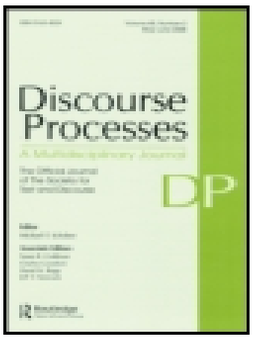

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Identifying Individual and Collective Acts of Remembering in Task-Related Communication

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Most previous research on communicative remembering has focused on memory tasks in which participants collaborate in constructing a joint version of some past event. In contrast, research on spontaneous acts of remembering in the context of other activities not focused on creating versions of the past has been neglected. A theory-based system conceptualizing communicative remembering as a form of collaborative action is presented for identifying individual and collective acts of remembering. Individual acts of remembering are called memory utterances. A distinction is made between explicit and implicit memory utterances. Explicit memory utterances are references to past events. Implicit memory utterances are utterances in which the past is used without being the object of reference. Collective acts of remembering (collective memory processes) encompass memory utterances and other pragmatically related utterances (eliciting questions, comments, acknowledgments, etc.). Excerpts from a corpus of task-related communication are presented to illustrate these phenomena. Issues pertaining to coding are discussed in detail, and descriptive data illustrating the instrumental nature of acts of remembering in this corpus are presented.

COLLECTIVE REMEMBERING IN COMMUNICATION: CONSTRUCTING A VERSION OF THE PAST?

Collective remembering, or the collaborative activity of reconstructing some past event or state of affairs in conversation, has received comparatively little attention in communication research to date. This state of affairs contrasts with other related fields of social psychology, such as small-group research in which the topic of group memory has been well researched (N. Clark & Stephenson, 1995; Hollingshead,

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1998; Wegner, 1987; Wegner, Erber, & Raymond, 1991). This is surprising, considering the centrality of memory as a psychological function. Furthermore, the increased interest of psychologists in the uses of memory in everyday life, building on the insight that memory is used often in social contexts and for social purposes, would seem to predict more interest in this field. However, since Edwards and Middleton's (1986) groundbreaking study of the organization of joint remembering in conversation, there has been little work done by other research groups (see, however, Hirst & Manier, 1996, and the contributions in Middleton & Edwards, 1990).

Edwards and Middleton (1986) proposed that joint remembering in conversation consists of constructing an account or version of the past. They described three main functions operating in reconstructive activity (these can be considered as subtasks of the task of constructing a version): framing and orientation, correspondence, and validation. Framing and orientation are communicative actions by which participants negotiate the task itself, including how they define efforts as relevant to the task and how they locate themselves within its demands. The correspondence function designates those communicative actions that serve to map the events being recalled into the constraints of narrative form. The authors distinguish between semantic and continuity subfunctions of the correspondence function. The semantic subfunction is the putting into words of experienced events; the continuity subfunction involves mapping the sequence of these events onto the sequence in the narrative.

Establishing correspondence involves the production of memories in verbal form; these memories thus are proffered by participants for the approval of other participants in the joint effort (the validation function). In many cases, accuracy or other aspects of the veridicality of the memories (When did A get home? What color was B's sweater?) are not trivial and are subject to validation by the other participants before being incorporated into the narrative. Edwards and Middleton (1986) identified several ways in which this is accomplished. First, speakers may offer evidence that their memories are accurate; participants may present arguments in favor of or against a given memory or appeal to plausibility (sometimes using markers such as "so," "then," or "because"). In addition, other participants may overtly accept or reject these candidate memories ("No it wasn't like that" or "That's right I remember"). Furthermore, if difficulties in recalling some aspect of the narrative become evident, collective search efforts can be mustered (Goodwin, 1987).

A similar approach to conversational remembering is Hirst and Manier's (1996) analysis of family remembering. Families were asked to recall together some event that was experienced by all members. Hirst and Manier were interested in the distribution of effort of recall among the family members. They found that the task of remembering was distributed according to three different and implicitly organized roles: narrator, monitor, and mentor. *Narrators* assumed the main effort of telling the story and, thus, produced the most memories. *Monitors* were participants who assessed the veracity of the events as narrated, and *mentors* contributed their part by ensuring that the narrator stuck to the task at hand ("You're

getting off the point") and also by prompting aspects of the story neglected by the narrator ("That's not all, though").

This taxonomy is remarkably similar to the functions of framing and orientation, correspondence, and validation described earlier. Indeed, it is interesting to map the discourse functions of Edwards and Middleton (1986) and the role-taking functions of Hirst and Manier (1996) onto each other. One might surmise that correspondence is accomplished primarily by narrators, framing and orientation by mentors, and validation by monitors. Therefore, it would seem that we have a rather plausible account of the organization of communicative remembering: Participants produce memories that are jointly negotiated and evaluated as to their validity, all the while monitoring their progress within the task constraints. Problematic aspects of the narrative can be reconstructed and validated with particular attention, and here the combined knowledge of the participants will be of advantage.

However, the question arises whether these functions always operate in communicative remembering. For example, when participants have differential access to the experiences being narrated, they might not be in a position to validate each other's memories. Or they simply might not be interested in doing so because of the demands of the current situation or because any memories evoked might not be sufficiently complex to require coordinated effort at recall or establishing consensus. In all of these situations, it might be the case that the functions of framing, correspondence, and continuity described by Edwards and Middleton (1986) operate differently or not at all. What characterizes such situations? The studies mentioned constitute cases in which groups were asked explicitly by researchers to construct a version of a collectively experienced past event; in other words, the task was defined from the outset as a memory task. As Edwards and Middleton put it, "establishing a mnemonic consensus, a shared version of the past, is the overall function which unites all of the phenomena we have examined" (p. 446). This is a feature that limits generalizability of the phenomena described in these studies. In the words of Hirst and Manier (1996), this might have "imposed task demands not present in more naturally occurring conversations" (p. 274). Although it seems unlikely that such constraints would distort basic processes of joint remembering, it is, on the other hand, plausible that establishing a version of the past constitutes a particular activity type (Levinson, 1992) that is not necessarily the only or most prevalent form of communicative remembering.

SPONTANEOUS ACTS OF REMEMBERING IN NATURAL CONVERSATION

Therefore, it becomes necessary to study communicative remembering in other contexts than that of an explicitly defined memory task. In particular, spontaneous occurrences of remembering in natural discourse not focused on establishing a

mnemonic consensus should be studied. How frequent are memory utterances in natural conversation, and what do they look like? The first problem that arises in answering such a question is developing a method for distinguishing memory utterances from other conversational forms. In the absence of an overarching constraint defining a given conversational task as a memory task, it might not be immediately evident which utterances are expressions of memory and which are not. In particular, it is not clear how phenomena of implicit remembering (use of the past in an utterance without directly referring to the past) are manifested.

Dritschel (1991) presented a system for analyzing spontaneous occurrences of autobiographical memory in natural conversation. The system differentiates on a first level between memory units and nonmemory units. Memory units are further subdivided into personal memory units (implicating the self) and nonpersonal memory units (not implicating the self). Personal memory units can be autobiographical memory, autobiographical fact, prospective memory, or metamemory units. An autobiographical memory unit is defined as "a clause consisting of a finite verb plus all its modifiers and containing an implicit or explicit self-reference to a past event or a collection of past events" (p. 321). An autobiographical fact unit is "a verb clause that describes some autobiographical/biographical information that need not be accessed in memory by event-related knowledge (e.g., *'I have two brothers'*)" (p. 321). A prospective memory unit is "a verb clause that expresses a memory for satisfying some future plans (e.g., *'I will be taking my French exam on Monday'*)" (p. 321). A metamemory unit is "a verb clause that relates information about one's memory and the ability to access memories (e.g., *'I couldn't remember having done that'*)" (p. 321). Dritschel further subdivided autobiographical memory units into actions, evaluations, propositional attitudes, and reported speech.

