Social dynamics at work: Meetings as a gateway

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Chapter 15

Social dynamics at work: Meetings as a gateway

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Abstract

Meetings offer an exciting gateway to dynamic social processes in organizations. During their meeting interactions, employees exchange information, build common ground, create new ideas, manage relationships, and make or break team climate. In this chapter, we highlight the potentials and possibilities for research on dynamic social processes during team meetings. Through the lens of a meetings researcher, we discuss how research questions and methodological issues in studying meeting interaction processes can be addressed. By focusing on the observable behavioral conduct of meeting participants (i.e., their verbal communication), we show how micro-level interaction processes, emergent patterns, and the dynamics of social influence throughout a meeting can be revealed. Our chapter includes a how-to guideline for researchers and practitioners interested in carrying out interaction analysis in team meetings. We illustrate our reasoning by providing data from a sample of 24 videotaped team meetings. Finally, we discuss limitations of behavioral research in team meetings. The chapter closes with an outlook and future research questions in the area of dynamic social processes in organizational meetings.

Keywords: Interaction process analysis; social dynamics; meeting behaviors; emergent interaction patterns; meeting phases

Introduction: Studying team meeting behavior

Most of us work in some kind of team setting (e.g., Kozlowski & Ilgen, 2006), which means that most of our affective experiences and workplace behaviors are embedded in a social context. As individuals, we are not independent from our surroundings but most of our actions are rather co-dependent on the social context and the social interaction settings that we find ourselves in (Van Lange & Rusbult, 2012). To gain a better understanding of organizational behavior and its dynamics, we argue that organizational behavior should be studied as it occurs within social interaction processes. Since meetings can be found across all disciplines and hierarchical levels in organizations, they constitute an ideal place to systematically observe and understand the complexity of dynamic social interaction processes in organizations (see also Cronin, Weingart, & Todorova, 2011; Weingart, 2012). Thus, meetings provide a gateway into the social dynamics in organizations.

Meetings can serve very different purposes such as sharing information, solving problems, or simply socializing (e.g., Horan, 2002; McComas, Tuite, Waks, & Sherman, 2007; Tracy & Dimock, 2003). However, most types of meetings have one objective in common: People meet to *interact* with each other (see also Schwartzman, 1989). Meeting participants need to do so to reach some form of collaboration and teamwork. It is this interaction and interdependence between meetings participants that make them a team instead of co-present individuals (see also Bonito & Sanders, 2011).

Imagine the following situation: A meeting leader opens the meeting by saying, "Our topic for today's meeting is the fact that we keep getting customer complaints", which will prompt behaviors by the other meeting attendees. For example, someone could point out a problem ("Yes, that's really an issue"). Upon which another meeting member could make a procedural suggestion ("We could start by reviewing the complaints from this month"). These examples show that meetings are not static events, but rather a process of verbal (and nonverbal) behaviors that follow one another over time. Hence, meetings are dynamic and the behaviors that meeting attendees show are embedded in a social interaction process. To capture such social dynamics in a quantitative way, we need to take a systematic look at meeting behaviors. Central to this systematic observation of (meeting) behavior is the use of an elaborated coding scheme and trained coders (Bakeman & Quera, 2011) which we will further explain in more detail in the next section.

Studying actual behavior—rather than proxies or self-reports of behavior—in small group research or in social psychology research in general is usually deemed as tedious and time-consuming, in comparison to using survey data (Baumeister, Vohs, & Funder, 2007). Moreover, since the 1980s research in social psychology has shifted toward the study of internal cognitive processes mostly assessed via self-report questionnaires (Baumeister et al., 2007; Wittenbaum & Moreland, 2008). In their edited book, Agnew, Carlston, Graziano, and Kelly (2010) show that the study of behavior in social psychology constitutes a promising research field. Behavioral processes are often an explaining mechanism linking input and output variables. This is especially true for scholars who study small groups (such as meeting researcher). However, as Moreland, Fetterman, Flag, and Swanenburg (2009) state, assessing group behavior is a "luxury" (p. 42) that many researchers cannot afford. Behavioral research takes time, money, and energy. In times of high publication pressure, behavioral research will always face a slight disadvantage. To simplify, our behavioral group researcher is still busy coding his team meetings while his colleague who works with survey data publishes one study after the next. However, we argue that this extra time and energy is well spent because focusing on behaviors during team meetings can uncover micro-level interaction processes, emergent patterns, and the dynamics of social influence throughout a meeting. This way the meeting researcher can actually investigate what happens during a meeting and how these meeting processes affect meeting outcomes. Previous research shows that analyzing the actual behavior of meeting participants helps us understand the specific within-meeting dynamics that can promote or diminish meeting satisfaction, team productivity, and overall organizational effectiveness (Kauffeld & Lehmann-Willenbrock, 2012).

In the following, we will explain the necessary steps for using interaction analysis on meeting data (e.g., developing a research question, deriving a coding scheme, setting up the data, and the coding and evaluation procedure).

How to analyze meeting interaction

Previous small group research on interaction processes emphasizes the importance of studying communicative behaviors in order to understand what actually happens in groups (e.g., Bonito & Sanders, 2011; Gouran, 1999; Gouran & Hirokawa, 1996; Jarboe, 1999; Meyers & Brashers, 1999; Pavitt, 1993, 1999; Poole, 1999). In this chapter, we focus on the study of verbal communicative meeting behaviors. However, we also encourage meeting researchers to study non-verbal meeting behaviors (e.g., examining the posture of meeting participants; see Schermuly & Scholl, 2012).

The necessary steps for analyzing meeting interaction are outlined in Table 15.1. Our guideline builds on observational research methods (see Bakeman & Quera, 2011) as well as on content analytical research methods (see Krippendorff, 2004). Content analysis is inherent in any verbal interaction coding procedure, as the verbal content must be analyzed before a code or observation category can be ascribed to it. An example of an early adoption of content analysis is Bales' (1950) interaction process analysis (IPA), a coding instrument for distinguishing twelve basic categories of verbal behavior in group interaction processes (for a contemporary application, see Keyton & Beck, 2009).

Defining the research question

As shown in Table 15.1, any interaction analytical research design includes several basic steps. First, the researcher needs to define the phenomenon of interest. For example, a meetings researcher might be interested in understanding problem-solving in team meetings. He would then define a behavioral variable, for example "idea generation", or a set of variables, for example "problem analysis and solution development" to operationalize the phenomenon of interest.

Insert Table 15.1 about here

Second, the meetings researcher would need to think about the way in which these behaviors are situated within the meeting interaction process. For example, if he has decided to focus on problem-solving behaviors, how might he establish where such behaviors begin and end within the team interaction process? How will he be able to separate one behavior from another within the meeting interaction flow?

Defining behavioral units

This second step concerns the issue of *unitizing*. There is one main question that needs to be answered when deciding on a unitizing rule (Bakeman & Quera. 2011). Are behavioral codes (see step 3) assigned to a *behavioral event* or are codes assigned to a specific *time interval*? Perhaps the most intuitive way to unitize interaction process data is by separating turns of talk, or speaker turns (e.g., Chiu, 2000). This means that the interaction process is separated or "cut" such that a new behavioral unit is assigned whenever the speaker changes. Hence, the behavioral code is assigned to a specific behavioral event (i.e., speaker turn). Unitizing according to turns of talk can be the method of choice for many research questions in the area of meetings. For example, unitizing according to turns of talk has been used by researchers interested in the way in which meeting attendees react to one another and shape the social network in the meeting (Sauer & Kauffeld, 2013).

However, for many other research questions, turns of talk may not be detailed enough in terms of the behavioral units that will be obtained. To return to our earlier example, the meetings researcher interested in problem-solving communication in meetings may be well advised to separate smaller behavioral units in order to investigate the functionality of specific problem- or solution-statements within the meeting process. For example, within the same turn of talk, a meeting attendee may first raise a problem and then offer a solution immediately afterwards. Another meeting attendee may first explain an idea and then ask a question, all within the same turn of talk. In these cases, it is advisable to distinguish so-called "sense units" (e.g., Bales, 1950), rather than turns of talk, within the meeting interaction flow.

