are very ambiguous – intrinsic ambiguity is high – and all team members agree that escalating the status quo is not necessary since both safety and mobility are valued equal by all members. At last, when there is nothing inherently ambiguous about the storm suddenly consensus comes into being of valuing safety over mobility. At a certain point in time, as it becomes clear that the storm actually turns out to be a hurricane, the intrinsic ambiguity is in fact very low: everyone has the same image about the threat posed by the storm and the potential disruption caused by it. When the nature of ambiguity is mainly intrinsic – that is, when the meaning of a phenomenon is so vague that no one really grasps it and urgency for thorough understanding seems low or when a specific interpretation of a situation becomes undeniable – sensemaking seems to be collective.

Our study shows that in the context in-between maximal and minimal intrinsic ambiguity, collective sensemaking can be conceptualized as a negotiation of meaning: ambiguity becomes more and more constructed, based on the diverging interpretations of

Table 1. Temporal development of entangled ambiguity and sensemaking.

Episode	‘Let’s manage this storm!’	‘When is a storm a storm?’	‘A hurricane is coming...’
Potential cues	<ul style="list-style-type: none"> • Weather agency report • Confusion wind gust and speed 	<ul style="list-style-type: none"> • Technical malfunctions in systems • Similar organizations shut down service • Weather agency reports Code Red 	<ul style="list-style-type: none"> • Storm evolved into one with hurricane-like proportions
Essence of ambiguity	High intrinsic ambiguity, low constructed ambiguity	Falling intrinsic ambiguity, rising constructed ambiguity	Low intrinsic ambiguity, low constructed ambiguity
Collective sensemaking	Shared and consensual sensemaking	Dissensus/struggle and negotiated sensemaking	Sudden shared consensual sensemaking
Decisive action	No upscaling, usual routine practice	Consideration of potential preventive measures but no action	No trains service in the North of the country

actors. This was the case when the cues about the storm became more pronounced and intrinsic ambiguity decreased – it became clear that a storm was coming. Preventive measures are regarded as a disruption of mobility and those actors who value mobility are only prone to opt for preventive measures if this seems absolutely necessary. Even though the fact that a heavy storm is approaching becomes undeniable, the idea that this storm will be a threat to the railway system becomes ambiguous instead: actors make increasingly diverging sense of the imminent storm and negotiations about the necessity of escalation and decisive action become tense. In other words, when the cues concerning the impending storm become less and less ambiguous, the actors in the team make sure that the storm remains ambiguous as ‘potential disruption’ because of their diverging interpretations. When a truce between diverging (paradoxical) objectives – such as mobility and safety – becomes increasingly tense, collective sense-making can be regarded as a struggle for meaning: instead of being grounded in commonly shared perceptions, collective sensemaking becomes based on negotiated compromises. A stable truce or a sudden tilting of the balance in favour of one specific objective – one side of the paradox – leads to common sense, whereas the gradual disturbance of a truce because of rising tension between diverging perspectives leads to negotiated sense.

The imminent unexpected event of a storm created an urge for collective sensemaking while the inter-organizational context increased the presence of diverging interpretative frames. Our case study demonstrates that the inter-organizational team is keeping the balance that enables both safety and mobility to be pursued, with the aim to avoid disruptive preventive measures. ‘Keeping things ambiguous’ – increasing constructed ambiguity when intrinsic ambiguity decreases – was used as a coping mechanism for making collective sense (even when this led to the decision to take no extra precautions). The process of collective sensemaking can be made possible through the social construction of ambiguity: this allows negotiation among different actors who still give contrasting meaning to a situation that in itself seems to become more and more obvious. In the context of inter-organizational collaboration, diverging understandings and interests, growing tension and potential risks, the prolongation of – socially constructed – ambiguity can sustain collective sensemaking – even if this entails refraining from action and maintaining the status quo.

We demonstrate that the mode of collective sensemaking is context-dependent and temporal: different situations trigger different modes of collective sensemaking. The mode of collective sensemaking can thus shift between sharedness and negotiation when unexpected events create tension between actors with diverging interpretations. In sum, a nuanced conceptualization of ambiguity in sensemaking studies leads to a more dynamic understanding of collective sensemaking. This finding is not only interesting for the extensive literature on sensemaking but also for researchers focused on collaboration in teams (e.g. Ashmos & Nathan, 2002; Morgeson et al., 2009), for it would entail that for instance the role of team leaders as prime sensemakers might not be automatically assumed. Creating inter-organizational teams is not automatically an instrument for fostering successful inter-organizational collaboration.

