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Gesture and Collaborative Planning
A Case Study of a Student Writing Group

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When writers plan a document together, they rely on gestures as well as speech and writing in constructing a common representation of their group document. This case study of a student technical writing group explores how group members used gestures to create a conversational interaction space that they then treated like a physical text that they manipulated, wrote on, and pointed at. These gestures suggested a group pretext that helped group members translate abstract goals into concrete plans. However, the close proximity of gesture to the physical act of writing may mislead students into thinking that the tricky work of translating abstract ideas into final written form had already been completed. Gestures and adaptor movements (such as fidgeting with a pen) also seemed to conspire to help individuals control the conversational space and call attention to themselves as writers. Implications for future research on gesture and collaborative writing, gender, and writing technologies are discussed.

Keywords: gesture; collaborative writing; teamwork; gender; pretext

When people talk, they make spontaneous movements with their hands and bodies that we call gestures. Gestures and speech often (but not always) have identical meanings, but these meanings are expressed in different ways. Gestures also may express images and concepts that cannot be articulated in speech and have been found to have a direct and profound effect on listener comprehension (Driskell & Radtke, 2005).

Author’s Note: Support from the National Science Foundation program for gender equity is gratefully acknowledged (#HRD-0225186). A special debt is owed to my research assistant Kara Alexander, who provided a major contribution to coding this data. Ryan Wolfe created the illustrations for this article. My gratitude also goes out to Davida Charney, who commented on an early version of this article, as well as to the editor and anonymous reviewers of Written Communication.
This effect may be pronounced when the conversation focuses on a material activity, such as home repair (Furuyama, 2000; LeBaron & Streeck, 2000). Gestures appear to play an important role in learning and have been found to both precede and support the ability to represent information in spoken and written forms (Roth, 2002).

Despite the rich information that gestures contain, this information is not easily transformed into written text. Whereas speech can be translated word for word into written form, gestures are often abstract and physical representations of language. This point has most notably been made by Beverly Sauer (1998, 1999) in her research on miners. Sauer shows how miners use gesture to represent embodied sensory information located outside written and spoken texts. Such nontextual information is not easily incorporated into formal written procedures—with the consequences that formal safety documents often fail to assist miners in making decisions in their complex, material environments.

Yet, although gestures are difficult to translate into writing, Haas and Witte (2001) have astutely noted how the physical form of gestures resembles the physical act of writing. Similar to writing, gestures employ hands, arms, and bodies. In their analysis of a group revising an engineering specifications document, Haas and Witte show how the gestures made by the various participants help the group arrive at a revised understanding of the specifications document under discussion. These gestures, Haas and Witte propose, may serve as trial locutions or “pretexts” (Witte, 1987) of the group document.

The physical proximity of gesture to writing suggests that gestures—particularly those gestures that involve writing tools such as pens and papers—may provide rich data for investigating collaborative writing groups. For instance, speakers I observed occasionally gestured with a pen to pantomime “writing” in the air or used hand gestures to embody sections of their yet-to-be-written text. Through examining such gestures, we might enrich our understanding of how groups partition labor, integrate multiple points of view, reach consensus, and negotiate shared authorship of the group document.

In trying to understand how gestures involving writing tools might come to shape a group’s understanding of a document, it is useful to review research on how writers working in solitaire physically manipulate the paper documents and writing tools involved in their tasks. Writers working from multiple sources point at documents with pens and pencils and mouse cursors to maintain their place, draw connections across multiple sources, and signal their
engagement with texts. They shuffle and reorganize documents and reorient their bodies vis-à-vis texts to gain fresh perspectives, reflect task representations in their heads, and help organize material for composition. Writers often jot down annotations and notes on paper documents other than their primary text—even when they are writing on the computer (Haas, 1996; O’Hara, Taylor, Newman, & Sellen, 2002). These tactile manipulations of documents increase during periods of intense planning or when writers shift from one writing activity to another (Haas, 1996) and are thought to facilitate the complex task of integrating text written on the page, information in source documents, and mental knowledge and task representations (O’Hara et al., 2002).