The issue of implicit reference to information in memory is defined as follows: An implicit self-reference is a self-reference that is inferred from its surrounding context. Implicit self-reference is found generally when participants describe events they observed rather than performed. For example, Dritschel (1991) wrote that "I went to the cinema" is an explicit self-reference, whereas "Jane and Susan were there as well" is implicit.

The coding system was applied to four dyadic conversations selected from the Svartvik and Quirk (1979) corpus. The system exhibited excellent interrater agreement in distinguishing autobiographical memory units from other idea units (Cohen's $\kappa = .89$). Thus, it seems possible to reliably identify spontaneous occurrences of memory in discourse not necessarily produced in the context of a memory task.

Nevertheless, the system presented by Dritschel (1991) is more of a taxonomy then a method for identifying memory utterances. This is because the system is content based: Utterances are treated at face value and analyzed according to content, not as speech acts. Also, there is no systematic treatment of definitional is-

sues, and the issue of implicit reference to the past in discourse is also not addressed systematically.

AN ACTION-ORIENTED APPROACH TO COMMUNICATIVE REMEMBERING

The problems identified previously can be solved by (a) basing any method for identifying memory occurrences in natural discourse on a conceptualization of such occurrences as pragmatic acts of reference and (b) grounding interpretation of these acts in their wider discursive and activity context. Such an approach allows one to account for both explicit and implicit acts of remembering in a systematic fashion. This study introduces the basic aspects of a coding system designed to support the analysis of spontaneous occurrences of memory in natural conversation. Based on excerpts of data collected from a study of task-related group communication, the concept of *memory utterances* (utterances referring to the past) is presented. Building on this, a unit of analysis termed *collective memory process* (a sequence of discourse encompassing memory utterances) is then defined. Aspects related to the coding of these units of analysis are discussed in detail and illustrated with descriptive data. First, however, the theoretical assumptions on which this system is based are presented.

My approach is based on an action-theoretical framework (Cranach, 1996; Cranach, Ochsenbein, & Valach, 1986) and a view of language use as a form of joint action (H. H. Clark, 1996). Both approaches propose that goal-directed action is composed of both individual (persons acting on their own) and joint (coordination of individual acts) components. Communicative remembering is a form of language use and, therefore, should exhibit individual and collaborative components. Note that this aspect is also well documented by Edwards and Middleton (1986) but only in the context of memory tasks.

A main feature of action and activity-theoretical approaches is the hierarchical nature of actions (Engeström, Brown, Engeström, & Koistinen, 1990; Leont'ev, 1981). Actions are incorporated into larger social and technological contexts, projects, or activities. They are composed of (more or less) automatic operations. An activity is a collectively organized, temporally recurrent pattern of action. It is the meaningful context for understanding individual actions. An action is a consciously regulated component of an activity. It typically is performed by an individual or a small group and is organized by a goal. An operation is an automatized (nonconscious) component of an action. In Leont'ev, an example is given of a tribe of primitive hunters who, to catch game for food, separate their numbers into catchers and bush beaters. The bush beaters frighten the game toward the catchers. The activity as a whole is hunting for food. It is functional for a collective (the tribe) and temporally recurrent (a part of the everyday life routine). An example

of an action would be frightening game, accomplished by the bush beaters. To do this, they have to perform the physical operation of beating the bushes at the right moment. Operations are rational only in the context of an action. Likewise, an action takes its meaning from the activity in which it is embedded. Through this focus on human practice, action and activity approaches supersede the dichotomy between individual and collective levels of analysis.

Activity theory has been applied to the case of memory by Zinchenko (1983), who distinguished between voluntary and involuntary remembering. Involuntary remembering occurs "within an action of a different nature, an action that has a definite task, goal and motive and a definite significance for the subject, but that is not directly oriented toward the task of remembering" (p. 77). Voluntary remembering is a "special action devoted to remembering. Here, remembering is not just a feature of an action, but constitutes the content of a special action associated with a memory task. The subject is consciously aware of the object of the action as an object of remembering" (pp. 77–78). This distinction between two basic aspects of remembering is analogous to Jacoby, Kelley, Brown, and Jasechko's (1989) distinction between memory as a tool (which corresponds to involuntary remembering in Zinchenko's terminology) and memory as an object. Jacoby et al. wrote that "when used as a tool, memory for a prior event is incorporated into an ongoing activity rather than being treated as an object for reflection" (p. 335). This distinction forms the basis of the distinction between explicit and implicit memory (memory without awareness) in experimental psychology. Identification of memory utterances in communication should be based on the distinction between voluntary and involuntary remembering. Implicit memory utterances (corresponding to involuntary remembering) can be defined as utterances in which the past is incorporated into an ongoing activity without being an explicit object of reference. However, note that in this case, the term *implicit* does not imply a lack of awareness of the past on the part of the speaker. Rather, what is implicit here is the reference to the past. This reference, however, can be made explicit.

Another way of thinking about such phenomena is in terms of the intentionality they incorporate. Treating remembering as a communicative act implies taking into account its intentional character. In other words, memory utterances typically could be defined as utterances referring to the experienced past of the speaker. However, this does not encompass all types of memory productions. Notably, it does not do justice to those cases, discussed previously, in which utterances are based on past experience or use the past without constituting a direct reference to the past. For example, Meacham (1982) wrote that "although a memory must be *from* the past, it does not necessarily have to be *about* the past, and may be about the present or the future" (p. 125). A case in point discussed by Meacham in detail is that of prospective memory (i.e., memory for intentions). Although remembering to execute a planned action is based on the past, it is not about the past. In this study, implicit memory utterances are defined as utterances informed by, based on, or using past experience without directly referring to the

past itself. In fact, "aboutness" can be taken as a criterion for deciding whether a memory utterance is explicit (about the past) or implicit (not about the past). For example, according to our definition, Dritschel's (1991) example of an implicit memory utterance, "Jane and Susan were there as well," is actually an explicit utterance because it refers to a past state of affairs (e.g., the past situation at which Jane and Susan were present). An instance of prospective remembering (e.g., "I will be taking my French exam on Monday"), however, does constitute an implicit memory utterance because there is no reference to the past.

THIS STUDY

The data corpus of this study was collected from communication of groups engaged in a computer task simulation. The purpose of this article is to describe, in detail, methodological aspects of identifying instances of remembering in task-related communication. After a presentation of the details of the study, the focus is on identifying memory utterances that explicitly and implicitly refer to the past, using examples from the corpus. Then, a rationale for identifying collective acts of remembering is presented, also supported by examples from the corpus. Finally, the implications of applying such procedures in exhaustive coding are discussed and some statistics on interrater agreement and descriptive data are presented. However, the principal focus remains methodological—that is, assessing problems involved with identifying and coding acts of remembering in communication. Substantive results from this simulation using our coding system already have been analyzed. For example, Bangerter, Cranach, and Arn (1997) showed that the contents of collective acts of remembering were related systematically to the activity contexts (phases of action regulation such as orienting, planning, implementing, and evaluating) in which they were produced. In other words, different types of information were remembered in the context of phases of action regulation. This, in turn, shows how remembering in communication is functional for the sequential regulation of group action.