If the meeting researcher decides on a unitizing rule based on behavioral events, he must also decide whether the duration of the behavioral unit is of interest. This leads to a distinction between *untimed-event data* and *timed-event data* (Bakeman & Quera, 2011). Usually, data obtained using a paper/pencil solution leads to untimed-event data. However, advancements in technology such as video recordings and new software solutions make it easier to also record the duration of a certain behavioral unit (i.e., recording onset and offset time for each behavioral unit).

On the other hand, some research questions may also require that codes are assigned to fixed time intervals instead of behavioral events. For example, research on emotions in meetings has investigated changes in group affect over the course of a meeting by coding a segment every 2-minutes (see Lei & Lehmann-Willenbrock, in this volume; see also Waller, Zellmer-Bruhn, & Giambatista, 2002 for a similar unitizing approach).

Coding behavior

Third, upon deciding on a unitizing rule, the meetings researcher needs to decide how the behavioral units will be coded. "Coding" in this context means that every behavioral unit will be assigned to a behavioral category. For many research questions, it is imperative that these behavioral codes are mutually exclusive, such that a specific behavioral unit will be assigned to one behavioral code only (Bakeman & Quera, 2011). Moreover, to avoid room for interpretation that will likely pose a threat to inter-rater reliability, and to ease the coding procedure, the coding scheme should be exhaustive (Bakeman & Quera, 2011). This means that a coder should be able to assign any unit that is selected or cut from the meeting interaction flow to a behavioral code within the coding scheme. Most coding schemes contain additional codes (e.g., "incomprehensible" and "other"), that are rarely assigned but necessary to have if one wants to ensure that the entire team interaction process gets coded. Leaving units uncoded will cause problems later; for example, lag sequential analysis for identifying emergent interaction patterns requires that the entire interaction data flow is coded. Hence, the coding scheme should be mutually exclusive as well as exhaustive.

The act4teams coding scheme

Some research questions may require developing a new coding scheme. However, a wealth of yet unanswered research questions in the area of meeting science can be addressed with existing coding schemes. One particularly useful coding scheme in the area of meeting interaction analysis is the act4teams coding scheme (e.g., Kauffeld & Lehmann-Willenbrock, 2012). The act4teams coding scheme is a mutually exclusive and exhaustive coding scheme recording time-event data. The observation categories in the act4teams coding scheme were derived from an extensive review of past research on competencies, expertise, teams, and problem-solving processes (Kauffeld, 2006). Act4teams is based on existing classification systems for intra-group interaction such as interaction process analysis (IPA, Bales, 1950), the system of multiple-level observation of groups (SYMLOG; Bales & Cohen, 1982), time-by-event-by-member pattern observation (TEMPO; Futoran, Kelly, & McGrath, 1989) and time-based process dimensions (Marks, Mathieu, & Zaccaro, 2001). See Kauffeld (2006) for a detailed explanation of the theoretical underpinnings of this coding scheme.

The act4teams coding scheme distinguishes four broader facets of meeting interaction behavior: Problem-focused statements, procedural statements, socio-emotional statements, and action-oriented statements. Table 15.2 shows an overview of the constituting categories. The four facets of meeting interaction behavior amount to a total of 43 behavioral categories for capturing meeting interaction.

Insert Table 15.2 about here

Problem-focused statements are directly aimed at understanding the problem or issue and finding appropriate solutions. These behaviors are particularly important for the study of meetings because meetings often serve the purpose of finding new solutions, reaching consensus, debating different ideas, and finally making decisions (e.g., Leach, Rogelberg, Warr, & Burnfield, 2009).

The presence of numerous meeting participants and a packed agenda calls for a good meeting structure. Studies show that a lack of meeting structure and lack of meeting facilitation lower meeting attendees' perceived meeting quality (Cohen, Rogelberg, Allen, & Luong, 2011; Leach et al., 2009; see also Wittenbaum, Vaughan, & Stasser, 1998). The act4teams coding scheme accommodates these findings by coding procedural statements. Procedural statements are aimed at structuring the meeting process to facilitate goal accomplishment; both positive procedural statements and negative procedural statements are coded. Examples of positive procedural statements comprise statements that point or lead back to the topic (coded *as goal orientation*), ensure contributions are to the point (coded as *clarifying*), and judge which topics are more important at the moment (coded as *prioritizing*). Negative procedural statements on the other hand cover for the fact that meeting participants can also loose themselves in long monologues that do not benefit the meeting process (e.g., talking about irrelevant examples). Such negative procedural statements are coded as *losing the train of thoughts*.

Socio-emotional statements capture the relational interaction that occurs in a team meeting, and again, can be both positive and negative. Relational communication can be seen as a means to develop and manage relationships in a dynamic group context and therefore "create the social fabric of a group" (Keyton, 1999, p.192). Positive socio-emotional statements comprise nine different codes in the act4teams coding scheme (e.g., *encouraging* *participation*, *providing support*, and *active listening*) However, socio-emotional statements are not solely positive but can have a dark side (e.g., Keyton, 1999). The act4teams coding scheme distinguishes four different negative socio-emotional statements (i.e., *criticizing/backbiting, interrupting, side conservations,* and *self-promotion).*

Last but not least, action-oriented statements describe a teams' willingness to take action to improve their work even after the meeting is over. Again, both positive proactive statements and negative counteractive statements are identified. Proactive statements make sure that ideas and solutions that are brought up during the meeting are also implemented later on. Thus, proactive statements are a good indicator for meeting success (we describe research findings on proactive and counteractive meeting behaviors in more detail in the next section). Positive, proactive statements are coded into one of three following categories: *expressing positivity* (i.e., signalizing enthusiasm or interest in ideas, options, etc.; formerly named *interest in change*), *personal responsibility* (i.e., taking on responsibility), and *action planning* (i.e., agreeing upon tasks to be carried out after the meeting: Who does what until when?). Negative, counteractive statements, on the other hand, show a lack of initiative and interest. The act4teams coding scheme comprises six counteractive codes. For example, *no interest in change* is coded when meeting participants deny optimization opportunities while the code *complaining* is used whenever meeting participants emphasize the negative status quo of their work, and promote pessimism. Examples of sense units coded with act4teams are shown in Table 15.3.

Insert Table 15.3 about here

Gathering behavioral data in meetings

Our meetings researcher in our initial example has by now decided that he is interested in the functionality of problem- versus solution-focused statements within the interaction process. He has decided to focus on sense units as a unitizing rule, and has selected the act4teams coding scheme as a tool for exploring his research question. As indicated in Table 15.1, he now needs to find ways to gather appropriate behavioral process data. Previous work on behavioral interaction processes in meetings has often relied on videotaped meeting interactions (e.g., Kauffeld & Lehmann-Willenbrock, 2012; Kauffeld & Meyers, 2009; Schulte, Lehmann-Willenbrock, & Kauffeld, 2013). Videotapes are especially helpful for analyzing meetings with multiple attendants. Previous research shows that participants who are advised to ignore the camera will quickly fall into their regular meeting routine, as indicated by behaviors such as answering cell phones, telling jokes, or criticizing absent supervisors (e.g., Lehmann-Willenbrock & Kauffeld, 2010; see also Coleman, 2000; Herzmark, 1985; Penner et al., 2007).

Naturally, videotaping meetings in the workplace requires substantial effort for establishing employees' trust and willingness to participate. Researchers aiming to gather this kind of rich behavioral data should be willing to spend considerable time getting to know potential participants, talking about the way they will handle their data, and explaining how individual participants' data will remain confidential. Nevertheless, ethical concerns are often more salient when using any kind of behavioral observation methodology, compared to using self-report surveys. Ensuring that the video data is stored outside of the organizational setting and only accessed by the researchers, maintaining confidentiality, and giving feedback about team-level results only will help alleviate ethical concerns and facilitate participants' trust in the researcher (see also Brewerton & Millward, 2001).

