Participation and Community

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Questions 1 and 2 in the invitation from the organizers ask for an assessment of interesting topics in my field and possible applications of them to the design of interactive systems. Since I am not a designer I feel that the best way that I can answer these questions is by describing some current research on Participation, and hopefully allowing those who work in the field of Interactive Design to use this in ways that are most relevant to their work. I do not have actual experience in Interaction Design. However for two years I worked at Xerox's Palo Alto Research Center (Xerox PARC) as part of the Workplace Project organized by Lucy Suchman. While there I had regular contact with many designers. I have great appreciation for their work and for its importance.

Much of my research has focused on participation. To demonstrate concretely what participation consists of, and how it might be investigated, I will here briefly present several examples from some of my research. The events being examined, and analytic frameworks relevant to their analysis, are described in more detail elsewhere (C. Goodwin 1994; 1995b; 1997; 2000; 2003b; 2003c; M.H. Goodwin 2000; C. and M.H. Goodwin 1987; 1996). A book bringing together much of this work, though not the aphasia, has just appeared in Italian (*Il Senso del Vedere*, Meltemi, 2003).

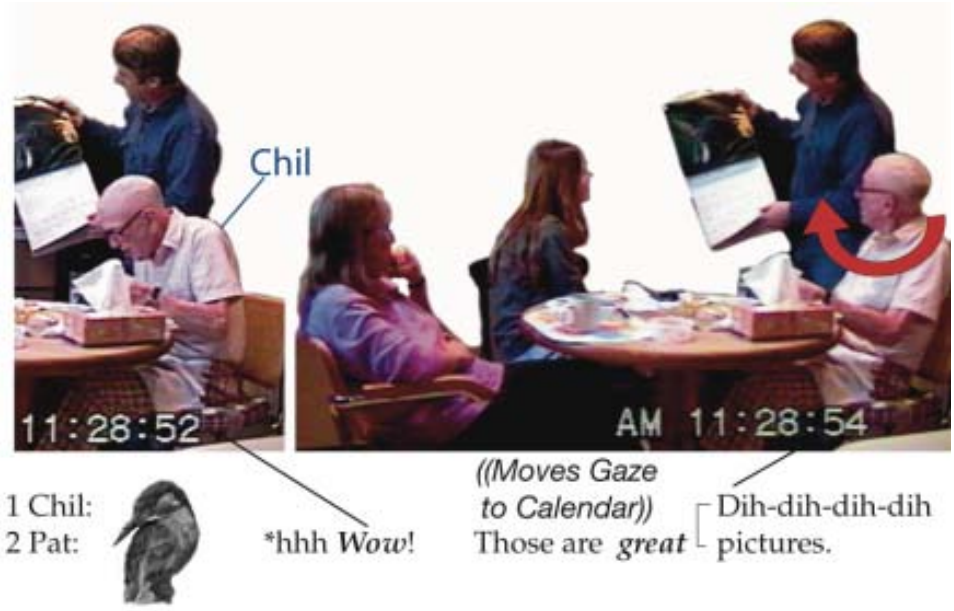
Participation

There exist several different approaches to the study of Participation. A research tradition in fields such as Linguistic Anthropology uses models proposed by Goffman in works such as Footing (1981), as a point of departure for the construction of typologies for different kinds of participants within speech events (e.g., ratified versus unratified participant, hearer, overhearer, etc.). Within such a categorical framework little attention is paid to how parties build action in concert with each other through ongoing analysis of what each other is doing, and how such mutual reflexivity is relevant to the collaborative production of future action. Another approach to participation focuses on how newcomers become competent members of a community through processes such as peripheral participation (Lave and Wenger 1991). While this is certainly relevant to what will be described here, it pays less attention to the detailed, moment-by-moment organization of specific, temporally unfolding activities.

In my own work I investigate Participation as a temporally unfolding process through which separate parties demonstrate to each other their ongoing understanding of the events they are engaged in by building actions that contribute to the further progression of these very same events. Parties participate in specific courses of action while taking into account 1) what each other is doing, 2) the consequences this has for the organization of future action, and 3) frequently relevant structure in the environment. A specific example will help make this more clear (for more detailed analysis of this sequence see Goodwin 2001). In Figure 1 the participants around the

table are admiring a calendar with pictures of bird that one of them as just received. As a new picture is revealed Pat, the woman on the left, assesses or evaluates it by saying "Wow! Those are great pictures" (line 2).

As a result of a blood clot in the left hemisphere of his brain, Chil, the man on the right in Figure 1 has severe aphasia. He is able to speak only three words Yes, No and And. Despite his impoverished linguistic abilities, Chil also assesses the picture, using a string of nonsense syllables ("Dih-dih-dih-dih") to carry an appreciative prosodic contour (line 1). Note however that his assessment occurs much later than Pat's, indeed when her talk has almost reached completion.