In this simulation, group members interacted according to different designated roles and hierarchies; they also had a number of different and shared complex tasks to perform together. The simulation lasted several days in an ongoing fashion. The purpose of designing such a complex situation was to simulate a realistic action environment. In addition, a priority was to design a situation in which the efforts and attention of the participants under observation were precisely not directed toward remembering. In such a situation, it is possible to observe spontaneous discursive productions of memory and have precise knowledge about the circumstances of their production. Such a situation combines high ecological validity with a degree of control only possible in a laboratory setting. To my knowledge, no such study yet has been performed. In the following subsections, the study design is described in detail.

Simulation

Goal-directed group action was simulated in a controlled observational situation in which a four-person group with a formal role structure had to manage a complex computer simulation of a modern city over 4 days. The study consisted of two main phases. The first was the training phase (Days 1 and 2), during which participants learned the basic functioning of the computer simulation (Day 1) and acquired specialized knowledge and responsibilities according to their different roles in the group (Day 2). This lasted 1 hr each day. The second was the simulation phase (Days 3 and 4), during which participants managed the computer simulation together. This phase occupied 90 min each day.

The computer simulation used is the game Sim City (Maxis Software, 1993). Players must build and manage a city, manipulating different game variables and building roads; police departments; commercial, industrial, and residential zones; and so on. Simultaneously, players must take into account factors such as environmental problems, crime, and public opinion.

The group was composed of two subgroups of two people: the City Council and the Traffic and Environmental Commission. Each subgroup was composed in turn of two roles, a group leader and a subordinate role, giving a total of four individual roles. The leader of the City Council is the mayor and is also the leader of the whole group. The leader of the Commission is the chairperson, and the two subordinate roles in each subgroup are Analyst 1 and Analyst 2. Roles were designated at the beginning of the study. During the training phase, each participant received a booklet detailing the responsibilities incumbent on them as a function of their specific roles. Leaders were responsible for long-term planning and decision making for their respective subgroups, and analysts were responsible for implementation of these plans and problem solving. In addition, the booklets contained (less detailed) information about responsibilities of other group members.

This group structure corresponds to a specific task structure. The computer was used to design a city in which several problems were particularly salient at the beginning of the simulation phase. Solving these problems constituted the specific tasks faced by the participants. The group as a whole worked toward the superordinate goal of achieving and maintaining a high public opinion rate. To do this, it was necessary to work simultaneously toward the goals of reducing crime, managing finances, reducing traffic, and reducing pollution (see Figure 1). The City Council was responsible for crime and finances, and the Commission was responsible for the other two tasks, namely traffic and pollution. Each task also can be decomposed further into several subtasks. At this level, actions consist of manipulating particular game variables, such as police departments, police funding, or parks (see Figure 1). Leaders received detailed information concerning aspects of the task structure for which their group was responsible (including information on causal relations between game variables), whereas analysts received more practical training concerning the manipulation of the game system.

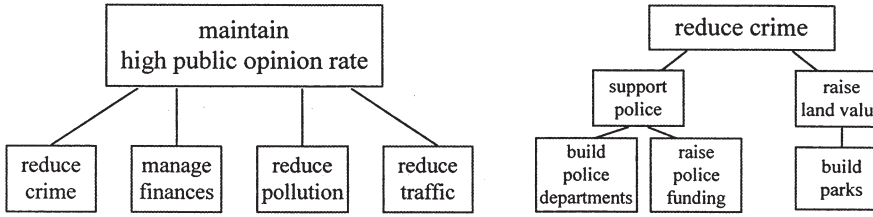

FIGURE 1 The superordinate task and four main tasks (left side). The task *reduce crime* with its subtasks: *build police departments, raise police funding,* and *build parks* (right side).

For the participants to interact in a manner appropriate to the structure of the group, interaction between group members took place according to a sequence called a discussion cycle, shown in Figure 2. This cycle was enacted by the participants twice on each day of the simulation phase (i.e., four times). A discussion cycle lasted approximately 40 min and consisted of six dyadic meetings, or sessions. During the first session (planning), the group leaders met together and planned what to do during the coming cycle. They had access to the computer system for consultative purposes only (the simulation was set on pause). The analysts were inactive during this session, which lasted 10 min. During the next two sessions (subgroup discussion), each group simultaneously met in separate rooms for 6 min and discussed group-specific aspects of the tasks in more detail. During the third session (execution), the analysts implemented the plans together on the computer. During this session, which lasted 15 min, the leaders were inactive, and the simulation was running. During the next two sessions (subgroup evaluation), both groups met again separately for 6 min to discuss results and feedback from the game system and to initiate new plans for the next cycle (the simulation was saved at the end of the first day so that, on the next day, players began where they left off). In this way, the group was confronted with an ongoing task lasting several days and implemented in a series of repeated dyadic interactions. Furthermore, the sequence of interactions (sessions) between group members requires the use of memory in transferring information from one session to the next. Therefore, the design provokes memory use without making it an explicit task.

A typical planning session might consist of the group leaders looking at the city map, discussing how to reduce crime, and deciding to build a number of police departments at strategic sites in the city. This decision would be discussed in more detail by the mayor and Analyst 1 during the discussion session (i.e., where to build them), whereas it might not even be mentioned in the discussion between the chairperson and Analyst 2. During the execution session, both analysts probably would execute their respective tasks (taking turns as they do so) and dealing with any problems that arise. During the evaluation session, Analyst 1 then would report on progress to the mayor (e.g., that not all of the planned police depart-

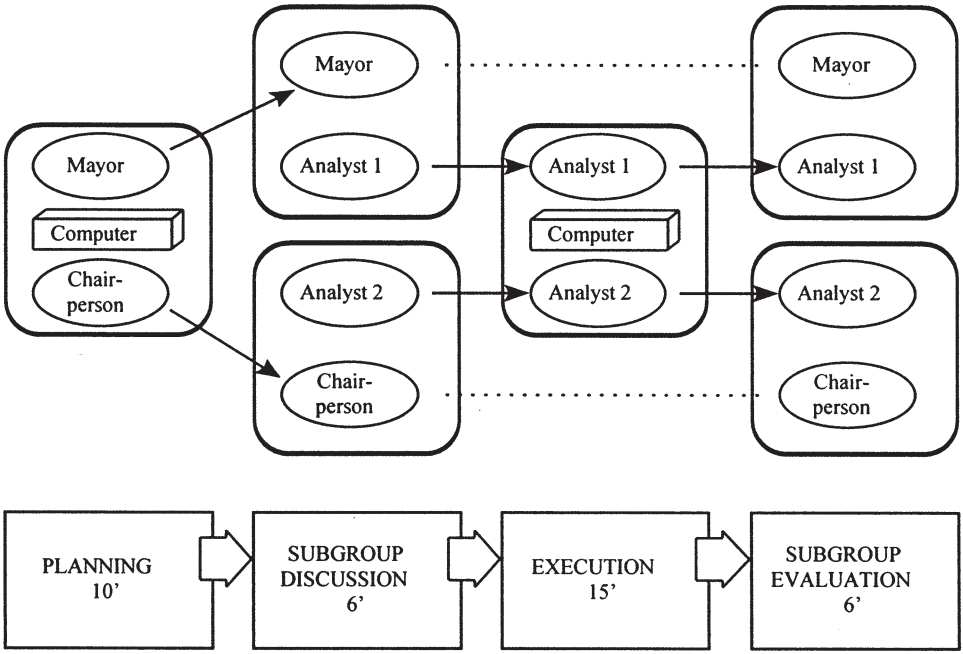

FIGURE 2 The different sessions of a discussion cycle. (*Note.* Rounded rectangles indicate the different sessions and ovals indicate the participants. The sequence of participation in the sessions is indicated by full arrows. The dotted lines indicate transition of participants through sessions in which they are inactive.)

ments could be built because of lack of time), whereupon the mayor might decide to continue building police departments in the coming discussion cycle.