If video data cannot be obtained, audio data might be a suitable alternative. However, several factors must be taken into consideration to make a well grounded decision for either video data or audio data (see also Dent, Brown, Dowsett, Tattersall, & Butow, 2005; Nicolai, Demmel, & Farsch, 2010). The biggest downfall of using audio data compared to video data is the loss of information embedded in the data. Video data is often considerably richer than audio data, as it grants access to the act of both visually and acoustically *observing* behavior. As such, it closely mirrors natural interactions. Audio data, on the other hand, implies that the meeting researcher can only *listen* to what happens during the meeting, as visual cues are not captured by in audiotapes (see also Nicolai et al., 2010). In addition, in many cases additional visual cues can help coders to understand verbal behaviors. For example, with increasing numbers of meeting attendees, behaviors such as interruptions and side conversations (see Table 15.2) become more likely, which increases the complexity of the meeting process data for the coders.

However, audio data also has considerable advantages. First, using a small audio recorder is less obtrusive than using a video camera. An audio recorder can be quickly placed in the middle of the meeting table and no major video set up is necessary (e.g., making sure that all meeting attendees are in the frame). Second, audio recorders are usually more affordable than video cameras. They use less battery (i.e., longer meetings can be captured) and are higher in portability. Another advantage of audiotapes is that the researcher gets to work with small data files. Thus, audio might be a suitable alternative for meeting researchers who face confidentially issues and/or need to rely on an easy, cost-efficient way to gather data, provided that the number of meeting participants is small and the research focus is on audible verbal behaviors only.

Training coders

Imagine that the meeting researcher in our initial example was able to gather video data in a sample of 20 team meetings. Now he faces step 5 as described in Table 15.1: Train coders and establish inter-rater reliability. Of course, training the coders can begin as soon as any data has been obtained. The coders should sign a confidentiality agreement, and the video data should not be shared with third parties at any point. Typically, coders begin their training by familiarizing themselves with the coding scheme. From the researcher's perspective, it is neither necessary nor advisable to share the research goal or hypotheses with the coders

(Haidet, Tate, Divirgilio-Thomas, Kolanowski, & Happ, 2009). However, coders should gain a good understanding of the coding scheme and the kinds of phenomena (e.g., problem-solving communication) that can be addressed with the scheme.

A detailed and self-explanatory coding handbook (i.e., coding manual) is crucial for successfully training coders (e.g., Bales, 1950). Simply handing out a coding scheme (e.g., as in Table 15.2) without further explanation likely will not yield reliable results. A good coding handbook should precisely explain the structure of the coding scheme (e.g., are codes hierarchically ordered?) and provide clear definitions and sample statements (or sample behaviors) for all codes (e.g., Haidet et al., 2012). Moreover, there should be clear guidelines to differentiate codes from one another (e.g., the difference between "solution" and "describing a solution" in the act4teams coding scheme). The coding handbook should also list all important coding rules, such as very clear unitizing rules and any other coding conventions (e.g., in the act4teams coding scheme meeting participants are labeled "A", "B", "C", "..." according to the way they are seated around the meeting table starting clockwise from the left to right of the video image).

Especially when working with a complex coding scheme, it can be useful to use a decision tree. For example, the act4teams coding scheme comprises four broad categories or macro codes (i.e., problem-focused statements, procedural statements, socio-emotional statements, and action-oriented statements) which are then split up into detailed micro codes. Inexperienced coders should first allocate a broader macro code to the observed behavior (e.g., deciding that an utterance falls into the broader category of socio-emotional meeting behaviors) and then allocate a more distinct micro code (e.g., deciding that the utterance under consideration should be coded as "providing support").

In addition to using a coding handbook, new coders should always be supervised by experienced coders who can give guidance and answer questions. Moreover, from our experience, it is a good idea to train a small group of new coders at once rather than training new coders separately. This ensures higher motivation and greater exchange among coders (Haidet at al., 2012). A kick-off workshop is a great way to start the training program for a new group of coders. Afterwards coders can meet in teams for further discussion and to work on training videos or transcripts. However, the training program should also allow ample time for coders to work on training material individually and at their own pace.

Furthermore, when training new coders it is useful to slowly increase the complexity of the coding material (Castorr et al., 1990). For example, new coders could start working from transcripts rather than starting with video material from the beginning. Moreover, it might be worth the time and effort to gather extra training videos that are short, explicit, and low in complexity. For example, for training coders to use the act4teams coding scheme, we recorded training videos of simulated meetings where meeting participants (i.e., actors) discussed fictional topics such as "How can we best plan our next office party?" In comparison, real meetings in the workplace usually center on very specific, context-driven topics which are not as useful for training purposes.

Coding data does not necessarily have to be software assisted. However, we highly recommend using professional software when working with video or audio data. There are several software options available on the market such as Observer software by Noldus (Noldus, Trienes, Hendriksen, Jansen, & Jansen, 2000) or Interact software (Mangold, 2010). Computer-assisted coding saves considerable time and offers a wide range of different possibilities for further analysis already implemented in the software (such as computing statistics for durations of speech for different meeting attendees). To illustrate, Figure 15.1 shows the screenshot of a stream of meeting behavior coded with the act4teams coding scheme using Interact software. It is important to allocate enough time for coders to get familiar with the software (and maybe also special hardware). If the coders know the coding scheme by heart but use the software incorrectly, the results will not be reliable.

Insert Figure 15.1 about here

Establishing inter-rater reliability

A basic requirement for every coding procedure is good inter-rater reliability (or inter-rater agreement). For example, if two different coders work separately on the same video material using the same coding scheme, they should obtain (more or less) the same results. The most common agreement statistic for calculating inter-rater reliability is Cohen's kappa (Cohen, 1960). Cohen's kappa assesses the level of agreement between two coders who assign codes from a mutually exclusive and exhaustive coding scheme to discrete units of behavior. The computed values can range from -1 to +1. Positive values indicate that the agreement is greater than expected by chance. The higher the kappa value, the better the agreement. When using software and live video, units are marked according to time rather than words. The smallest time units are usually frames per seconds. Obviously, it is impossible for two coders to cut the video at the exact same time. A common procedure here is to construct very clear unitizing rules and to employ just one trained unitizer to identify the units. Subsequently, other trained coders assign these identified units to a behavioral code from the coding scheme. However, there are also newer and more advanced measures to calculate inter-rater reliability so that, for example, coders can simultaneously unitize and code streams of behavior. For more detailed information on how to calculate observer agreement, we recommend Bakeman, Quera, and Gnisci (2009) as well as Quera, Bakeman, and Gnisci (2007).

In sum, training new coders takes considerable time that highly depends on the complexity of the coding scheme. Since the act4teams coding scheme is a rather extensive and detailed coding scheme, detailed training takes about 200 hours. Afterwards, a trained coder needs about ten hours to code a one-hour video, when using Interact software to facilitate the video cutting and coding process.

Detecting behavioral sequences

When inter-rater reliability has been established and the meeting interaction data is coded, our meeting researcher has a wealth of options for further analyzing the behavioral process data. He has now reached step 6 in Table 15.1. For example, he can now pool the coded data from his 20 team meetings to form one large file, and examine emergent sequences of behavior across all meetings (e.g., Kauffeld & Meyers, 2009). Software such as Interact (Mangold, 2010) or GSEQ (Bakeman & Quera, 2011) that has implemented lag sequential analysis can be instrumental for testing hypotheses about emergent behavioral patterns. Consider our meetings researcher, who has hypothesized that solution statements tend to elicit agreement or support in meetings (see Table 15.2 for the different behavioral codes for solution statements in the problem-focused column, and support statements in the socio-emotional column). He can now test whether his hypothesized behavioral sequences (i.e., solution-support, describing a solution-support, or arguing for a solution-support) actually occur above chance in the data. We will describe these different possibilities to explore the coded data in more detail in the next section.

Other analytical options

Finally, our meetings researcher may also decide to summarize or "collapse" his behavioral process data. Content-analytical researchers often use tabulations (absolute or relative frequencies of observed behaviors or rates of behaviors) or cross-tabulations (frequencies of co-occurrence of several behaviors; see Krippendorff, 2004, for an overview). For example, our meeting researcher could be interested in the average number of solutions brought up by his meeting attendees.