It might be argued that Chil's delay is a manifestation of his cognitive deficits, for example that he lacks the ability to respond to relevant events with normal timing. However, when his embodied behavior is examined a quite different picture of what is happening emerges. When Pat begins her ***"Wow"*** Chil is looking down at food he is eating. In order to assess something, to judge it in some fashion, an actor must perceive it. Immediately on hearing Pat's ***"Wow"*** Chil raises his head and moves his gaze to the object being assessed. Only when his has been completed, and Chil is actually looking at calander, does he perform his own assessment. Note also that Chil does not move his gaze toward the source of the sound he is reacting to, Pat, but instead recognizes that the activity in progress is an assessment and immediately moves to the object being assessed. His understanding of, and contributions to, the events in progress are displayed as much through the precise movements of his body, as with his talk.

Chil's use of visible embodied behavior as well as talk to participate in the assessment, the activity that the parties are currently pursing together, both displays his understanding of the events he is engaged in, and contributes to the further shaping of these very same events. If analysis is restricted to Chil's linguistic output he appears to be a severely impoverished actor, indeed almost an idiot who talks in

nonsense syllables. However, focusing on how he **participates** with others in the joint construction of relevant action allows us to recover Chil's cognitive competence, and to demonstrate his ability to engage with precision in speech activities, despite his almost complete inability to speak. Rather than acting as an isolated, self-contained agent, his cognitive abilities are lodged within a community of other actors who participate with him in the construction of the actions and events that make up the lifeworld they inhabit together.

This view of Participation has several consequences. First, study of Participation in this fashion requires analysis of the specific activities that parties are engaged in. The notion of a situated activity system (Goffman1961, C. Goodwin 1996, M.H.Goodwin 1990) is central. Second, rather than being accomplished within a single semiotic modality, such as language, participants build meaning and action by using the resources provided by a larger ecology of sign systems (see also Hutchins 1995), that can include talk, a range of different kinds of sign systems displayed by the visible body (for example gesture, displays of orientation through gaze and posture, multi-party participation frameworks, etc.), and semiotic and other forms of structure in the environment. Within such a framework any individual sign can be partial and incomplete. Chil's nonsense syllables, prosody, and gaze mutually elaborate each other to create a whole that is not visible in any of its constituent parts. Third, the organization of participation within emerging courses of action has consequences for vision and perception as forms of socially organized practice. The temporally unfolding activity that Chil is participating in systematically leads him to gaze at a particular place within the complex visual environment of the room in Figure 1, and to formulate what he sees there in ways that are relevant to the activity. The multi-modal organization of this activity, the way in which it encompasses not only language but also visible displays by the body and orientation to, and formulation of, objects in the environment, allows us to describe with some precision how actors construct relevant events through participation in emerging courses of action.

Participation is central to the organization of talk-in-interaction, and the diverse speech activities that occur within it (stories, arguments, sentence construction and so forth), and this has in fact been one major focus of my research (Goodwin 1981; 1984; 2002). Here however I will focus on instances in which tools and objects are integrated into this process.

Architectures for Perception

Participation in activities can encompass not only talk and different kinds of embodied displays, but also tools, documents, situated writing practices and various kinds of structure in the environment. The practices used by archaeologists to classify color provide one example. In Figure 2 two young archaeologists are faced with the task of systematically describing the color of the dirt they are excavating (1999; 2000).