Data Collection and Transcription

Nine groups completed the study. Participants were recruited among students of the University of Berne, who participated in the study as part of a course requirement. Because participation lasted a total of 6 hr over 4 days, they also were remunerated to ensure optimal cooperation. The interaction between the participants was recorded on videotape, and word-for-word transcripts of verbal communication were written. Communication in the transcripts was segmented into units of analysis (utterances) according to a procedure developed by Mösch (1990). Utterances correspond approximately to a sentence in written language. A separate transcript was written for each session, amounting to a total of 216 transcripts (approximately 30 hr of discussion).

All excerpts are English translations of the original German transcripts. Utterances and actions are transcribed on separate lines and numbered, and they are

preceded by an abbreviation of the speaker's or actor's role (M = mayor, C = chairperson, A1 = Analyst 1, A2 = Analyst 2). Acts are transcribed in italics. Commas indicate self-interruptions followed by restarts. Onset of simultaneous speech (or simultaneous speech and action) is indicated by a bracket symbol ([ ). Short pauses within turns are marked by a full stop. Abbreviations in subscript appended to memory utterances (MUs) in Excerpt 1 indicate which sessions they refer to (EX = execution, P = planning, SGD = subgroup discussion). Abbreviations in superscript in Excerpts 4 and 5 indicate spatial references shown in Figure 4.

MUs and Collective Memory Processes (CMPs)

In the following sections, examples of explicit and implicit MUs are presented in their discursive contexts. As discussed previously, explicit and implicit MUs are defined in relation to the intention of the speaker. Explicit MUs are about the past; the speaker makes an intentional reference to a past state of affairs. In other words, it is the intention of the speaker to evoke the past. In contrast, implicit MUs are not about the past; rather, the past is "present," effective or used (Bartlett, 1932) in some form, even though the intentions and attention of the speaker are directed elsewhere. MUs also can be incorporated into larger units of analysis, termed *CMPs*. In the following three sections, examples of both types of MUs and CMPs are presented.

EXPLICIT REFERENCE TO THE PAST

There are different kinds of explicit MUs. A prototypical case is constituted by "displays" of remembering (Goodwin, 1987; Middleton, 1997). Such utterances appear in the general form of *I (don't* or *can't) remember*; in other words, they comprise a metacommunicative clause that refers to the act of remembering or forgetting itself (e.g., "I can't remember how much is left in the fund"). This was analyzed in detail in the research of Edwards and Middleton (1986) and Hirst and Manier (1996). Such explicit displays can (among other functions) serve the purpose of redirecting collective attention to the act of remembering itself. Such displays did not occur very often in the corpus. This indicates that remembering typically occurred without effort; this is possibly due to the fact that participants were allowed free use of external aids (notes). However, other kinds of explicit MUs could be found. Consider the following excerpt:

(1) (Group 4, fourth discussion cycle, subgroup evaluation session City Council)

both persons are looking at a hand-drawn sketch of the city

1 A1: and there concerning the traffic$_{SGD}$ we couldn't take care of that$_{EX}$

2 *indicates point on sketch*

3 M: what?

4 A1: you {plural} said it was something like unnecessary roads or so_{SGD}
5 M: no
6 there were like such $forks_{PL}$
7 *indicates sketch*
8 A1: aha yes
9 we couldn't take a look at $that_{EX}$
10 M: yes
11 it's not so urgent

Here, Analyst 1 is reporting on the preceding execution session to the mayor. The sequence begins with her mentioning the fact that a particular task (apparently concerning unnecessary roads to be bulldozed) was not accomplished (Utterance 1). This apparently straightforward opening utterance is in fact a complex MU, in which direct references are made to two distinct points in the past. First, the analyst is referring to the moment when the plan was first discussed in the subgroup discussion session. This is accomplished by means of the clause "and there concerning the traffic," which is a shorthand reference or "label" for the plan which was discussed in more detail two sessions before. By doing this, the analyst directs attention toward the execution of this plan, on which she then reports in the same utterance, saying that it could not be taken care of. The mayor's subsequent expression of incomprehension (Line 3) induces the analyst to refer to the discussion session again. She produces a second MU (Line 4), designed as a specific reference to the words employed by the mayor and the chairperson themselves ("you said") during planning and imparted to the analyst by the mayor in the discussion session, probably in an effort to jog the mayor's memory. This in turn induces the mayor to recall what she observed in the planning session (Line 6). She refutes the formulation attributed to her from the subgroup discussion session by the analyst, reminiscing instead from her own experience in the planning session, a third point in the past. This is evident in the use of the clause "there were . . . ," indicating a state of affairs. Had she wanted to correct the analyst's MU referring to the subgroup discussion session, she probably would have formulated Line 6 as "I said . . . ." She reformulates the problem originally referred to by the analyst as "unnecessary roads" in terms of "forks" (MU), whereupon the analyst picks up her original report again (MU; Line 9), which is then accepted by the mayor (Line 10).

This excerpt is interesting because it illustrates a case in which ongoing activity is temporarily interrupted or suspended while difficulties that have arisen are solved. Another description of this sequence would be to say that the goal of the activity has shifted: Instead of being focused on the task at hand, attention has been re-allocated to elucidate a question that normally would have been implicitly accepted by both participants. The goal of the activity now is to establish some understanding of which past situation and plan is being referred to, and the MUs

produced by the participants (Lines 1, 4, 6, and 9) draw on different sources from their personal as well as shared past experience to accomplish this purpose.

There is also some subtle evidence in this excerpt indicating that establishing exactly what was or was not the case in the past is not an important issue. Taking up Line 6 again, it is noteworthy that although the mayor refutes the analyst's MU in Line 4, she does not dispute directly the analyst's version of things; rather, she refers directly to her own experience in the planning session. In other words, she refers to her original *experience* of the event rather than her subsequent *report* of it; this can be seen as a more direct and efficient move—however, only when the goal is to establish the state of affairs to a degree sufficient for present purposes and not what was said exactly (contrast this with the correspondence function of Edwards & Middleton, 1986). This hints at the instrumental nature of the remembering in this excerpt, which would indicate that the study design was successful in producing such phenomena. The following excerpt illustrates similar points:

(2) (Group 6, third discussion cycle, subgroup discussion session City Council)

1	M:	and a stadium is probably too expensive
2	A1:	mhm
3		otherwise in the north or what?
4	M:	huh?
5	A1:	if there's enough money build a stadium in the north
6	M:	I don't know
7	A1:	isn't there one in the south?
8	M:	is there one already?
9	A1:	it's the same city as yesterday you said right?
10	M:	yes yes
11	A1:	[then there is one yes
12	M:	[was there one
13	A1:	well we'll see

The participants are discussing the possibility of building a sports stadium to make the city more attractive. This takes place in the opening utterances of the sequence (Lines 1–6). The analyst is involved more actively in formulating the plan (Lines 3 and 5), which is greeted rather unenthusiastically by the mayor (Lines 1, 4, and 6). For some reason (possibly to justify his proposal to build the stadium in the north), the analyst presents a statement (Line 7; an MU formulated as a question) that there is already a stadium in the south of the city. The mayor's subsequent expression of uncertainty (Line 8) induces the analyst to seek confirmation that the city with which they are working is indeed the same one as the day before. The mayor is in a position to confirm this (Line 10; MU) on the basis of

his experience of the preceding planning session, which is the opening session of the third discussion cycle and, hence, the first contact members of the group have had with the simulation on the 2nd day. Having secured this fact, the analyst then confirms the existence of a stadium in the south of the city (Line 11; MU).