After running sequential analysis and reducing his data to obtain simplified summary scores, our meeting researcher could also take it one step further. Imagine that he wishes to combine his coded meeting interaction data and identified interaction patterns with other variables such as survey-based evaluations of individual or team attitudes, such as participants' meeting satisfaction or engagement beyond the meeting (e.g., Allen &

Rogelberg, 2013; Rogelberg, Allen, Shanock, Scott, & Shuffler, 2010). For example, to link the emergent solution-support patterns in his meetings to participants' satisfaction with the meeting he might aggregate the coded behavior by counting the frequency of solution-support patterns per meeting, and use a correlational design to examine the link to meeting satisfaction. Other examples of studies that have combined content analytical data with other variables include research linking the overall frequency of specific meeting behaviors to survey-based team outcomes (Kauffeld & Lehmann-Willenbrock, 2012), a study linking questionnaire-based diversity to coded overall elaboration behaviors in a group task (Pieterse, van Knippenberg, & van Ginkel, 2011), or a study connecting the overall frequency of interaction patterns to team performance (Stachowski, Kaplan, & Waller, 2009).

Thus far, we hope to have illustrated that the potential for informing meeting science by interaction analytical methods particularly concerns step 6 as indicated in Table 15.1. In the following sections, we highlight recent research in the area of meetings science that has focused on the interaction process, and present new findings from a preliminary study using pattern analysis.

Research findings: Behavioral triggers and emergent patterns in team meetings

Although previous research on dynamic behavioral processes during meetings is sparse overall, a number of studies have begun to utilize interaction analytical methods to tap into these processes. In the following, we review recent finding that specifically focus on team meetings. First, we introduce findings on functional and dysfunctional meeting behaviors and their impact on meeting outcomes (Kauffeld & Lehmann-Willenbrock, 2012). Second, we focus on specific behavioral triggers in meetings that can lead to *sequences of behaviors* that occur beyond chance (e.g., lag sequential analysis; Bakeman & Quera, 2011) and *emergent patterns* of behaviors (e.g., pattern analysis; Magnusson, 2000). Third, we introduce further ways to capture the dynamics that evolve over time throughout different phases in team meetings.

Functional and dysfunctional behaviors in team meetings

A long tradition of research has aimed to understand successful and effective decision making in small groups and overall group performance (e.g., Kerr & Tindale, 2004; Wittenbaum et al., 2004). Why do some groups succeed while others fail? The same thing can be said or asked for team meetings. Why do we feel that some meetings are successful while other meetings seem to be a failure or simply are a waste of time (see Rogelberg, Leach, Warr, & Burnfield, 2006)? Analyzing the actual behavior of meeting participants can help us understand what makes a team meeting successful. Previous research shows that team meeting behaviors shape both team and organizational outcomes. In a longitudinal study, Kauffeld and Lehmann-Willenbrock (2012) analyzed 92 videotaped team meetings using the act4teams coding scheme. Using a correlational design, they were able to link specific meeting behaviors with survey based outcome measure (i.e., meeting satisfaction, team productivity, and overall organizational effectiveness measured 2.5 years later). As a result, they identified functional as well as dysfunctional team meeting behaviors. Functional, positive meeting behaviors include behaviors such as generating ideas and solutions, managing the discussion process (i.e., positive procedural statements in the act4teams coding scheme), and planning specific actions to be carried out after the meeting (i.e., positive, proactive statements in the act4teams coding scheme). These functional meeting behaviors were positively correlated with meeting satisfaction, subsequent team productivity, and organizational effectiveness (Kauffeld &Lehmann-Willenbrock, 2012). On the other hand, dysfunctional, negative behaviors such as losing the train of thought, criticizing others, or complaining showed significant negative links with team and organizational outcomes (Kauffeld & Lehmann-Willenbrock, 2012).What is important here is the fact that these negative effects of dysfunctional meeting behaviors were more pronounced than the positive effects of functional meeting behaviors. Statements expressing no interest in change and complaining behaviors (e.g., "Nobody ever listens to us. ") were found to be especially frequent and harmful (Kauffeld & Lehmann-Willenbrock, 2012). From a practical perspective, these results emphasize that dysfunctional meeting behaviors such as complaining should not be underestimated.

Emergent behavioral patterns in meetings

Recall our earlier example of a meeting leader who starts a meeting by introducing a new problem ("Our topic for today's meeting is the fact that we keep getting customer complaints"), which will trigger specific behaviors by the other meeting attendees. This example shows that interactions in team meetings are not independent from one another. Certain behaviors showed by one meeting participant such as bringing up new ideas elicit certain behaviors by other team members (e.g., questioning the idea) and have an impact on the following actions such as discussing the new idea (Chiu & Khoo, 2005). What comes into play here falls under the tenets of interpersonal theory, which argues that any specific behavior in an interaction process between two or more people invites specific responses (e.g., Sadler & Woody, 2003), potentially resulting in recurring patterns of interaction. To avoid confusion, the terms "pattern" and "pattern analysis" are used differently by different researchers. Generally speaking, interaction patterns are defined as regular sets of verbalizations and nonverbal actions (e.g., Stachowski et al., 2009).

Different methodological approaches—ranging from solely qualitative to strictly quantitative—can be applied to detect such patterns. Moreover, there are specific applications labeled as "pattern analysis", such as Magnusson's T-pattern analysis (Magnusson, 2000). What all of these approaches have in common is that patterns of interaction are described as team-level or higher-level phenomena that emerge or arise as a result of interaction among individual or lower-level elements (Holland, 1998; Kozlowski, Chao, Grand, Braun, & Kuljanin, 2013; Morgeson & Hofmann, 1999). In the context of meetings, it is this interaction among meeting participants that creates so-called emergence (see also Cronin et al., 2011).

Sequential analysis insights into meeting processes

Previous research on team meeting interaction has identified emergent cycles or patterns of interaction by means of lag sequential analysis (e.g., Kauffeld & Meyers, 2009; Lehmann-Willenbrock, Allen, & Kauffeld, 2013; Lehmann-Willenbrock, Meyers, Kauffeld, Neininger, & Henschel, 2011; Lehmann-Willenbrock, Allen, & Meinecke, 2014). Lag sequential analysis (Sacket, 1979) examines temporal patterns in sequentially recorded events of groups or individuals. In meeting research, it can determine whether a certain sequence of behavior (e.g., a solution statement followed by a support statement) occurs above chance.

To determine how often one behavior is followed by another, the coded data needs to be fed into an interaction sequence matrix. So-called first-order transitions or interacts occur when one statement directly follows the previous one (lag1); second-order transitions occur when a statement is followed by the next-but-one statement (lag2); and so forth. Transition probabilities can then be computed by dividing the cell frequencies by the cell sums. The cell frequencies represent how often each event occurs in the sequence and the cell sums show how often the first event is found in the sequence. Transition probabilities indicate the probability that a specific behavior B occurs after a particular given behavior A (Benes, Gutkin, & Kramer, 1995). Thus, transition probabilities designate the likelihood that B is triggered by A within the meeting interaction process.

Transition probabilities are always confounded with the base rates of the events that follow. Thus, a high transition probability is not per se an indication of an above chance transition frequency. To examine whether any transition probability differs from the unconditional probability for the event that follows, z-statistic as a statistical check can be used (Bakeman & Gottman, 1997). A z-value larger than 1.96 or smaller than -1.96 implies that a behavioral sequence occurs above chance. This procedure sounds pretty straightforward. However, meeting researchers interested in using lag sequential analysis should be careful that their coded data actually fit the requirements for using such an analysis. One common obstacle are structural zeros within the interaction matrix (that is if the coding scheme does not allow that an event can be followed by any of the same type) or small cell frequencies. Usually, certain meeting behaviors are more likely than others. For example, most meetings will involve some kind of problem analysis while criticizing and gossiping behaviors are usually (and luckily) rather sparse. Thus, meeting researchers usually need to code a lot of meetings to obtain reliable results.