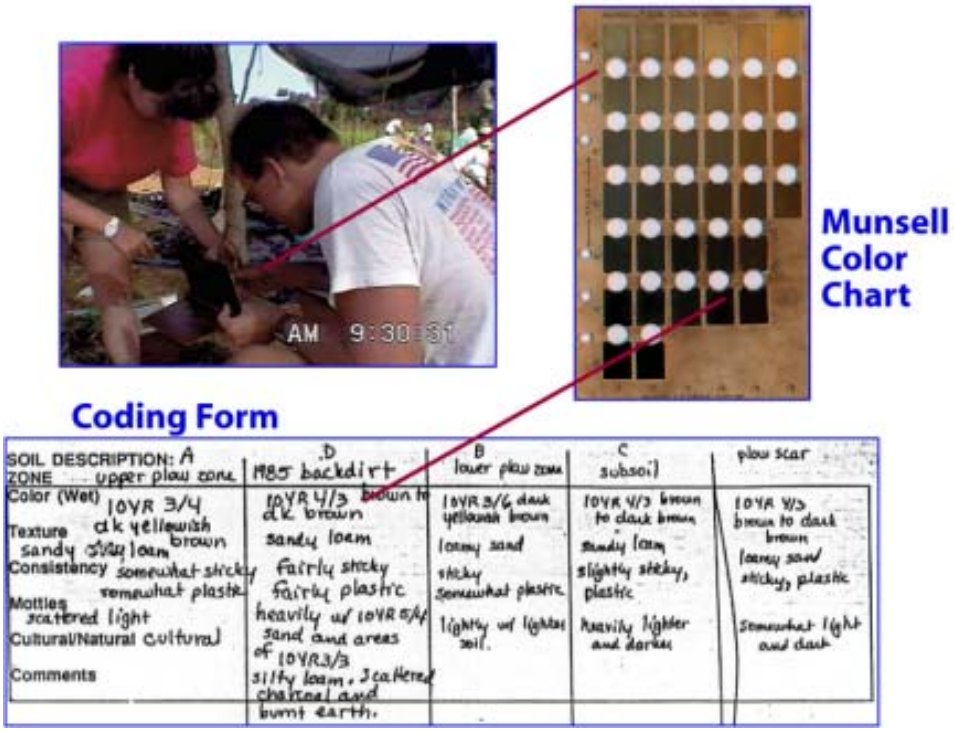


Figure 2
These two archaeologists are engaged in the process of classifying the color of a patch of dirt because they have a form to fill out. The form, which contains a set of categories for coding properties of the dirt being excavated, was constructed months earlier by the senior archaeologist. In the future, away from the excavation and back at the lab, the form will provide a crucial component of the data to be analyzed. The form thus links action across different settings. The use of a coding forms such as this carries with it an array of perceptual and cognitive operations that have far reaching impact. By participating in the activities required to fill out such a form a worker views the world from the perspective it establishes. Of all the possible ways that the earth could be looked at, the perceptual work of the young archaeologists using this form is focused on determining the exact color of a minute sample of dirt. They engage in active cognitive work, but the parameters of that work have been established by the system that is organizing their perception. Coding schemes distributed on forms allow a senior investigator to inscribe his or her perceptual distinctions into the work practices of the technicians who code the data.

To classify particular samples of dirt the archaeologists use a Munsell color chart. The chart, with its systematic array of color samples, incorporates into a portable physical object the result of a long history of scientific investigation into the properties of color. It is used in many different fields faced with the task of accurately classifying color. The version of the chart which the archaeologists bring into the field has been tailored to the distinctive requirements of their work situation. First, the color samples are organized as pages that fit into a small loose leaf book that can be easily carried to the field. Second, since dirt typically contains only a limited range of color, only a subset of the complete chart is used. Third, circular holes are cut next to

each color patch. The archaeologist holds a sample of the dirt being coded on a trowel held under the page. The trowel is moved from hole to hole until the best fit between the color of the dirt on the trowel and an adjacent patch on the chart is found.