As in Excerpt 1, this sequence illustrates an interruption of ongoing activity to clarify a problematic state of affairs. The individual MUs produced by the participants reflect their access to different past events, and it is only their enunciation in a joint effort of recall that allows the participants to form a coherent picture of the actual situation. It is worth noting that, from a hierarchical perspective, this excerpt contains two separate efforts at recall that are nested within each other and are, in turn, nested within the discussion concerning the stadium. This is shown in Figure 3: Sequence 3 is nested within Sequence 2, which in turn is nested within Sequence 1. In pragmatic terms, Sequences 2 and 3 can be considered as insertion sequences (Yule, 1993); more precisely, they correspond to "push" and "pop" types of topic shift in Grosz, Pollack, and Sidner's (1990; see also H. H. Clark, 1996, p. 343) terminology. These types of topic shift correspond to initiation and termination of subprojects, respectively. Again, here the focus is on the present situation. The concern with "how it was exactly in the past" is subordinated to other concerns. Here too, the past is remembered with ease. The action context here can be described as planning whether to build a stadium. Subprojects of remembering, as exemplified by Subsequences 2 and 3, seem to be a normal part of any planning activity of reasonable complexity—in other words, monitoring situational aspects relevant to the plans at hand to ensure their appropriate contextualization.

The previous excerpts illustrate cases of explicit MUs (i.e., utterances in which a direct reference is made to past events). Such utterances often constitute sequences that became functionally autonomous from "normal" ongoing activity to establish or clarify a certain state of affairs before moving on with the task at hand. However, this is not the only, or most important or interesting, way in which memory was found to operate in this data corpus. In the following section, a selection of cases illustrating some very different phenomena of implicit remembering are discussed.

IMPLICIT REFERENCE TO THE PAST

Memory utterances implicitly referring to the past can be defined as utterances in which the past is in some way "present," effective, or used (Bartlett, 1932), although it is not directly the object of reference. Such MUs are, in contrast to explicit MUs, often not readily identifiable as such by themselves; one needs access to transcripts of past discussions to ascertain this. As an example, consider the proposal in Excerpt 2 to "build a stadium in the north." This proposal was raised in an earlier session (in the subgroup discussion session of the second discussion cycle), which is presented in the following excerpt:

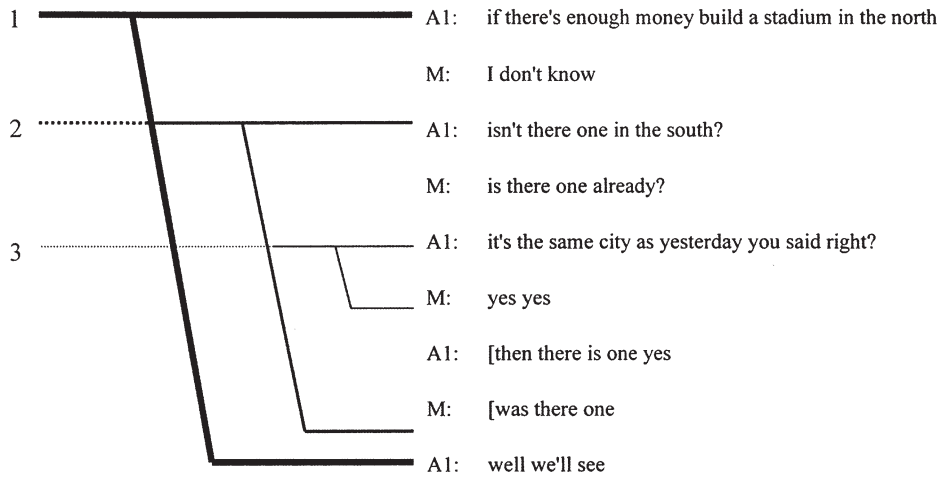

FIGURE 3 Hierarchically nested sequences (joint projects). Sequence 1: Discussing whether to build a stadium. Sequence 2: Establishing whether there already is one in the south. Sequence 3: Establishing whether the city is the same one as the day before.

(3) (Group 6, second discussion cycle, subgroup discussion session City Council)

1	M:	you should also build a stadium or what
2	A1:	there is one
3		enough
4	M:	is there one
5		but not there
6	A1:	yes well then it'll go, well that wouldn't be so bad at all
7		then they'll be happy
8		*writes in notes*
9	M:	well it's in the southwest it is the stadium
10	A1:	yes
11	M:	then you could build one more in
12	A1:	in the north
13	M:	in the north there
14		I don't know
15	A1:	in the center
16		rather a little more, I'll see
17	M:	yes
18		it's probably not at all possible financially
19	A1:	how expensive is it?
20	M:	I don't know

This is an earlier time at which the idea of building a stadium was discussed, and many of the themes discussed in Excerpt 2 can be recognized as originating in this excerpt (e.g., concern with the high cost of the stadium). When one is in a position to compare these two sequences, it becomes clear that Utterances 1, 3, and 5 in Excerpt 2 originate in the earlier discussion (and thus constitute implicit MUs). However, this fact is not transparent to a reader who does not have access to the sequence in Excerpt 3. Indeed, these three utterances are not designed as intentional references to the past at all but rather seamlessly form a part of the planning activity in which the participants are engaged. Moreover, these MUs do not interrupt the activity in any way; the efforts of the participants are engaged in planning, and only later in Excerpt 2 does remembering become problematic. Despite this, the discussion in Excerpt 2 is informed by what has been expressed earlier; things have been said already, and the speakers understand each other. For example, the label "in the north" in Utterances 3 and 5 of Excerpt 2 has its origin in the initial discussion in Excerpt 3 concerning where to put the stadium.

Another typical situation in which implicit MUs were found is in the transmission of plans between different sessions. For example, plans discussed between the mayor and Analyst 1 in the subgroup discussion session might be discussed again between the analysts in the execution session. This is illustrated in Excerpts 4 (execution session) and 5 (the preceding subgroup discussion session).

(4) (Group 4, first discussion cycle, execution session)

1	A1:	well I really must build around two police stations
2		*taps on sketch, shows it to A2*
3		wait I'll get maps
4		[is that okay?
5		[*clicks on CRIME RATE window*
6	A2:	yes
7	A1:	you see
8		well I think this is crime
9	A2:	*points to area*^{A} *on computer screen*
10	A1:	Then I need at least one station there^{A}
11		*points to area*^{A} *on computer screen*
12		and there^{C} maybe another police station
13		*points to area*^{C} *on computer screen*
14		well there I'd put two^{D}
15		*indicates area*^{D} *on computer screen*
16	A2:	yes
17	A1:	there^{A} maybe another one
18		*points to area*^{A} *on computer screen*

Here, Analyst 1 is explaining the details of her task to Analyst 2. To facilitate understanding, a reproduction of the relevant areas of the city is shown in Figure 4. There are no explicit references to the past in this excerpt. However, as before, a very different picture emerges when one examines the preceding session.