For example, in a study of 33 team meetings, Kauffeld and Meyers (2009) found that complaining behavior in team meetings triggered further complaining behavior, as the following example illustrates:

Meeting attendee A: "Nothing can be done, so why should we bother"

Meeting attendee B: "Yeah, nothing ever changes around here anyway"

Meeting attendee C: "I don't know why we ever try to change things"

Hence, complaining behavior tends to come in cycles such that one participant's complaining encourages others to complain as well (Kauffeld & Meyers, 2009). Complaining statements often occurred in a complaining/support/complaining sequence or in complaining/complaining/complaining cycles. On a more positive note, they also found that solution statements tended to occur in cycles, such that solutions lead to further solutions in team meetings (solution cycles; Kauffeld & Meyers, 2009).

Employing the framework of emotional contagion, Lehmann-Willenbrock and colleagues (2011) investigated 52 team meetings and linked complaining cycles as well as interest-in-change cycles to emergent affective states in team meetings. One main implication here is that naturally occurring verbal interaction constitutes affect in groups. Verbal statements within the meeting process create and sustain the group's mood. Complaining cycles were linked to a passive group mood whereas interest-in-change cycles were linked to an active group mood.

Moreover, meetings research using lag sequential analysis has revealed that procedural meeting behaviors aimed at structuring the discussion flow tend to be sustained by supporting statements within the meeting process (Lehmann-Willenbrock et al., 2013). Such structuring statements play an important role throughout the meeting process as they promote proactive communication (e.g., who will do what and when) and significantly inhibit dysfunctional meeting behaviors (e.g., losing the train of thought, criticizing others, and complaining). Also, team members were more satisfied with the discussion process and outcomes when procedural meeting behaviors were more evenly distributed across all team members. Hence, interaction analysis shows that all team members should held responsible for facilitating meeting processes.

And recently, sequential analysis has also been used to gain insights into intercultural differences in meeting behaviors and interaction patterns. Specifically, a study comparing meeting processes in student teams from the U.S. and Germany found that differences in interaction behaviors, such as a stronger focus on problems in German meetings and a focus on solutions in U.S.-American meetings, were substantiated in emergent interaction patterns (Lehmann-Willenbrock et al., 2014).

What all of these studies have in common is that they have focused on the sequential nature of meeting interaction. Sequential analysis helps us answer questions such as: How do meeting participants react to one other? Or: Can we predict specific meeting behaviors by behavioral triggers? In sum, sequential analysis offers an analytical tool for achieving a very fine-grained view of meeting interactions.

Pattern analysis

Another way to look at meeting interaction is to identify more general patterns of interaction, using pattern analysis (e.g., Magnusson, 2000). Pattern analysis is used as a data reduction technique when searching for deeper connections among pairs of cases in a data set (Punj & Stewart, 1983; Romesburg, 2004). Against this background, pattern analysis examines the data with a more holistic perspective than sequential analysis and attempts to find similarities between cases throughout the complete data set that are not obvious by merely looking at the data (Aldenderfer & Blashfield, 1984; Romesburg, 2004).

For more than 40 years, scholars of various research fields have tried to detect obvious and non-obvious patterns in human behavior (Magnusson, 2000). Researchers have examined patterns of interaction in children's and adult's dyadic interaction (Ducan & Fiske, 1977), in children's social interaction (Magnusson, 2000), in problem solving at school (Chiu & Khoo, 2005), or group interaction during crises (Stachowski et al., 2009). In the context of team work, broader patterns of interaction became a central research subject as team performance was found to be a result of recurring clusters of statements that were thematically related and occurred several times during the working process. For example, Tschan (2002) examined medical emergency teams and found that completed sequences of action regulation involving goal orientation, task performance, and monitoring were positively related to performance. Stachowski and colleagues (2009) examined simulated crisis situations among nuclear power plant control room crews and found that shorter, fewer, and less-complex interaction patterns were linked to higher team performance. More recently, Goh, Goodman, and Weingart (2013) found cycles of planning, enacting, and reviewing activities in creative project teams.

There are different approaches for detecting such broader patterns of interaction and again some are more qualitative while others use sophisticated algorithms. One well-known pattern algorithm is Magnusson's T-pattern algorithm implemented in *Theme* (Magnusson, 2000). Interact software (Mangold, 2010), on the other hand, has implemented pattern analysis that is based on Ward's cluster analysis method (e.g., Aldenderfer & Blashfield, 1984; Romesburg, 2004). It is beyond the scope of this chapter to describe differences and similarities between these approaches. Instead, we want to describe additional ways to capture the dynamics in meetings that evolve over time by looking at different phases in team meetings.

Temporal phases in team meetings

The contemporary perspective of team processes argues for a central focus on temporal team dynamics unfolding over time (e.g., Cronin et al., 2011; Marks et al., 2001). In particular, in their temporal model of team task performance, Marks and colleagues (2001) call for researchers and practitioners "to consider a team's temporal rhythms in measurements and evaluations of teamwork processes and effectiveness" (p. 369). Concerning the specific team work context of team meetings, specific behaviors such as coming up with new ideas during the meeting are embedded not only within the social context of the team, but also within the temporal process of the meeting. So how can we tackle this temporal perspective?

Unanswered research questions include the question how team member participation differs during the process of the meeting, or whether certain sequences of behaviors are more likely in certain phases of the meeting. Moreover, a distinction of different meeting phases could help us understand how social influence emerges over time within the meeting process. With one notable exception (Jarzabkowski & Seidl, 2008), meetings research to date has not yielded insights into different phases in meetings. However, we can borrow from the existing literature on negotiation (e.g., Adair & Brett, 2005; Liu, 2013; Olekalns, Brett, & Weingart, 2003). To study different phases and to identify breakpoints between phases, negotiation researchers have used both interval-driven and event-driven approaches (Adair & Brett, 2005).

An *interval-driven* approach separates a meeting into standardized phases. This approach typically uses either time or the number of speaking turns to determine the beginning and end of different phases. For example, a new meeting phase could be created every ten minutes. To consider differences in meeting length, researchers could also divide the meeting process into equal parts. For example, the meeting process could be cut in half, or separated into quarters or into tenths. *Event-driven* approaches, on the other hand, focus on content and identify clusters of similar behaviors. In the context of meetings, a new meeting phase would be marked when team members exhibit a cluster of behaviors that is different from the previously observed one (Adair & Brett, 2005). For example, an event-driven approach could identify meeting phases such as a clearly defined beginning and ending phase. Event-driven approaches require some sort of reliability check. For example, if a meeting researcher is interested in determining clear beginning phases, then different coders would need to cut the meeting process at the same breaking point. Again, using either approach, coding schemes (such as the act4teams coding scheme) can be used to capture the meeting participants' behaviors in each phase.

Both approaches have both benefits and shortcomings (Adair & Brett, 2005). The main strength of the event-driven approach is that it captures the very unique progression of phases. However, it is more difficult to generate general models using an event-driven approach. An interval-driven approach, on the other hand, is usually based on theory as phases are determined a priori. As such, an interval-driven approach facilitates the development of general models. Moreover, it can be very useful to determine between-group differences to draw comparison within and across phases (Adair & Brett, 2005). Meeting researchers interested in separating the meeting process into different phases should chose an approach that best suits their respective research question. In the next section, we provide an application sample of interaction processes in team meetings within a two-phase model. To illustrate the possibilities of pattern analysis for understanding interaction processes in meetings, we will introduce a preliminary study using pattern analysis in a sample of 24 team meetings.

Interaction analysis on meeting data: An application

The following preliminary study was conducted in order to begin to explore the notion of phases in meetings. Our study was driven by two main research questions.

RQ1: Do frequencies of interaction behaviors differ between the first and second halves of team meetings?

RQ2: Do patterns of interaction differ as the meeting progresses?