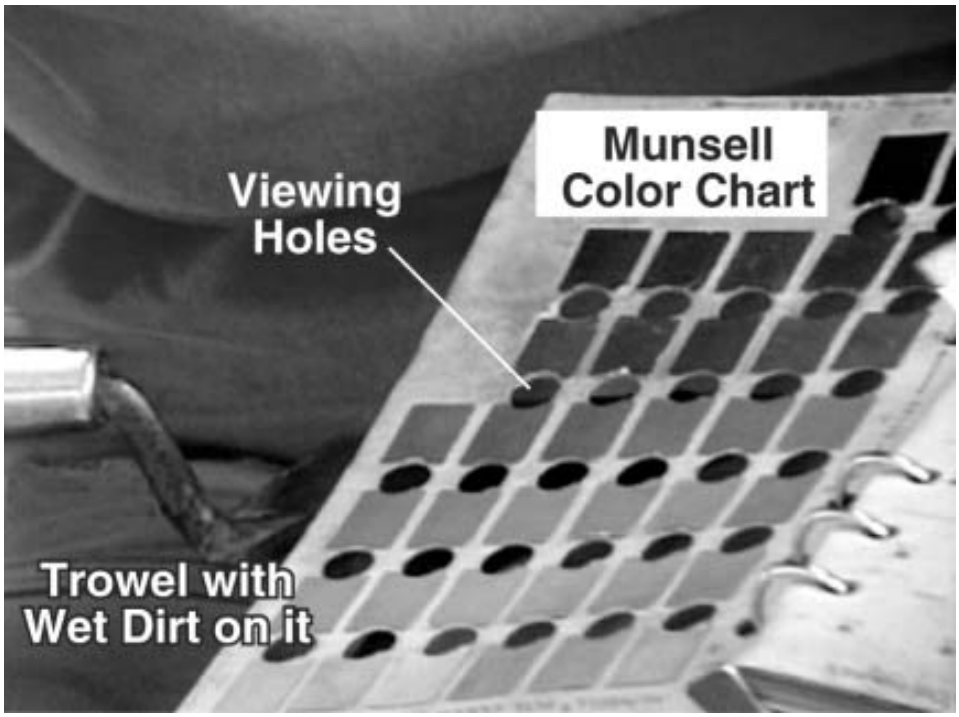


Figure 3
With elegant simplicity the Munsell chart juxtaposes in a single visual field two quite different kinds of space: 1) actual dirt from the excavation at the archaeologists' feet is framed by 2) a theoretical space for the rigorous, replicable classification of color. The latter is both a conceptual space, the product of considerable research into properties of color, and an actual physical space instantiated in the orderly modification of variables arranged in a grid on the Munsell page. The Munsell book encapsulates in a material object theory and solutions developed by earlier workers at other sites faced with the task of color classification. The pages juxtaposing color patches and viewing holes that allow the dirt to be seen right next to the color sample provide an historically structured architecture for perception.

The distinctive structure of the Munsell chart contributes to the organization of participation in the activities in which it is used. It entrains the body of the party using it in specific ways, makes relevant particular embodied practices, and structures perception in fine detail in ways that contribute to the further development of the activity that is the focus of the participants' work. When multiple parties work with the chart together its structure contributes to the organization of their talk and embodied interaction with each other. Figure 4 provides an example.

13 Jeff I'll take it. *((takes trowel))*
14 (2.0)
15 Pam: Down.
16 (1.2)
17 Pam: En this one. *((Points))*
18 (0.4) *((Moves Trowel))*
19 Jeff: nuhhh?
20 (1.8)
21 Pam: °Or that one? (whoops) *((Points))*
22 (0.8)
23 Pam: Fou:r.
24 (0.8)
25 Pam: Is it that?
26 Na:That's- not-
27 ↑What was the ***br***owness of that?
28 Jeff: °mmhh,

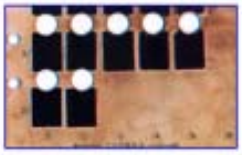


Figure 4
In this sequence the task of color classification is organized within a situated activity system that links a range of apparently disparate phenomena, including talk, the bodies of the participants, the dirt they are examining, and the tools being used to scrutinize that dirt, into a coherent course of action. Using the Munsell chart structures the activity of color classification in a quite specific way. To locate the proper color category the sample is moved from color patch to color patch under the ordered grid provided by the page until the best match is found. Through use of the chart the process of color classification has been reorganized as a spatial task. At line 17 Pam moves her hand to the space above the page and points at a particular color patch while saying "En this one." The use of an indexical expression, "this one" rather than, say, a name to identify a specific color is made possible by the way in which the chart organizes alternative color choices as samples arrayed in space. Within the field of action created by the activity in progress the point is not simply an indexical gesture, but a proposal that the indicated color might be the one they are searching for. It creates a new context in which a reply from Jeff is the expected next action

In line 19 Jeff rejects the proposed color. His move occurs after a noticeable silence in line 18. Dispreferred actions in conversation, such as this rejection, are frequently preceded by gaps (Pomerantz 1984). However when the tape is examined something else seems to be going on. The silence is not an empty space, but a place occupied by its own relevant activity (M.H. Goodwin 1980). Before a competent answer to Pam's proposal in line 17 can be made, the dirt being evaluated has to be placed under the viewing hole next to the color sample she indicated, so that the two can be compared. During line 18 Jeff moves the trowel to this position. Because of the spatial organization of this activity, specific actions have to be performed before a relevant task, a color comparison, can be competently

performed. In brief, in this activity the spatial organization of the tools being worked with, and the sequential organization of talk-in-interaction interact with each other in the production of relevant action (e.g., getting to a place where one make an expected answer requires rearrangement of the visual field being scrutinized so that the judgment being requested can be competently performed).

The practices used by archaeologists to classify color provide one example of how parties construct the events that constitute the distinctive lifeworld of their community, and the settings where consequential work is done within that community, by participating in pertinent activities while attending to each other, relevant tools, and structure in their environment. Within this process work-relevant perception and categorization are organized through specific social practices. This is not accidental. Ways of systematically constituting the objects of knowledge that define a profession's domain of expertise are central to the social organization of the professional vision of that community. Indeed communities develop tools, such as the Munsell chart, to more easily and systematically accomplish repetitive cognitive tasks that they face (Hutchins 1995). The use of such tools has a number of consequences. First, they provide one example of phenomena being attended to within the local interaction that link the current events to other settings in both the past and future. Second, such tools structure in fine detail local embodied practice (e.g., with a coding form a senior archaeologist is able to organize the cognitive and perceptual activity of those who will actually excavate the site), and help shape how parties participate in local sequences of action. The situated practices required to properly use such tools and documents has consequences for how a community sustains itself over time as new members join it. As newcomers build upon solutions their ancestors have embedded in specific tools, such as the Munsell chart, they must become competent in the practices required for the proper use of such tools (Hutchins 1995). The sequence just examined was recorded at a field school for new archaeologists. In brief the practices used by archaeologists to classify color provide one example of how participation is shaped by both the distinctive structure of the tools being used to accomplish a task, and the local organization of talk-in-interaction.