When writers work collaboratively, the number of texts they must juggle increases dramatically. Writers now have to contend with multiple versions and competing representations of the text yet to be composed. Thus, the physical manipulations of source documents, bodies, and tools that we see in writers working alone might be expected to increase when writers work together. Such manipulations not only help collaborative writers deal with the large number of texts they must negotiate but also allow individuals to signal engagement, focus of attention, viewpoint, and shifts in activity to others. Previous research, for instance, has helped establish how important pointing at documents can be to helping groups establish a shared locus of attention (Cohen, Cash, Muller, & Culberson, 1999; Haas & Witte, 2001). It seems reasonable to infer that other nonverbal interactions involving paper, writing tools, or bodies of group members also serve communicative functions.

Thus, the tactile manipulation of documents and tools that solitary writers unconsciously make when planning documents may take on communicative import when writers work together. Even if unintentional, actions such as the nervous twiddling of a pen can communicate engagement in the authorial task or preparation to write. Researchers typically lump such manipulations of objects into a general category called adaptor movements (so labeled because these movements help the individual adapt to the conversational setting; Ekman & Friesen, 1969) and exclude them from most analyses of gestures. However, one premise of the current study is that the proximity of such adaptor movements to the physical actions involved in composing makes them an important focus of study.

The close resemblance of gesture to writing can potentially complicate notions of authorship because certain gestures may give the
appearance of writing without the linguistic constraints involved in translating abstract ideas into written prose. We may thus find that gestures help group members project themselves as authors of the group text. If we consider that gesture production is not neutral terrain but is subject to many of the same power mechanisms that regulate spoken discourse, we might find that gestures become a mechanism through which collaborators exert control or ownership over a group document. Given that the information encoded in gestures is often better recollected than that encoded in speech (McNeill, 1992), gestures may play a powerful role in shaping group conceptions of authorship and authority.

In fact, an analysis of gesture may help explain some of the gender dynamics that occur in collaborative writing settings. Previous research has noted that women’s written contributions to technical writing projects are often overlooked or minimized, whereas men are occasionally accorded credit for work they did not do (Morgan, 1994; Wolfe & Alexander, 2005). Perhaps gender differences in gesture production might contribute to such dynamics? A meta-analysis of research on gender and nonverbal communication suggests that men make a larger number of expansive movements and more manipulations of objects than do women (Hall, 1984). The current study hopes to build on this research by hypothesizing about the ways different types of gestures made by men and women might interact with other gendered dynamics in writing groups.

The following microanalysis of a collaborative writing group will certainly not answer all of these questions, but I do hope it will provide some provocative hypotheses that can help shape future research on collaborative writing. The group I analyze here was selected because private, final interviews with team members revealed a mismatch between students’ recollections of what their teammates contributed to the project and the actual writing those teammates produced. My focus on this team was an attempt to discover factors that might have contributed to this mismatch. Although I do not have sufficient data to argue for a causal relationship between gestures and perceptions of authorship, the microanalysis below does address the following research questions about gesture and collaborative writing:

- How do members of a collaborative writing group use gestures—particularly those gesture involving writing tools and artifacts—when planning a group document? What sorts of work do gestures do in this
situation? How might they contribute to or detract from attempts to create a shared sense of the document?

- How might gestures and manipulations of writing tools and artifacts contribute to perceived involvement and control of the collaborative document?

BACKGROUND AND METHODS

Participants

Keith, Mark, and Natalie were European American students in the 26 to 30 age range enrolled in a technical writing class in the spring 2003 semester. All three students were biology majors nearing the end of their college studies.