Data were gathered during regular team meetings in 24 semi-autonomous teams drawn from two different medium-sized organizations in Germany. Both organizations implemented regular team meetings as part of a Continuous Improvement Process (CIP; e.g., Liker & Franz, 2011). The team members' age ranged from 17 and 62 years (M = 35.71, SD = 10.79) and about eighty percent (82.4 %) of the team members were male. Organizational tenure ranged from 0 to 42 years (M = 9.62, SD = 8.38). Prior to the data inquiry, the team members and their supervisors agreed on a particular problem-solving task that they wanted to discuss during the team meeting. For example, teams discussed how work collaboration could be improved, or how team product quality could be enhanced. A maximum of seven employees took part in the team meetings. All meetings were videotaped and coded using the act4teams coding scheme (see Table 15.2). Inter-rater reliability was κ = .81.

In order to reduce complexity, we collapsed the coded meeting behaviors into seven broader aspects of interaction, according to the act4teams coding scheme. We examined problem-focused statements, positive procedural statements, negative procedural statements, positive socio-emotional statements, negative socio-emotional statements, positive proactive statements, and negative counteractive statements. To examine behavioral patterns in different team meeting phases, we used an interval-driven approach and divided each team meeting into two equal halves. Hence, we examined the first and second phase separately. First, we compared frequencies of behavior between the two phases. Second, we used pattern analysis to detect underlying patterns of interaction.

Figure 15.2 illustrates the coded stream of behavior from one of the 24 coded team meetings. The upper line shows the flow of interaction in the first half of the meeting and the lower line shows the flow of interaction in the second half of the meeting.

Insert Figure 15.2 about here

As depicted in Figure 15.2, the first and second half of the meeting show readily apparent differences in the frequencies of specific behaviors as well as the range of observed behaviors. Next, we explore the quantitative representations of these observed differences.

Behavioral frequencies in different meeting phases

To consider differences in meeting lengths, we computed percentage scores for the seven aspects of meeting interaction across each meeting phase. We used the Wilcoxon signed-rank test as a non-parametric test to accommodate our small sample size. Results showed that, on average, meeting behaviors were distributed differently across the first and second halves of the meetings. Table 15.4 depicts the different frequencies of behavior found in the two phases.

Insert Table 15.4 about here

Problem-focused statements were significantly more frequent in phase 1. Negative procedural statements and negative socio-emotional statements, on the other hand, were significantly more frequent in phase 2 ($p < .05$, respectively). Negative counteractive statements were also marginally more frequent in phase 2 of the observed meetings ($p < .10$). These findings suggest that during the first phase of the meeting, the teams primarily worked on problems and solutions. In the second half of their meetings, the teams were still mainly concerned with problem-focused issues. However, they also showed significantly more dysfunctional communicative behaviors (in terms of negative procedural and negative socio-emotional statements). Team members were more likely to run off topic and criticized or interrupted each other more often in the second phase of the meeting. In addition, they showed a tendency to engage in more negative counteractive meeting behaviors such as complaining.

Applying pattern analysis

Second, we examined behavioral patterns across both meeting phases. To do so, we applied pattern analysis as implemented in Interact software (Mangold, 2010). The method begins with treating each statement or behavior as its own cluster, and then successively merges the clusters, finally resulting in one single cluster containing all cases (Aldenderfer & Blashfield, 1984; Romesburg, 2004). The first cluster evolves after the Euclidean distance between each cases and the average similarity is measured and squared (squared Euclidean distance). The cases with the lowest squared Euclidean distance build the first cluster. During the process of gradually adding cases to the cluster, the average similarity of the developing cluster is constantly measured. Cases that increase the sum of squared deviations within a cluster the least are merged first. Vice versa, cases that increase it the most are merged last (Aldenderfer & Blashfield, 1984; Romesburg, 2004).

The process of hierarchically clustering the cases reveals a hierarchy of clusters that is expressed in the *relation strength* of each cluster. The lower the relation strength of a cluster, the more homogenous are the cases within that cluster. Interact automatically sorts the detected clusters by their relation strength. For example, a hidden cluster on level one would represent lower relation strength than on level two or three, and the cluster would therefore be more homogenous than on any higher level.

The detected patterns or clusters are highly dependent on the selected data and can only be interpreted in context (Mangold, 2010). As it is not possible to compare the results with any reference values, the researcher needs to decide which cluster is substantive and which is not (Mangold, 2010). We employed a checklist for comparing the results of both halves of each of the 24 meetings. The checklist method, as a method that researchers have used in different contexts before (e.g., Bishop, 2003; Jacobs, 1997; Porter & Votta, 1998), turned out to be a feasible, accurate, and reproducible way of conducting pattern analysis in team meetings. Results such as composition and relation strength of a hidden cluster, and how often it occurred among all videos, were recorded in a table. Once the results of all 24 meetings were entered in the table, every detected hidden cluster received its own number. If the same hidden cluster occurred in two different sets, it received the same number. In the end, the checklist contained very detailed information such as which hidden clusters existed, which occurred most often, and how teams showed different patterns between both phases.

In both meeting phases, analysis with Interact detected hidden clusters up to level six. That is, all statements were gradually added to the cluster and at level six all seven aspects were integrated into this one cluster. However, this study only takes into consideration hidden clusters at level one to three. Results indicated the following hidden clusters among the first halves of the meetings (i.e., phase 1): A hidden cluster at level one was formed by negative procedural statements and positive, proactive statements (relation strength = 84.89). At hidden cluster level two, negative, counteractive statements were added to the cluster (relation strength = 318.35). Positive procedural statements were integrated into the hidden cluster at level three (relation strength = 713.48). The same hidden clusters were found among the second halves of the meetings. Yet, differences in relation strength between the two phases were obvious. At hidden cluster level one, the relation strength was 253.93; at level two the hidden cluster had relation strength of 593.17 and at level three, relation strength was 1009.86. That is, relation strengths of the hidden clusters within phase 2 were considerably higher than in phase 1. Additionally, hidden clusters on all three levels showed higher frequencies in phase 2. However, the conclusion that hidden clusters in phase 2 are not as strong as in phase 1 cannot be made. Since results from cluster analysis must always be interpreted within context and as phase 1 and phase 2 were investigated separately, they must be treated as two different data sets with two different contexts.

Our results showed that the three main hidden clusters were the same in both phases, although this does not necessarily mean that the same teams in phase 1 show the same clusters in phase 2. Our checklist revealed that at level one, only 8 out of the 24 teams shared the same pattern in both phases. At level two and three, the number of teams who maintained the same interaction pattern dropped to 1 out of 24.

In sum, results from pattern analysis showed that teams changed their way of working between phase 1 and phase 2. These findings are in line with previous research on group development over time (Gersick, 1988, 1989, 1991). As such, a theoretical implication of our findings is that group development models can be transferred to meeting interaction processes. Moreover, our findings align with scholarly work and continued calls for research on time as an influential factor for understanding interaction (e.g., Cronin et al., 2011; Roe, Waller, & Clegg, 2009), which certainly applies to meetings as well. In fact, a recent study has identified lateness to meetings as one particularly salient component of chronicity in the meetings domain (Rogelberg et al., 2014). As a practical implication, these results suggest that meeting leaders should aim to avoid derailing meeting processes in later phases of a meeting. Longer meetings may be especially prone to derailment, as illustrated by Figure 15.2 (second phase of the meeting). As meetings progress, team members are more likely to engage in dysfunctional team meeting behaviors.

Summary and Future Research

Meetings provide a rich context for understanding dynamic processes in groups and teams. Moreover, interaction patterns in team meetings reflect team and organizational effectiveness (e.g., Kauffeld & Lehmann-Willenbrock, 2012). As such, understanding the social dynamics in workplace meetings can also help us understand broader social processes in organizations.

Because meetings are such a frequent activity for employees of contemporary organizations, understanding the social interaction dynamics during meetings becomes a research subject in its own right. We began our chapter by highlighting ways in which meetings researchers can go about addressing research questions that require a closer look at the interaction dynamics during meetings. We described specific action steps in conducting process-analytical research on meetings, such as defining phenomena of interest, establishing behavioral units, and training coders. We then provided an overview of available methods for exploring process-analytical data and for testing hypotheses about emerging behavioral patterns in meetings. Finally, we showcased pattern analysis as an example of a new method for detecting behavioral patterns within the meeting interaction flow.