(5) (Group 4, first discussion cycle, subgroup discussion session City Council)

both persons are bent over a hand-drawn sketch of the city

M: but I think you must build police stations
A1: yes
well at least two more for sure I'd say
M: that's what I would have said as well two for now
that'll cost a thousand
A1: mhm
looks at M's sketch of the city
there[C] somewhere or what
points to area[C] on sketch
M: yes well [behind there[C] it's really really bad
A1: [there[C] there[C] there[C]
M: and up here[A] it's pretty bad too
points to area[A] on sketch
A1: [then I'd
M: [there there's a lot of industry[A]
points to area[A] on sketch
A1: then I'd put one in the middle there somewhere[B]
points to area[B] on sketch
M: mhm mhm
A1: or one just up up there[A]
points to area[A] on sketch

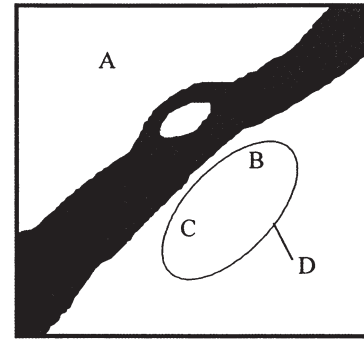

FIGURE 4 A map of the city. The city is divided from the northeast to the southwest by a river with an island in the middle. Areas A, B, C, and D are potential building sites for police departments referred to in Excerpts 4 and 5. Area D is a larger area encompassing Areas B and C.

22 M: or you or you could put one there[C] a little lower down
23 and then there[A]
24 *points to area,[C] then to area[A] on sketch*
25 A1: yes there[D]
26 *makes circular movement around zone[D]*

To the analyst informed by Excerpt 5, Utterances 1, 10, 12, 14, and 17 in Excerpt 4 now are recognizable as implicit MUs grounded in the preceding session's talk, even without any explicit references to this session. Furthermore, a closer analysis reveals a series of subtle differences in formulation chosen by Analyst 1 in Excerpt 4. Consider the verb *must* in Line 1. It is an implicit reference to the preceding session, reformulated as an obligation: Analyst 1 thereby signals that she is acting in her role and executing orders from the mayor. In doing this, she legitimates her claim for a certain slot of the 15 min available. Actually, this utterance is an instance of prospective remembering (i.e., the remembering of an earlier intention). In this particular case, the "must" is also a marker of a certain institutional necessity. The "need" (Line 10) reflects the gravity of the situation. In other words, in Excerpt 4, Analyst 1 "needs at least one" police station in (A) because she was informed in the preceding session that things were "really bad" in (A) as stated in Excerpt 5, Utterance 11. Contrast this with Line 14: "Well there I'd put two." The conditional (and hence more cautious) formulation also reflects the uncertain status of the large area south of the river (D). In the preceding discussion, the mayor and Analyst 1 proposed slightly different locations for building sites (B and C; see Utterances 17 and 22 in Excerpt 5). Utterance 14 in Excerpt 4 thus can be interpreted as an effort on the part of the analyst to do justice to both earlier proposals. This is also a novelty; in the preceding session, there was no discussion of building two police departments at both locations B and C.

Thus, the data presented in Excerpts 4 and 5 show that subtle variations in formulation by Analyst 1 can be related to past discussion. Together with Excerpts 2 and 3, one might conclude that, even in the absence of explicit MUs, participants in the discussions were using the past in their communicative activity.

This could only be established on the basis of extracontextual information (i.e., through access to transcripts of the past discussions). This constitutes a problem: Implicit MUs only can be identified as such on the basis of criteria such as "similarity" or correspondence between past and present formulations. Because there is no explicit reference being made by the speaker, this similarity is what leads to the conclusion by an observer that past experience is being used. Therefore, this conclusion will always be an *empirical inference*; it will never be absolutely—but only relatively—certain. However, it is necessary to distinguish clearly between cases in which the inference of a link between the present and a precise point in the past can be made and cases in which this link is not possible. Cases in which this link cannot be made clearly often correspond to what is called *semantic knowledge* (Tul-

ving, 1972)—in other words, knowledge dissociated from its experiential basis. For example, the knowledge that two police departments "cost a thousand" (Excerpt 5, Utterance 5) was acquired at some time after the point when the participant in question joined in the study. However, this item of knowledge in all likelihood is encoded and, in any case, displayed without any related information marking the temporal circumstances of its acquisition. Such cases were not coded as implicit MUs because they do not constitute use of a particular past episode.

Therefore, even though identification of implicit MUs is purely inferential, it still can be done without any conceptual confusion. It remains to be shown, however, how MUs, both implicit and explicit, are related to their immediately surrounding communicative context. In the next section, a unit of analysis integrating MUs and related utterances into larger units of discourse is discussed.

COLLECTIVE ACTS OF REMEMBERING

This approach is based on a view of language use as a kind of joint action. This view (H. H. Clark, 1996) distinguishes between two levels of analysis of joint action: the level of the individual participatory actions and the level of coordination between individuals. Based on this view, it is possible to conceptualize the phenomena of communicative remembering examined earlier as a kind of joint action. To do this, it is necessary to define the two levels of analysis. It seems that MUs would constitute individual participatory actions. It therefore remains to define a unit of analysis at the level of the joint action as a whole. MUs are individual productions based on a personally experienced past. They nonetheless are embedded in a dialogical context; they are related to preceding utterances, and their production determines the context within which future utterances are produced (Schiffrin, 1994). For example, an MU might be triggered by a question (see Utterances 9 and 10 in Excerpt 2) or might itself provoke commentary, possibly including other MUs. According to the view of communication as joint action, participants try to establish the mutual belief that both have understood what the speaker meant by a given utterance. Therefore, utterances must be both presented and accepted as understood (H. H. Clark & Schaefer, 1989).

Therefore, a unit of analysis reflecting the level of joint action should incorporate both MUs and these related utterances. In this sense, the construct of a CMP can be defined as a set of thematically homogenous utterances containing and related to at least one MU and comprising more than one turn. Both participants therefore must contribute to a CMP. A minimal contribution would be a simple acknowledgment of an MU with, for instance, a back-channel utterance. More elaborate discussion of MUs constitute implicit acknowledgment. CMPs designate communicative sequences in which MUs are produced by one or more participants and discussed. In other words, they are units of analysis in which MUs exhibit se-

quential and hierarchical interdependence with surrounding utterances (see Figure 3) or in which collaborative activity focuses on reconstructing past events.

CMPs are defined as thematically homogenous units of analysis. The activity of the participants in this study is object related; in other words, it is directed toward the transformation of objects in the simulation. In task-related communication, change of topic can be related to a change in the focus of activity. Therefore, topic change should be a good criterion for unit building. In this study, a predefined catalogue of approximately 40 themes (e.g., police departments, pollution rate, tax rate, etc.) essential to completion of the various tasks was used as a segmenting criterion. Examples of themes from this catalogue related to the task of reducing crime are shown in Figure 1 (lowest-level boxes of the right-hand side tree; e.g., police departments, police funding, parks). These themes are defined on a relatively low level and, thus, reflect a fine-grained focus of analysis corresponding to the requirements of related research (Bangerter et al., 1997). In another research context, such a level of detail might not be necessary. The important thing to recognize is that the level of detail required depends on the analytical objectives pursued. In the following excerpt, the procedure for segmenting CMPs for this study is illustrated.