Concerning Change Management literature, we suggest that change agents can revert to different change strategies depending on their perception of the collective sensemaking abilities of a team. A more nuanced view on collective sensemaking based on the

duality of ambiguity can be useful for finding out whether an inter-organizational group has learned to make common sense, is attempting to overcome diverging interpretations or has become indecisive and too hesitant to engage into action. In other words: do team members agree about changes, are they still negotiating or are they keeping each other in a lock hold? The implications of our findings for change management practices is the suggestion that change agents should be sensitive towards the ambiguity of triggers for change and they should actively reflect upon and question the assumed collectiveness of interpretation within teams or groups, especially in an inter-organizational context.

Future studies on collective sensemaking in an inter-organizational context can focus on recognizing situations in which ambiguity is enacted as a result of diverging understandings. The motivations of team members could be studied: do they strategically manipulate ambiguity in order to enact the most proficient trade-off between contrasting ambitions (Abdallah & Langley, 2014; Tracy & Ashcraft, 2001) or do they hide behind ambiguity because they are unable to negotiate common ground? Are decision-makers attempting to make the most elegant and balanced decision or are they too afraid to make any decision while instead stalling sensemaking until only one possible course of action is left? This tension is also visible within our case study, although we were not focused on answering it in this paper. Since inter-organizational collaboration is an increasingly prominent feature of contemporary networked society (Jørgensen et al., 2012; Morgeson & Hofmann, 1999; Smith & Lewis, 2011), an increased understanding of the tension between making proficient trade-off or escalated indecision is a valuable research objective.

Conclusions

The core research question of this paper focuses on the ways in which an inter-organizational team collectively makes sense of an unexpected disruptive event in a complex organizational field. Our findings do not offer the ultimate solution for the debate in literature whether this collective sensemaking is commonly shared or negotiated. Instead, we show that conceptualizations of opposing groups of scholars are both valid statements: team work can be a catalyst for collective sensemaking (Arnaud & Mills, 2012; Vlaar et al., 2006, 2008) just as well as the balancing act of being committed towards both home organization and inter-organizational team can lead to negotiated collectiveness (Cooper & Slagmulder, 2004; Jørgensen et al., 2012; Kajüter & Kulmala, 2005). Our findings show that the context – and in specific the kind of ambiguity in that context – influences which route toward collective sensemaking is followed.

The case study describes three episodes of collective sensemaking efforts of a winter storm by an inter-organizational team of coordinators managing the Dutch railway network. Our analysis exhibits how ambiguity shifts from intrinsic to constructed and how collective sensemaking changes from shared via negotiated and back to seemingly shared when emergency measures become unavoidable. Collective sensemaking is commonly shared when the situation is intrinsically ambiguous (it is unclear what the weather will be like) and collective sense is negotiated when ambiguity is constructed (there will be a storm but there are different interpretations of its consequences). The duality of ambiguity (Sillince et al., 2012) entails that sometimes actors aim to resolve ambiguity and sometimes enact ambiguity instead. Whereas in some instances intrinsic ambiguity is

resolved through shared collective sensemaking, in other instances constructed ambiguity is precisely the enabler of negotiated collective sense in situations of diverging interpretations.

Additionally, in the realm of studies on ambiguity within organization science, we further refined the idea of the strategic use of ambiguity. Our findings are in line with earlier studies demonstrating that ambiguity can be used strategically in order to make a decision which is acceptable to actors with diverging objectives (Abdallah & Langley, 2014; Alderman & Ivory, 2015; Eisenberg, 2007). In contrast to the dominant notion that one key actor is exploiting ambiguity to further his or her ambition (Sillince et al., 2012), we show that constructed ambiguity can also serve the common strategic purpose of making collective sense of a situation.

A final contribution of this paper concerns the literature on change management. The core insight of our study is that while change management scholars have conceptualized and agreed upon a sense of urgency as a key trigger for change, it is not self-evident that this trigger is interpreted in the same way by all change agents involved. We have shown that this trigger is rather ambiguous and we claim that a focus on diverging sensemaking might help change managers to recognize tensions and dilemmas and cope with them (Tracy & Ashcraft, 2001). Ambiguity might be beneficial during organizational change because it could enable change agents to transcend paradoxes, creating a new reality free of tension (Abdallah et al., 2011). However, ambiguity also increases the risk of the pathology of escalating indecision (Denis, Dompierre, Langley, & Rouleau, 2011) during change processes: people with divergent interests who aim to solve a common concern remain unable to agree and thus refrain from taking action. In the case of an organizational change process, this could lead to inertia during the move from a *status quo* towards a new organizational reality. Our point is that diverging or even contrasting interpretations of the urgency for change can have effect on the implementation of change: being aware and coping with ambiguity can be regarded as an important aspect of successful organizational change management

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