Limitations

Despite the numerous advantages and research opportunities inherent in process-analytical methods, as outlined in this chapter, these methods also have some limitations. Perhaps the first thought that will come to the mind of a meetings researcher contemplating the use of these methods is the fact that both data gathering and data analysis are labor intensive. As we discussed earlier, this labor investment not only concerns setting up a coding procedure and training coders, but also requires additional efforts for gaining the trust of the participants, particularly in field research settings. In comparison, survey methods may often be easier to implement, although they come at the cost of losing insights into dynamic processes in meetings.

Another issue to consider is that process-analytical research is prone to errors if coders are either not trained well enough or if the coding procedure is otherwise flawed (e.g., because coders do not have a detailed coding handbook which they can consult). In any case, continuous data-checking routines should be implemented throughout the coding process and subsequent analysis of the behavioral data.

Finally, not all phenomena of interest to meetings researchers may be reflected in observable behavior. For example, the question whether meeting attendees trust one another will likely require a survey measure, although the obtained survey scores could very well be reflected in specific behaviors or behavior patterns (see Wildman et al., 2012). The key, then, is to be open to multi-method approaches and to use the best of both worlds. Moreover, we need to keep in mind that while meetings capture an increasingly important part of organizational behavior and the social dynamics surrounding it, other workplace settings outside the meeting context also contain social dynamics and shape employees' behaviors, experiences, and attitudes.

Future research ideas

By illustrating the manifold opportunities and exciting insights that become available by process-analytical methods, we hope to have sparked ideas and enthusiasm among meeting researchers aiming to understand the fine-grained dynamics of meetings. A small but growing number of meetings researchers from different disciplines is already actively pursuing process-analytical research on meetings, many of whom are contributing to the current volume. However, we believe that the methods outlined in the present chapter can provide the toolkit for moving the field of meeting science forward. Several important research questions remain unanswered. The following examples are merely a selection, and we hope that readers will add their own.

First, phases in meetings as outlined in our preliminary study example remain largely unexplored to date. One research questions pertaining to phases in meetings concerns the issue of emergent social influence over time. For example, it remains to be seen whether emergent social influence in meetings takes place early on, related to the notion of "setting the tone" for specific interaction patterns (Zijlstra, Waller, & Phillips, 2012). Moreover, meetings research has yet to explore whether social influence fluctuates and changes, with different meeting attendees taking on the leadership roles over the course of a meeting. Similarly, officially appointed meeting leaders may carry more or less conversational weight, and may have a stronger or weaker impact on emergent interaction patterns during different phases of a meeting.

Second, interaction dynamics and emergent interaction patterns may differ considerably across different organizational contexts, meeting purposes, and meeting group compositions. Previous findings on meeting interaction dynamics using quantitative process-analytical methods are limited in that they have focused predominantly on leaderless meetings and semi-autonomous work teams working on problem-solving tasks, from industrial settings, and hence from male-dominated samples (e.g., Kauffeld & Lehmann-Willenbrock, 2012; Kauffeld & Meyers, 2009; Lehmann-Willenbrock et al., 2011, 2013). The interaction dynamics revealed in these previous findings may not generalize to other industries, different meeting agendas, and particularly, different gender compositions in the meeting (e.g., Carli & Bukatko, 2000).

Third, initial findings from student groups suggest that emergent interaction patterns during meetings can differ considerably when comparing meeting attendees from different cultural backgrounds (Lehmann-Willenbrock et al., 2014). To date, no research efforts have been made toward substantiating these findings in real organizational meetings. Moreover, the aforementioned study drew comparisons between monocultural teams, whereas many contexts in which employees of contemporary organizations encounter intercultural differences will involve members from different cultures at the same time. Future research should explore these settings and use interaction analytical methods to help us understand behavioral differences not only in terms of the frequencies of specific communicative actions, but also in terms of the "trigger" function of specific communication behaviors and subsequently emerging patterns, depending on the cultural background of the speaker.

Finally, in addition to paving the way for innovative meeting science, interaction analytical methods can be useful tools for team training and development. For example, a team could receive feedback on their individual behavior as well as their team processes based on a process analysis of their meeting. Such a "mirror" of the team's own behavior, when facilitated by a skilled team trainer, may be more accessible and can hold more face validity for participants, compared to more subjective evaluations of the teamwork. As such, feedback about meeting processes can be fruitful for promoting team reflexivity.

In closing, we would like to emphasize that the future of interaction process research aimed at understanding the complexity of meetings will depend on interdisciplinary collaboration. For example, communication and social psychology scholars can provide the theoretical backdrop for hypothesizing about group processes and communication dynamics that are at play during meetings. Organization scientists can design field studies with an eye not only for obtaining rich meeting data, but also for the practical implications that can be drawn from the results. And finally, computer scientists continue to improve the toolkit for understanding meeting dynamics, for example by developing methods for detecting breakpoints and critical time windows during meetings (Chiu, 2008; Kim & Rudin, 2013).

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Table 15.1
Basic steps in interaction process analysis

1) Define phenomenon and behavioral variables of interest
2) Select unitizing rule (e.g., turns of talk, utterances, or specific time segments within a meeting)
3) Choose existing coding scheme or develop a new coding scheme
4) Gather behavioral process data (videotape or audiotape)
5) Train coders, code data, and establish inter-rater-reliability
6) Run sequential or pattern analysis to detect interaction patterns and/or
7) If necessary, reduce data to summarize or simplify (e.g., calculate overall frequencies of specific behaviors in a meeting)

Table 15.2
Act4teams coding scheme for verbal interaction behaviors in meetings (adapted from Kauffeld & Lehmann-Willenbrock, 2012)

Problem-focused behaviors	**Procedural behaviors**	**Socio-emotional behaviors**	**Action-oriented behaviors**
Problem	**Positive procedural behaviors:**	**Positive socio-emotional behaviors:**	**Positive, proactive behaviors:**
Describing a problem	Goal orientation	Encouraging participation	Expressing positivity
Connections with problems	Clarifying	Providing support	Taking responsibility
Defining the objective	Procedural suggestion	Active listening	Action planning
Solution	Procedural question	Reasoned disagreement	
Describing a solution	Prioritizing	Giving feedback	
Problem with a solution	Time management	Humor	
Arguing for a solution	Task distribution	Separating opinions from facts	**Negative, counterproductive behaviors:**
Organizational knowledge	Visualization	Expressing feelings	No interest in change
Knowing who	Summarizing	Offering praise	Complaining
Question			Seeking someone to blame
	Negative procedural behaviors:	**Negative socio-emotional behaviors:**	Denying responsibility
	Losing the train of thought (running off topic)	Criticizing/backbiting	Empty talk
		Interrupting	Ending the discussion early
		Side conversations	
		Self-promotion	