Seeing in Depth

The interplay between artifacts that provide architectures for perception, positioning within situated activity systems, and participation in local sequences of action is again visible in another setting that will now be briefly examined (1995b). In Figure 5 a team of oceanographers is investigating the interaction between river and sea water in the mouth of the Amazon.

Figure 5

The sampling grid, on the left in Figure 5, is a document designed by the oceanographers themselves that has enormous consequences for both the science being done, and the lives of those who inhabit the ship. The points chosen on the grid, where different teams of scientists will sample different properties of the water, shapes what they will be able to report as the outcomes of their study. In so far as it determines where they will sample, it structures their perception of the phenomena they are investigating. The points to be sampled were chosen through an intense political process. Different kinds of scientists wanted to sample at different places (for example close to shore versus out to sea). It was recognized that some of the most interesting data could be found as close to shore as possible. However, the ability to sample there was limited by both properties of the ship (it required sufficient depth to maneuver) and the relationship between the Brazilian and the American governments. Because of the United States' long history of intervention in South America, the Brazilian government was reluctant to let a United States ship loaded with electronic gear have complete access to its shores. The research team included Brazilian scientists. The sampling grid was thus a tool built by the participants themselves through consequential political processes that shaped in very consequential ways their perception of the world they were studying.

The grid had enormous consequences for the lives of those on the ship. It established the basic rhythm of work and sleep. As soon as the ship stopped at each point on the grid teams converged on the ship's quarterdeck to take their samples. As soon as this was done the ship set sail for the next point as teams catalogued the data they had collected. This pace was relentless and many on the ship did not sleep for 36 or 48 hours in a row because of the pace set by the sampling grid. The greater distances between rows of points were seen by those inhabiting the grid as places where rest might be possible, and thus a way of seeing the structure in the grid quite different from that of someone seeing the graphs it made possible later in a journal article.

The ability of scientists to see relevant structure in the water they are investigating, and what precisely they see there, is structured by both the tools they are using, and how they are participating in larger activity systems. In the middle image in Figure 5 two scientists are collecting data at one of the points on the sample grid. The man on the right is a geochemist. To obtain samples of the water under the ship at different depths, he has attached a ring of metal bottles to a probe that is lowered as close to the bottom as possible. As the probe ascends back toward the ship he can send a signal to it that closes

each bottle at the depth he chooses. The woman on the left is a physical oceanographer. For her research she requires measurements of properties of the water such as its temperature and salinity at various depths. To obtain these measurements she has placed instruments attached to a computer in the center of the ring of bottles being used by the geochemist. These instruments send the readings back to the ship as the probe descends, and the computer in front of her produces a graph of structure in the water column. Because some of its most central measurements focus on the **C**onductivity, **T**emperature and **D**epth of water, the probe is called a **CTD**.

The geochemist can and does use the picture of structure in the water column provided by the physical oceanographer's tools to determine where he wants to take his samples. Her tools are thus used to structure his perception in ways that are relevant to the tasks he is engaged in.

The physical oceanographer faces a second task: getting the probe as close to the bottom as possible without actually hitting the bottom and risking getting the probe stuck in the mud. One of her instruments uses the pressure of the water to provide a very accurate measurement of depth. However, since it is only recording pressure, it provides no information whatsoever about how close the probe is to the bottom. To help determine this she uses a different instrument, roughly a form of sonar, which provides a far less accurate measure of depth, but which does produce a complex image showing the relationship between the probe and the bottom. Though the two scientists are standing right next to each other, each is using a different tool to see where the probe is located. The alternative perceptual structuring provided by each tool is adapted in fine detail to the different tasks each actor faces (taking water samples with reference to the structure made visible in the water column, versus locating the probe with reference to the bottom).

There is yet a third actor in this process. Above them, in a work station facing the rear of the ship, a sailor, who communicates with the scientists through an intercom, is actually raising and lowering the probe by adjusting the length of the cable that is attaching it to the ship. He lacks the elaborate visual displays the scientists are working with, and has only a meter indicating how much cable has been used (which is not an accurate measurement of depth because currents can move the probe horizontally).