(6) (Group 1, first discussion cycle, subgroup evaluation session Commission)

1	A2:	well and bridges the tram and the train I couldn't do that	MU
2	C:	mhm mhm	
3		and up there did you do something?	
4		*points to sketch*	
5	A2:	yeah just also. also fixed	MU
6	C:	but not APPs ⌜well power plants	
7	A2:	⌞but no APPs built uhuh	MU
8	C:	and the budget did you raise it?	
9	A2:	yes. yes we raised that	MU
10	C:	yes you did all of that	
11	A2:	there's still too heavily. ⌜too heavily travelled roads	MU
12	C:	⌞yes	
13		I somehow have to think up something there	

In Excerpt 6, Analyst 2 is reporting back to the chairperson on measures undertaken in the preceding execution session. Five successive CMPs can be distinguished. They concern the following themes: railways (Utterances 1 and 2), roads (Utterances 3–5), power plants (Utterances 6–7), transport budget (Utterances 8–10), and roads (Utterances 11–12). These CMPs illustrate some of the different types of interdependence between MUs and surrounding utterances mentioned previously. The first CMP contains one MU (Line 1), which is acknowledged by a back-channel. The MU in the second CMP (Line 5) is an answer to an eliciting

question on the part of the chairperson (Line 3). In the third CMP, the MU (Line 7) is also elicited (Line 6). The fourth CMP consists of an elicitor–MU–acknowledgment sequence. In the last CMP, Analyst 2 spontaneously volunteers information (Line 11) that is acknowledged in midutterance by the chairperson. This information (that heavy traffic is still a problem) leads the chairperson to state that she will have to deal with the problem (Line 13). This closing utterance of the excerpt is not considered as part of the CMP because it is not related to the MU as a continuation of collaborative recollective activity. Instead, it is a future-directed intention elicited by the MU. It is worth noting that although communication in Excerpt 6 is almost entirely directed to reconstructing past events, five different CMPs can be distinguished. This reflects the segmentation criteria defined in the thematic catalogue. Segmentation, therefore, reflects different elements of a detailed, predefined task and goal structure that is assumed to be relevant for the participants as well. The fact that five CMPs can be distinguished reflects the rapid switches of focus of the participants' discussion; rather than discussing each theme in detail, they are establishing a summary of the activities of the previous session (the plausibility of this interpretation is supported by the fact that the excerpt is located 50 s from the beginning of the evaluation session).

CODING MUs AND CMPs

The preceding sections were dedicated to introducing and illustrating an approach for identifying acts of remembering in task-related communication. The approach identifies two different components of acts of remembering: individual (MUs) and collective (CMPs). What remains to be shown is that the approach is useful on a level beyond that of the exemplar. In other words, applicability of the system in coding must be demonstrated. In this section, focus is on describing details and problems involved in this coding process. It becomes evident that the particular nature of implicit reference to the past requires special attention.

Based on the previous concepts and a thematic catalogue, coding rules were developed, and all of the transcripts were coded for MUs (not distinguishing between explicit and implicit MUs) and CMPs. Coders had access to all necessary transcripts for coding (this is necessary to identify implicit reference to the past). A total of 6,801 MUs (18% of which were implicit MUs) and 2,738 CMPs were coded. Interrater agreement of coding (based on double coding of one third of the corpus by two trained coders: myself and an assistant) was checked using Cohen's kappa. Kappa values for MUs varied between .71 and .79 for the different types of session, and kappas for CMPs varied between .60 and .74. According to Fleiss (1981), such values indicate interrater agreement varying from adequate to excellent. Furthermore, these values correspond to levels of interrater agreement typical for task-related communication (Tschan, 1995). It is possible to compare

these results to Dritschel's (1991) assessment of interrater agreement for "autobiographical memory units." Interrater agreement was lower in this case (.76 for MUs on average vs. .89 for autobiographical memory units). However, a corresponding comparison for CMPs cannot be made because no other system exists for coding collective acts of remembering.

How is the comparison on the level of the utterance (i.e., MUs vs. autobiographical memory units) to be interpreted? This approach differs from Dritschel's (1991) in at least three ways: size of the corpus, nature of interaction, and treatment of implicit reference to the past. The size of this corpus can be estimated at approximately 300,000 words, which makes it approximately 15 times as large as Dritschel's. Second, the talk in this corpus is task oriented, whereas in Dritschel's analysis it is informal conversation. Third, Dritschel's method does not address the issue of implicit reference to the past. Taken together, these features lead to the expectation that coding in this case will be more difficult.

As discussed earlier, implicit MUs can only be identified as such on the basis of an inference; making this inference requires access to transcripts of past interaction. Therefore, the inclusion of implicit reference phenomena in this procedure would be expected to lower interrater agreement. To assess whether this is indeed the case, the cases in which coders disagreed on whether to code an utterance as an MU were analyzed. Thirty-five percent of these cases were constituted by implicit MUs. Therefore, implicit reference accounts for approximately one third of all coding problems. Given that the proportion of MUs in the corpus was 18%, coding implicit MUs seems to be somewhat more difficult than coding explicit MUs.

Another possibility is that difficulties of coding implicit MUs also might interact with the size of this corpus; the potential domain of reference (and, thus, the number of other transcripts that needs to be taken into account in coding implicit MUs) is large. This conceivably could complicate coding and, thus, lower interrater agreement. This, however, was not the case. An analysis of references (Cohen's $\kappa = .61$) revealed that over 80% of all CMPs referred exclusively to the immediately preceding session. Thus, references to temporally distant sessions are infrequent in this corpus. This possibly reflects features of the task situation (in particular, the need to transfer information from one session to the next to ensure task resolution). In any case, it indicates that coding disagreements probably are not due to the size of the corpus.

Beyond questions of reliability, the question of the usefulness of this coding system must be addressed. What are the potential applications of such a system? This question must be answered in the context of the increased research interest for memory in everyday life situations and for socially shared cognition and activity (Resnick, Levine, & Teasley, 1991). In these fields of research, the analysis of psychological functions—such as memory or learning in the context of natural, ongoing activity—is a priority. However, such an endeavor requires one to have a system designed precisely to analyze these functions, as they are spontaneously produced in activity contexts not necessarily concerned with memory or

learning per se. This system was designed with this in mind. In the next section, descriptive quantitative analyses of the distribution and internal structure of CMPs are presented to illustrate this.

DISTRIBUTION AND INTERNAL STRUCTURE OF CMPs: MEMORY SUBORDINATED TO ACTION

These descriptive analyses have the purpose of broadly illustrating some features of memory use in the simulation (more detailed analyses of the instrumental relation between memory use and different phases of action regulation have been published elsewhere; Bangerter et al., 1997). Analysis focuses on two dimensions: the distribution of CMPs over different moments of the simulation and how CMPs are coordinated between participants (their internal structure; e.g., their interactional extension or number of MUs they encompass). These two aspects are expected to reveal more about the exact relation between memory and action in the simulation. For example, nonhomogenous distribution of CMPs across different sessions or over discussion cycles would indicate that the participants' activities at certain moments place special requirements on memory. Likewise, analysis of the internal structure of CMPs reveals more about the most frequent discursive contexts of MUs and, therefore, complements the example analyses presented earlier in the excerpts.