The Class and Assignment

The class was a 300-level introductory scientific and technical writing class taught in a computer-assisted classroom at an urban university. The instructor was a female graduate student in her early 30s with previous experience teaching technical writing. The instructor provided little in the way of formal structure or support for the group collaborations but did move around the room asking and answering questions as the groups met.

The assignment discussed here was a semester-long collaborative proposal that required a five-page review of research related to the group’s topic, a survey of the proposal audience, a five-to-seven page written proposal that needed to include technical graphics, and a final oral presentation to the class. Students were allowed to choose their own groups and topics. This group of biology students worked together to propose that the Biology Department prepare informational pamphlets and materials to assist graduating students with medical school applications.

Data Sources

In addition to the 16-min, 40-s conversation described in detail below, a research assistant or myself observed and recorded all meetings of this group, received copies of all e-mails exchanged, collected copies of all paper drafts, collected biweekly process diaries from all
team members, and conducted private interviews with team members at the end of the semester. In the private interviews, we asked students to describe the contributions of each of the team members, rank their teammates by their writing and computing abilities, and reflect on specific incidents that had occurred over the course of the project. An interview also was conducted with the instructor after grades had been turned in to obtain her assessments of the project and the individual students’ abilities. Similar data was collected from five other teams the same semester as part of a large project funded by the National Science Foundation (NSF) on gender and teamwork (NSF #HRD-0225186; University of Louisville Human Subjects Protection #582-02).

The Conversation

The analysis here focuses on a 16-min, 40-s segment of videotaped conversation collected early in the project when the team was planning their initial proposal. This was the third group meeting, the first two having been spent brainstorming for a topic and negotiating the group composition (the group originally had six members but then broke into two smaller groups of three each). In this segment, the group is planning what will go in their final document, who will be responsible for which sections, and how they will present their project to the class in the final oral presentations.

This segment was originally chosen because all three team members took notes on this day, an unusual situation for this group in which Natalie had been designated the official team note-taker. In his final interview, Keith claimed that note-taking was not important to the project and that he normally did not take notes. Mark and Natalie similarly both characterized note-taking as a “secretarial” task in their final interviews, although both regularly took notes during meetings. Given that Keith seemed to perceive note-taking as a low-prestige activity that should be delegated to others, I was particularly intrigued by differences the analysis might reveal between his physical performance of note-taking and that of his teammates.

The conversation begins with the group discussing the research they will need to complete for the proposal and who will complete these tasks. Concurrent with this discussion, the group also plans the various sections the final proposal will include, the format of the written document, and the format of the final oral presentation. Approximately 7 min into the conversation, the instructor joins the group for 2
min to answer questions about the assignment requirements. After the instructor leaves, the group discusses graphics that they might include in their final PowerPoint presentation. At approximately 10-½ min, the group switches from discussing the overall structure of the proposal to discussing one component of the project: a survey that they would give to undergraduates and faculty in the Biology Department asking questions about the relative importance of various components of the medical school application. At this point, Keith asks Mark to e-mail him a copy of the survey questions that the two had generated during a previous meeting that Natalie had missed. Keith stops taking notes as Mark reads off the survey questions and Natalie writes them down. The group goes on to generate additional questions.

Even though Keith asked Mark to e-mail him a copy of the survey questions, this did not happen. None of the group members appeared to share their notes with one another after this conversation. Natalie, however, did e-mail the group after she distributed her survey, listing the questions and the results she had compiled.

**Data Analysis**

This initial analysis roughly followed some of Strauss and Corbin’s (1998) grounded theory techniques for the open coding of data to discover emergent theories or hypotheses. In grounded theory analysis, the researcher begins by defining categories and properties, or dimensions, of those categories. Constant comparison is used to define these categories and properties and to relate diverse elements to one another.