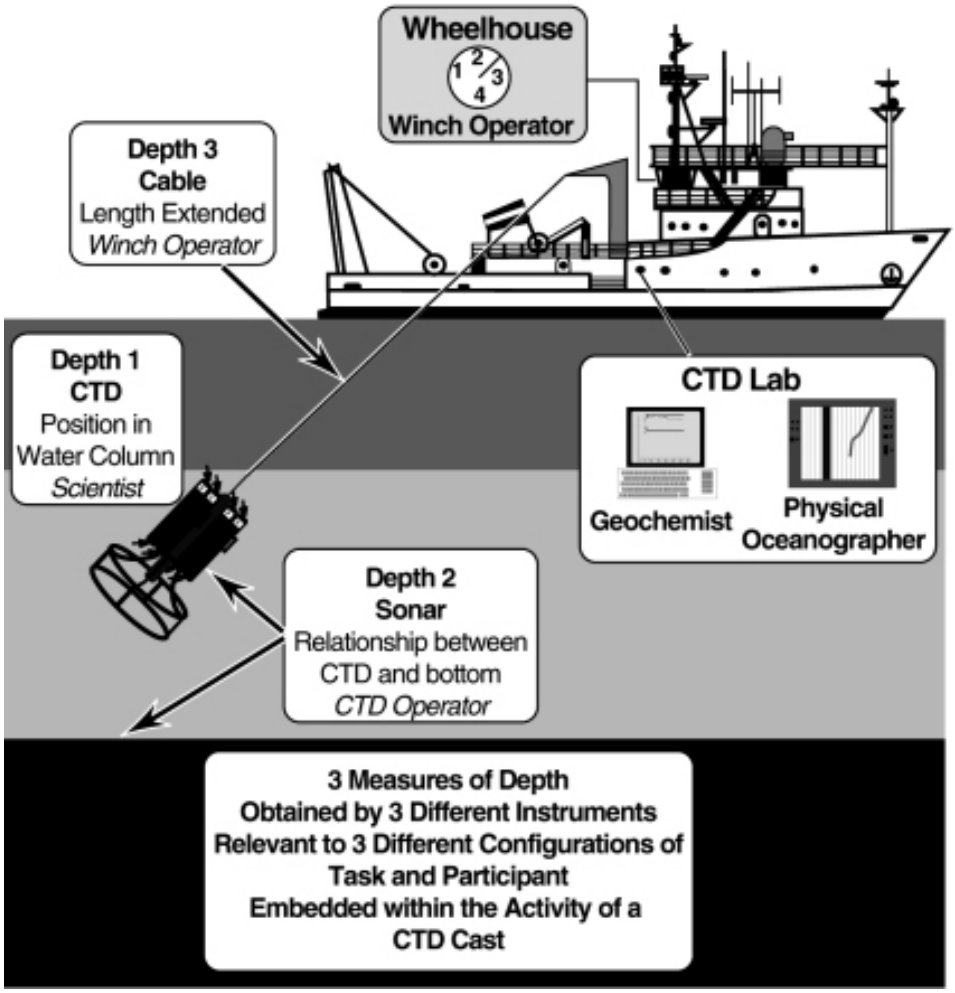


Figure 6
The activity of deploying the probe involves the articulation in real time of multiple views of how the tool being worked with is positioned within its relevant environment. Though three parties are collaborating in the activity of moving the same tool through its environment, each has different perceptual access to that environment, that access being shaped by the tools that each is using, and these tools being selected in terms of the tasks that each is facing. What is involved in this activity is not simply a division of labor, but a division of perception.

Moreover, there is an historical dimension to this process. To do their work here the participants assemble, and integrate into a common course of action, a diverse collection of tools designed in quite different eras (e.g., the meter used by the winch operator has a history that extends back thousands of years, the "sonar" had its origins in the Second World War, and the computer display is contemporary state of the art) for very different tasks.

These parties build action together through the detailed way in which they participate in a common task. Despite the intensity of their collaboration each sees the world they are working in together differently. These differences are structured by the alternative positions that each occupies in the activity, and the tools each uses to

accomplish their specific work. Analysis of their participation in these terms permits description of the community they form as a dynamic process that encompasses differentially positioned participants, situated activities, relevant tools, and orientation toward a consequential environment.

Such participation extends as well to how they analyze each other's bodies and gestures in ways that further the tasks they are engaged in within a changing constellation of different kinds of locally relevant spaces. For specific analysis see Goodwin (1995b).

Finally, the development of new tools for seeing phenomena in a work relevant way can significantly change how participants organize themselves in space, and the structure of their work relevant interaction. One example is provided by the film industry. For the first three quarters of the twentieth century directors had to wait a day until the film had been developed before they could actually see what they had shot. Then small video cameras were mounted on the film cameras so that what the camera was recording could be watched in real time. Some directors now found it advantageous to look at their television monitors rather than directly at the actors. In the following, from a magazine article about the work of cinematographers, Pratt is the Director of Photography and Peterson is the film's director:

> Pratt usually stood beside the cameras and the actors, and Petersen stood or sat in a tent fifteen or twenty feet away, watching the video screens that showed each camera's shots. "This video business is fantastic," Pratt told me one day. "It's altered the way things are done. The director used to stand by the actors and have eye contact. Now some directors just shout from the tent, 'Act better!' (Wilkinson, 2003p. 131).