Distribution of CMPs

The nine groups exhibited varying counts of CMPs (Group 1: 354, Group 2: 272, Group 3: 336, Group 4: 289, Group 5: 290, Group 6: 289, Group 7: 247, Group 8: 310, and Group 9: 351). To test whether the number of CMPs produced in different discussion cycles (see Figure 2) varied, a repeated-measures analysis of variance (ANOVA) was conducted with discussion cycle as a within-subjects factor (each group was treated as a separate case; discussion cycles can be considered as multiple measures within each group) and the mean number of CMPs produced as the dependent variable. This was done to investigate whether any trends over the 2 days of the simulation phase existed (e.g., a possible reminiscence effect, with more CMPs being produced near the end of the simulation). The ANOVA did not reach significance, $F(3, 24) = 0.29$, $p = .84$. Therefore, production of CMPs remained constant over discussion cycles; in other words, there were no trends over the 2 days of the simulation phase of the study.

Production of CMPs also was analyzed as a function of session type. In Table 1, the mean number of CMPs produced in each type of session (averaged over discussion cycles) is shown. Because these values clearly are dependent on the varying length of the sessions, means are divided by the length of the corresponding session in minutes (and, therefore, correspond to the mean number of CMPs produced per minute). A repeated-measures ANOVA with session type as a within-subjects factor (each discussion cycle was treated as a separate case; the sessions are

TABLE 1
Means and Standard Deviations of Collective Memory Processes Produced Per Minute According to Session Type

Session Type	*M*	*SD*
Planning	0.44	.44
Subgroup discussion city council	2.64	.61
Subgroup discussion commission	2.31	.71
Execution	0.69	.23
Subgroup evaluation city council	2.69	.52
Subgroup evaluation commission	2.64	.82

linked and therefore can be considered as multiple measures within each discussion cycle) was performed with number of CMPs per minute as the dependent variable. It was highly significant, $F(5, 170) = 127.61$, $p < .0001$. Thus, in the subgroup discussion and evaluation sessions, approximately five times more CMPs per minute are produced than in the planning and execution sessions. A factor that might account for this is the position of these sessions in the discussion cycle (see Figure 2). The subgroup discussion and evaluation sessions link the planning and execution sessions. Thus, they are instrumental for the transmission of information within subgroups, whereas in the other sessions, more time is taken up by interacting with the computer system. In the subgroup discussion sessions, plans must be discussed in more detail before they are implemented in the execution session (for examples, see Excerpts 2, 3, and 5). Also, in the subgroup evaluation sessions, the subgroup leaders must be informed of relevant changes in the simulation before the upcoming planning session of the next discussion cycle (for examples, see Excerpts 1 and 6). All of these factors are conducive to a higher rate of CMPs for these sessions.

Internal Structure of CMPs: Length and Number of MUs

The number of utterances in all CMPs was coded; this can be construed as a measure of length (i.e., of interactional resources expended). It was found that 27.6% of all CMPs were composed of two utterances. A further 20.7% were composed of three utterances, 14.2% were composed of four utterances, and 9.5% were composed of five utterances. Thus, 72% of CMPs in the corpus incorporated between two and five utterances. The most frequent lengths (two and three utterances) indicate that most CMPs probably had interactive structures such as MU–acknowledgment or comment, question–answering MU, or question–answering MU–acknowledgment of MU (for examples, see Excerpt 6). In any case, these results show that CMPs are relatively short, which in turn places an upper limit on their complexity.

Furthermore, the number of MUs in each CMP was coded. Because this number is dependent on the total number of utterances in a CMP, these two aspects were analyzed in conjunction. Table 2 shows a cross-tabulation of the number of

TABLE 2
Number of Memory Utterances for Collective
Memory Processes With Two, Three, Four, and Five Utterances

	Number of Memory Utterances				
Number of Utterances	*1*	*2*	*3*	*4*	*5*
2	659	97	—	—	—
3	188	338	40	—	—
4	56	188	127	18	—
5	14	94	105	43	5

MUs for CMPs comprising between two and five utterances. For CMPs with two utterances, in an overwhelming majority of cases, there is one MU. For CMPs with three utterances, in a majority of cases, there are two MUs. For CMPs with four or five utterances, in a majority of cases, there are two or three MUs. These distributions clearly indicate that approximately one utterance out of two in a CMP is a MU. Whether such nonmemory utterances typically are eliciting questions, comments, or acknowledgments remains unclear. However, cases in which all utterances in a CMP are MUs, or in which there is only one MU receiving extended commentary, seem to be atypical. Taken together with the fact that CMPs are mostly rather short, it seems unlikely that the discourse functions of framing, correspondence, and validation identified by Edwards and Middleton (l986) were fulfilled systematically in this corpus. This is a strong indication that, in this corpus, remembering was not an object of contention or even a focus of activity. Rather, memory was used in a subordinate or instrumental role.

DISCUSSION

The objectives of this research were to present a theory-based and reliable system for analyzing spontaneous acts of remembering in natural discourse. Findings are summarized in this last section. Acts of communicative remembering can be conceptualized as joint actions. Joint action can be analyzed on the level of individual participatory actions and as an integrated whole. MUs correspond to individual participatory actions. One may distinguish between two types of MU: explicit and implicit.

Explicit MUs constitute intentional references to past events experienced by the speaker. Explicit MU are about the past. They are identifiable as such on the basis of self-contained information. According to the case in point, this might be a metacommunicative clause referring to the activity of remembering, use of a verb in the past tense, or contextual information (e.g., absence of the state of affairs referred to). Implicit MUs are utterances in which the past is used, effective or "present," even though it is not the object of reference. Implicit MUs are not

about the past; however, effects of the past can be discerned in subtle resemblances in formulation. Implicit MUs are identifiable as such only on the basis of extracontextual information, such as access to transcripts of prior discussion.

On the level of joint action as a whole, CMPs were defined as thematically homogenous sequences containing and related to at least one MU (explicit or implicit) and comprising contributions from more than one speaker. A CMP, therefore, begins with an initial MU or eliciting utterance and ends with the last utterance related to the last thematically identical MU encountered.

The system of identifying acts of remembering in communication presented here has several advantages. First, it is consistently theory based; it is founded on a conceptualization of communicative remembering as a form of language use and, therefore, as a form of cooperative action (H. H. Clark, 1996). Cooperative action can be analyzed on an individual and a group level (Cranach, 1996). This system also reflects these possibilities. In addition, it is not ad hoc; it is congruent with important aspects and phenomena of memory such as involuntary and prospective memory.

The problem of implicit reference to the past is an important feature of this approach. This issue is not treated in other research on conversational remembering. This possibly might reflect the naturalistic orientation of most of these studies (e.g., fieldwork and reanalyses). In such studies, it is not possible to systematically record interaction in a moment-by-moment fashion. In this way, implicit reference to the past often goes unnoticed and cannot be assessed. Even though it seems that implicit reference is rather difficult and time consuming to code on an exhaustive basis, these data show that it can be done reliably. Furthermore, the supplementary effort involved might well be worth it, for the excerpts discussed earlier show that this form of MU plays an important role in action regulation. People who interact on a regular and intensive basis (e.g., in work situations) communicate repeatedly with each other. The content and results of their conversations (e.g., decisions) are not discovered anew each time they meet again; rather, their common past is always used and reused as a resource. Explicit reference to the past constitutes only a part of this use (another example of implicit use of the past related to implicit MUs is the establishment of conventions in referential communication; Brennan & H. H. Clark, 1996). The purpose of this research is to present an analytical framework for studying these different forms of memory use as well as a reliable procedure for applying it.

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