Data analysis began with both a research assistant and I examining the videotaped interactions of five different student collaborative writing groups working at various stages of their group projects. Categories that emerged during this initial open coding of data included writing in the air, embodying sections or parts of documents, creating a barrier with a notepad or body part, pointing, clicking pens on and off, nodding, and fidgeting. Properties that emerged during this initial coding included the physical materials (e.g., pen, paper) and body parts (head, hand, finger) involved in the gesture, the amount of space taken up by the gesture, who or what the gesture was directed toward, who was speaking when the gesture occurred, the number of repetitions, and whether the gesture made noise. These categories and properties were then further dimensionalized by the amount of semantic information communicated (e.g., resting a chin in one’s
palm communicates low semantic information, whereas using a pen to “draw” several lines in the air to represent sections of documents contains high semantic information), the degree to which the movement suggested authorship, the amount of authority suggested by the gesture, and the extent to which the movement appeared to call attention to the person making the gesture.

The 16-min, 40-s conversation described above was then microanalyzed using a combination of qualitative and quantitative techniques. The qualitative analysis continued using grounded theory techniques to constantly compare, analyze, and refine categories, properties, and dimensions until the primary conceptual category of the conversational interaction space as group document was reached. Although the development of this category was aided by previous research describing how speakers use gestures to create a shared interaction space that helps establish common conceptual points of reference (McNeill, 1992; Sauer, 1999), the observation that this space was often treated like the physical documents at the group’s disposal is unique to this qualitative analysis. This conceptual category is further unpacked and developed in part two of the analysis.

To understand further how gestures helped shape this group’s conception of their shared document and the writing situation, my assistant and I then coded the conversation to record every gesture and adaptor movement (examples include twiddling a pen, adjusting a notepad, scratching a leg) made by group members. Although most research on gesture excludes adaptor movements because they are not directly related to the spoken text, adaptor movements are included here because they seemed to suggest authorship and facilitate control over the conversational text. Even movements such as scratching a leg or moving a soda can shape a conversation because such actions draw the gaze and attention of other group members.

The start and end time of each gesture and adaptor movement was recorded, discursively described, and then coded according to the properties discussed above (e.g., physical materials involved, who was speaking, whether the movement made noise, etc.). A series of short, repetitive movements was recorded as a single gesture or adaptor if no rest occurred between the movements—for instance, four consecutive nods of the head would be coded as a single gesture. Such consolidation was necessary to avoid the daunting task of trying to distinguish individual movements that could be as short as a tenth of a second. To compensate for this consolidation, the total duration of movements (in nearest number of seconds) is reported throughout.
These movements were then grouped into four main categories of conversational gestures and four categories of adaptor movements. The categories of conversational gestures correspond to those categories used in other published research on gesture (cf. McNeill, 1992; Krauss, Chen, & Chawla, 1996), whereas the four categories of adaptor manipulator movements (which are generally not reported in research on gesture) are generated from the researcher’s own analysis of this conversation. Table 1 describes these categories in detail. An independent rater was enlisted to code 30% of these gestures, $k = .69$, using Cohen’s simple kappa, a level suggesting substantial agreement above chance (Fleiss, 1981).

In addition, separate analyses were conducted to record writing-oriented activities (writing, handling paper, manipulating computer). Writing-oriented activities are task-specific movements that have a clear end goal. They are distinguished from conversational gestures and adaptor movements by their extended duration and focus on the activity itself. This intense focus on the activity can effectively remove the individual from the conversation.

Readers should be warned that several idiosyncrasies due to the naturalistic setting in which the data was collected affect the accuracy of this analysis. Participants were recorded using a single video camera in a crowded classroom, and they occasionally moved their chairs out of the video frame or turned their backs so that their actions were not visible. This was particularly true of Mark and Natalie, both of whom sat on the peripheries of the video frame and at various points completely turned away from the camera to look for papers or use the computer. Moreover, the participants all held notebooks and sat in positions that concealed smaller movements. Thus, although quantitative analyses are reported, these numbers should be viewed as representative of general trends, and not an absolute account of all movements in this conversation.