Table 15.3
Sample utterances (sense units) coded with act4teams

Sample statement	**act4teams code**
The information flow in our group is bad.	Problem
For instance, we don't know how's going to be here next week.	Describing a problem
This means it's really hard to schedule anything for the whole team.	Connections with a problem
We need to find a way to improve that.	Defining the objective
We could put use a calendar for the team.	Solution
We could put it in the lunch room, for example.	Describing a solution
But not everyone uses the lunch room.	Problem with a solution
The advantage would be that it's easy to see who's going to be here and who's not.	Arguing for a solution
The lunch room is on the ground floor.	Organizational knowledge
Mr. Smith is the one who hands out materials down there.	Knowing who
Is he the one who works in the sales department?	Question
Alright, back to the topic.	Goal orientation
So essentially you're saying that ...	Clarifying
Let's talk about ... first.	Procedural suggestion
Should I write that down?	Procedural question
That's the most important issue we're facing.	Prioritizing
And we should come to a decision; we only have five minutes left.	Time management
Anna, please take notes on the flip chart.	Task distribution
(A writes on flip chart)	Visualization
Ok, so far we've talked about	Summarizing
And then I was all, like, … and then he's all, like, ….	Losing the train of thought (running off topic)
And then I said, … and then he said, ….	
By the way, yesterday on the evening news, I heard that…	
Pete, you haven't said anything yet.	Encouraging participation
Yes, exactly.	Providing support
Uh-huh.	Active listening.
That's not true because...	Reasoned disagreement
I didn't know that.	Giving feedback
I am a manager and not superman. Superman has way cooler hair.	Humor
In my opinion, …	Separating opinions from facts
That makes me really angry.	Expressing feelings
Now, I'm glad that…	
You did such a great job earlier…	Offering praise
It seems like you guys sit around drinking coffee the whole time anyway.	Criticizing/backbiting
Our boss is a complete idiot.	
[Team member B cuts A short]	Interrupting
[Team member A talks on his cell phone during the meeting]	Side conversations
If everyone did it my way, we wouldn't have any problem.	Self-promotion
This sounds promising.	Expressing positivity
We all need to make an effort for this.	Taking responsibility
I'll go see him on Monday and ask him.	Action planning
We will never be able to accomplish that.	No interest in change
Yeah right, like that's ever gonna happen.	
Nobody ever listens to us.	Complaining
We're always the ones who get bullied.	
That's Mike's fault, he just doesn't feel responsible.	Seeking someone to blame
That's none of our business; they should take care of it.	Denying responsibility
Aren't we all friends.	Empty talk
The world just keeps on turnin'.	
Okay, all has been said, let's just stop. [after 10 minutes]	Ending the discussion early

Table 15.4
Average distribution of meeting behaviors across the first and second halves of the meetings (Wilcoxon signed-rank test)

Meeting behavior	**First half (phase 1)**	**Second half (phase 2)**
Problem-focused behaviors	48.5 % *	44.77%
Positive procedural behaviors	8.62 %	6.69 %
Negative procedural behaviors	0.52 %	2.09 % *
Positive socio-emotional behaviors	27.27 %	26.5 %
Negative socio-emotional behaviors	9.31 %	11.38 % *
Positive, proactive behaviors	1.92 %	2.67 %
Negative, counteractive behaviors	3.86 %	5.89 % $^{+}$

Note. Wilcoxon signed-rank tests were used to test for differences between both phases. $^{+}p < .10$; $^{*}p < .05$

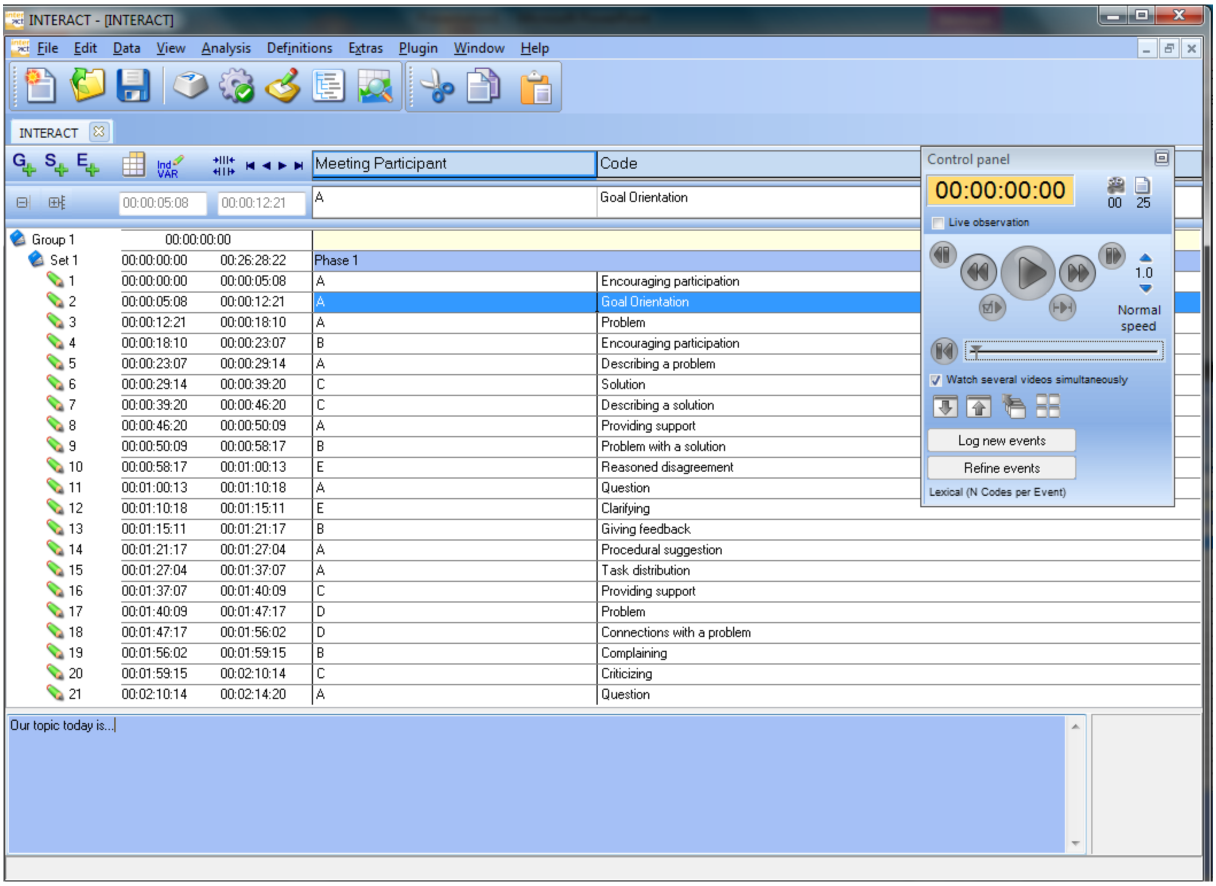

Figure 15.1. Stream of meeting behavior coded with the act4teams coding scheme using Interact software (Mangold, 2010)

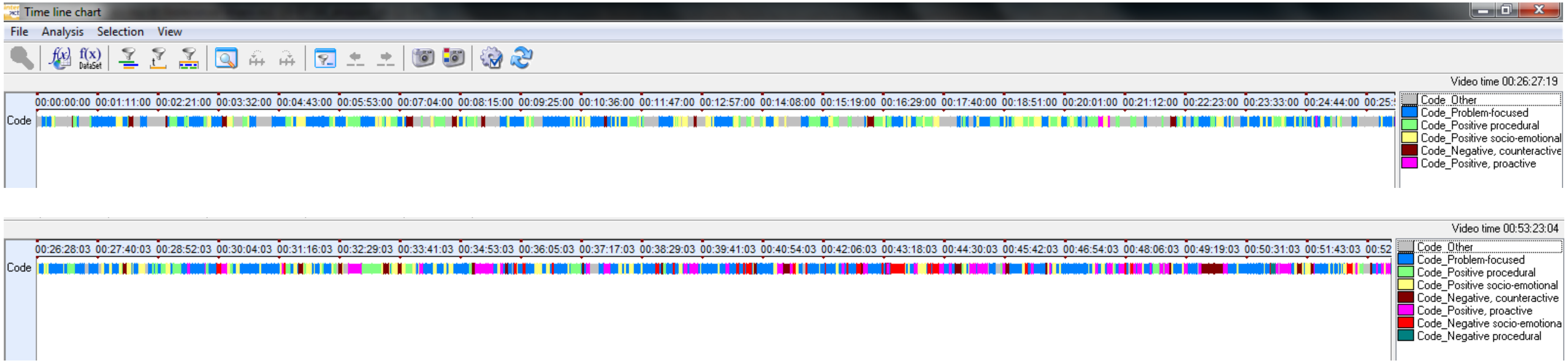

Figure 15.2. Time line chart of one meeting coded with the act4teams coding scheme. The upper line (1) shows the flow of interaction in the first half of the meeting and the lower line (2) shows the flow of interaction in the second half of the meeting.