Aphasia

I will now return to Chil, the man with Aphasia in Figure 1, to look briefly at the practices he uses to communicate (for more detailed analysis of Chil's communicative practices see 1995a; 2003a; 2003d). Chil manages to function as a powerful speaker in conversation by getting others to speak the words that he needs, and also by using structure in his local environment (including relevant objects, the talk of others, and the way in which the spaces that constitute his lifeworld are sedimented with meaning). Timing and sequential positioning are crucial to this process. The practices that he uses may have consequences for the design of tools that could facilitate the communication of people in his position. To oversimplify, much research focuses on the construction of tools that would give someone such as Chil resources for the construction of complex symbolic objects, such as sentences. Of necessity many of these tools are quite complex, and indeed their construction can probe the boundaries of research in fields such computer science. The practices that Chil uses suggest an alternative: the design of rather simple tools that would allow someone with aphasia to invoke structure in the environment in a way that is appropriate to the unfolding organization of the activities he or she is engaged in. Rather than focusing primarily on construction of complex symbolic objects, such tools might place a premium on timing, the ability to rapidly act in concert with others in ways that are appropriate to the moment by moment unfolding of

human interaction, that is to reflexively participate in the construction of the ongoing events.

Before beginning let me note a few caveats. First, I am not designer, and this is being offered simply as data and practices that might stimulate the thinking of others. Second, aphasia, and other forms of brain damage are highly variable. Chil's particular mix of strengths and weaknesses should not be taken as typical for all aphasics.

In Figure 7 Chil is sitting at his kitchen table with his daughter Pat and son Chuck. They have been talking about the births of Pat's two children. Both were born in California, one in San Francisco, and the other in Redding (a city in Northern California). The births occurred approximately twenty years ago when Pat lived in California. Chil and his wife, who live near New York City, went to California for the births. Chil has been using gesture and other resources to get Pat to recall incidents about the births which they are telling Chuck.

Figure 7

In line 2 Pat starts to talk about something that happened in San Francisco. Chil immediately intercepts her talk with one of his three words "No."Pat then changes "San Francisco" to "Redding" (note how the replacement of the first place name with the second is displayed explicitly through the way in which the "I was in X" format is recycled). Because of the injury to his brain Chil is completely incapable of either saying a word such as "Redding" or of constructing the sentence that encompasses that lexical item. However, in a number of significant ways he is the author of what is said in line 5. Thus, if Chil had not intervened Pat would now be talking about something quite different, some event that occurred in San Francisco. Moreover, though the transcript does not fully capture this, as she speaks Pat displays that Chil is the ultimate authority as to the accuracy of what she is saying, as indeed would be the case if she is now trying to provide the correction he signaled was needed with his "No." Thus she raises her head while gazing intently at Chil while

lifting her eyebrows with a facial expression that seems to indicate that she is checking with him. Chil does in fact treat what Pat says as an action that requires his verification by responding to it with a "Yes." In essence Chil has gotten Pat to speak words that he can't, and in so doing to move the conversation in a new direction, one that he has chosen.

What resources enable Chil to function as a consequential speaker in conversation despite his almost complete inability to speak?. First, his limited vocabulary, Yes, No and And, presupposes that he is living and acting in a world already inhabited by others, and structured in fine detail by their semiotic activities. Thus Yes and No are second pair parts, terms designed not to stand alone, but instead to function as next moves to actions produced by others. They thus have a strong indexical component in that recipients use the semiotic structure of the talk being responded to as a point of departure for understanding an action such as "No" by Chil. With his "No" here Chil is not objecting to life in general, or any of the millions of things in the world that could be opposed, but instead to something that the prior speaker just said, the most salient possibility being the place name that she just produced. Pat can reasonably infer that Chil is asking her for a different place name. These possibilities are further constrained by the local history of the discourse in progress where Pat has been talking about two births that occurred in two different cities. She can and does succeed by producing the other city (Redding instead of San Francisco) in response to Chil's objection. The locative character of the solution Chil wants is further suggested by the pointing gesture that co-occurs with his "No." Indeed he is actually pointing in the direction (West) that is at issue. Note also how his actions presuppose a cognitively complex co-participant, one who is not simply decoding what he says, but using that talk as the point of departure for structured inferences. One pervasive model of a speaker's competence focuses on mental processes within an isolated individual. Here Chil functions as a consequential speaker through his ability to participate in public, socially organized language practices.