**ANALYSIS**

The analysis is divided into three parts. Part I provides an overview of the types of gestures, activities, and other movements participants performed. Part II uses the categories derived during open coding of this conversation to illustrate how the group interaction space was treated much like a tangible document that group members wrote on, pointed at, and moved in space. Part III focuses on how
Table 1
Descriptions of Gestures, Adaptor Movements, and Writing-Oriented Activities

<table>
<thead>
<tr>
<th>Conversational gestures</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Iconic</td>
<td>Gesture is a metaphor or image to suggest a concept, idea, action that the speaker is trying to convey. Examples include spreading hands apart to show “separation,” drawing with the pen on the air to suggest the act of writing, or making a series of hand movements to suggest sections of a document.</td>
</tr>
<tr>
<td>Deictic (pointing)</td>
<td>Uses finger, hand, pen, paper to point at another person or document. Speakers can also point at the conversation space when referring to abstract concepts.</td>
</tr>
<tr>
<td>Beats</td>
<td>A short flick of the hand or fingers up and down, so named because they look like beating in musical time. Of all gestures, beats are the most insignificant looking, but they reveal the speaker’s conception of the structure of the narration (McNeill, 1992).</td>
</tr>
<tr>
<td>Symbolic body</td>
<td>Body movements that do not involve hands but nonetheless have clear communicative significance. Examples include shrugging shoulders and nodding.</td>
</tr>
</tbody>
</table>

| Adaptor/manipulator movements               |  |
| Fidgeting with pen                          | Apparently absentminded movements of pen that do not support the conversational text. Includes tapping pen against a notepad, clicking pen on or off, flipping pen around in hand, twiddling pen in the air. When an adaptor movement included both pen and another object or body part, it was coded as fidgeting with a pen. |
| Fidgeting with paper                         | Apparently absentminded movements of paper that do not support the conversational text. Includes tapping notepad against knee, flicking paper, visibly adjusting hands on notepad. |
| Touching self                               | Adjustments of the body that may help individual adapt to the environment but do not support the conversational text. Includes scratching, rubbing face, touching hair. |
| Manipulating food or drink                   | Eating, drinking, handing food to others. In this conversation, Keith was the only participant to bring food or drink. |

| Writing-oriented activities                 |  |
| Writing                                     | Composing written text. Distinguished from fidgeting with pen by duration of activity and fixation of gaze on written text. In this conversation, all writing occurred with pen and paper. |
| Interacting with paper                      | Purposefully searching through papers, handing paper to another group member, moving finger along written text. Distinguished from fidgeting by duration of activity and fixation of gaze on paper being handled. |
| Interacting with computer                   | Touching computer mouse while gaze focused on computer screen. |
gestures, adaptors, and writing events may have facilitated individual speakers in controlling the group interaction space.

I. Overview

Table 2 provides an overview of the gestures, adaptor movements, and writing-oriented activities made by group members. A detailed description of these gesture categories can be reviewed in Table 1. Of the 135 conversational gestures made, more than 60% were either deictic or iconic. Approximately three-fourths of these deictic and iconic gestures were made by Keith. Part II of this analysis will suggest how these gestures may have contributed to perceptions of authorship.

Adaptor movements also were prevalent throughout this conversation and actually outnumbered conversational gestures in the
The sheer quantity of adaptor movements observed here suggests that such movements may be important to analyze. In this conversation, Keith made an exceptional number of adaptor movements, accounting for nearly three-quarters of all adaptors. Part III of this analysis section focuses on how some of these adaptor movements may have facilitated group members in gaining control of the conversational text.

The bottom section of Table 2 shows that although students made only 93 writing-oriented activities, the amount of time spent with such activities exceeded that spent making other movements. Writing-oriented activities often removed individuals from the conversation because their attention was focused on a specific task. Natalie and Mark spent far more time engaged in such writing-oriented work than did Keith, the implications of which will be discussed further in Part III of this analysis.