Much research into the design of tools that could help someone such as Chil communicate focus on tools that would enable a speaker to produce complex symbolic structures, such as sentences. The computer program through which the physicist Stephen Hawking (whose speech problems result from something other than aphasia) is able to talk is one example. Such tools, and the research that makes them possible, are important and can help many people who have difficulty producing speech. In essence such research tries to recreate the complex symbolic processes or the prototypical competent speaker. By way of contrast Chil can use very simple tools, a word consisting of only a single syllable, to say something novel and complex. He does thus by tying to and invoking relevant structure in his environment. He is not an isolated monological speaker, but instead an actor operating within a world inhabited by others and structured in fine and relevant detail by their activities.

This may have the following relevance to the design of tools for someone such as Chil. Instead of trying to produce complex symbols, and treating an actor such as a Chil as an entity required to produce

sentences from scratch in isolation, it might be possible to design simple tools that could rapidly and reflexively intervene in unfolding courses of action by tying to semiotic structure produced by others. Something like a simple buzzer, though with a more pleasing sound, comes to mind, perhaps one that could include relevant intonation contours (though not described here Chil's use of intonation for both action and the display of emotion is crucially important -- see Goodwin, Goodwin and Olsher 2002).

Looking at this from a slightly different perspective, some aphasic speakers are able to haltingly and slowly construct far more vocabulary items than Chil. Though their aphasia is considered less severe, the onward movement of the conversation in progress can be severely delayed, as the construction of each word becomes a task in its own right. This situation can become difficult for interlocutors. By way of contrast, what would be preserved by a simple tool that tied to structure in the ongoing talk of others, and what was preserved in Chil's way of participating in the talk of others, was the rapid, reflexive timing of typical interaction. It has been suggested that the very severity of Chil's aphasia paradoxically helped him function as an engaging and effective conversational partner, by eliminating futile efforts to produce relevant vocabulary.

I raise the possibility of trying to design very simple tools that invoke structure in their environment in part because of a conversation I had with a new Ph.D. in computer science at a conference recently. I was interested in talking with her because she had just given a paper on aphasic speech. I suggested that she look at the actual interaction of people with aphasia, but she said that for her research it was adequate to focus on transcripts of the talk they produced. Consider what transcripts of Chil's talk, in isolation from that of his interlocutors, would look like. I also suggested that very simple tools might be extremely powerful. She told me that she could never get tenure unless she designed complex computer programs. Moreover, it helped her lab, and her standing at her new university, to require expensive equipment for her research.

In brief, despite his catastrophically limited ability to produce language, Chil is able to function as a powerful speaker in conversation. This is possible because he does not act as an isolated speaker (the prototypical locus for the study of language in contemporary formal linguistics), but instead constructs meaning and action by participating in talk-in-interaction with others.

Conclusion

By participating together in courses of action separate parties both display their understanding of the events they are engaged in, and build meaning and action in concert with each other. Through this process a community is constituted in a number of different ways. The situation of Chil, the man with aphasia, provides a particularly clear example. Not only his social, but also his cognitive life depends upon the way in which talk is embedded within the activities of a small local community, those who are interacting with him. He is able to build consequential meaning and action only by participating in courses of action with others. That participation has a moral dimension. Despite his impairment those who share Chil's lifeworld with him treat him as

a cognitively alert human being, someone who can understand others, and who has intelligent, relevant things of his own to say. Indeed they invest considerable effort to figure out just what he wants to tell them. This situation could be much different. It would be quite possible for others to assume that someone who can barely speak is an idiot and exclude him from participation in those discourse practices that constitute him as full fledged human being. In most central ways the community that encompasses Chil is brought into being and structured through the ways in which members of that community participate in relevant courses of action together.

Participation is lodged within specific activities. This has a number of consequences. First, these activities constitute crucial aspects of the cognitive, social and cultural life of a particular group. By participating in such activities actors become competent members of the group, and also acquire the distinctive ways of seeing, the professional vision, the stance toward a consequential environment that both defines membership in a group, such as a profession, and differentiates it from other groups. Second, the forms of participation through which parties build courses of action together can include not only the talk and bodies of other actors, but also relevant tools and other forms of structure in their environment. Mastery of the practices required to use such tools to get relevant work done is crucial to the organization of competent membership in the group. Documents and tools open possibilities for the analysis of both how local interactions are systematically linked to others, and how current participants build on the work of their predecessors by using the tools they have designed to accomplish relevant tasks. Indeed some tools function as historically shaped architectures for work-relevant perception. The different tools on the oceanographic ship both make possible particular ways of viewing the environment that is the focus of attention, and help organize and situate actors with reference to each other. As illustrated by the viewing holes on the Munsell chart the specific ways in which a tool is designed structures embodied participation and work-relevant vision in the tasks where it will be used. Participation in activities thus provides crucial structure for the social and cognitive organization of a community and shapes its members in distinctive ways.

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