II. The Conversational Interaction Space as a Group Document

When speakers converse, their gestures shape a physical interaction space between them. Speakers use this interaction space to negotiate multiple viewpoints and draw relationships between both abstract and concrete ideas (McNeill, 1992; Sauer, 1999). The writers here used the conversational interaction space much as they did the physical documents at their disposal: They pointed to the interaction space to show how individual sections would be integrated in the final document, used gestures to physically signal their “place” in the conversation, mimed moving the interaction space as if it were a physical document, and most notably, “wrote” on this space. These tactile manipulations of the conversational interaction space closely resemble the ways that solitary writers physically manipulate documents and tools at their disposal (Haas, 1996; O’Hara et al., 2002). Thus, the group’s conversational interaction space became, in effect, yet another text that these student writers used to negotiate and integrate their individual visions of the group document.

Writing on the group interaction space. The concept of a conversational interaction space acting as a physical document is perhaps most strongly illustrated by the phenomenon of writing on the interaction space. This phenomenon took two forms. In the first, speakers mimed the physical act of writing by using their pens to write in the air, thereby treating the group interaction space as if it were literally a
paper document the speaker was composing on. In the second form, speakers actually embodied the text itself through their gestures.

The writing in the air gesture is illustrated in Transcript 1. As Keith describes how the demo section of the final report will recommend certain sources, he turns his body, lifts his pen in the air, and draws a squiggle in the space between him and Natalie. Figure 1 shows Keith’s body orientation as he makes this gesture. His pen is extended and held between thumb and index finger just as it would be if he were actually writing on the space between him and Natalie. Visually, this gesture resembles how a writer working alone might jot down a note or annotation to himself. This act of writing in the air treats the group interaction space as a literal document on which group members compose.

Keith wrote in the air three times during the 16-min, 40-s conversation (neither of the other group members made this type of gesture). On two of these occasions, the gesture was used to help Keith describe and/or visualize a section of the group document that had yet to be written (see Transcript 1). The third act of writing in the air took place at 7 min, 33 s as Keith was trying to clarify assignment requirements with the instructor, asking, “It’s not like a [1-s pause]...Do you have a format for that?” During the 1-s pause, Keith moves his pen as if he were physically writing on the interaction space between himself and the instructor. The gesture suggests that Keith is familiar with writing similar reports—even if he cannot recall the appropriate terminology to describe them.

Transcript 1
Writing on the Conversational Interaction Space

Keith  (0:08) That will give us the archival. You know, what’s out there right now. So we can talk about if there’s anything in agreement [Writing while speaking] We can recommend certain sources [Stops writing and scratches leg] in the demo section [Orients body toward Natalie. Raises pen to just below shoulder level and draws a squiggle in the air (see Figure 1).]

Natalie  (0:12) nodding

Keith  (0:13) [Brings pen back down to notebook] saying you should check out such and such book [Brings both hands together 10 in. above the center of notepad then makes two horizontal motions, the second 5 in. below the first] because it’s really good [Puts both hands on pen and clicks it off and turns head to read his notepad.]

NOTE: See the appendix for transcription conventions.
Speakers also used gesture to mime the act of delivering their final presentation. Transcript 2 illustrates this phenomenon. At the beginning of this transcript, Keith illustrates the act of clicking through PowerPoint slides as he makes his hand into a fist and moves his thumb up and down while repeating “click, click, click.” A few seconds later, Mark makes the same gesture when explaining how easy it is to click up a slide and read it off the screen. By representing the final presentation as a series of mechanical “clicks,” this gesture reduces anxiety and reassures group members that the presentation is nothing to worry about. Moreover, the clicking gesture presupposes that the presentation has already been written. This jump forward to a point after the slides have already been completed seems to minimize the amount of work yet before the group.

**Embodying the group document.** The second way in which group members wrote on the group interaction space occurred when speakers used gestures to embody their group document. This type of gesture was more conceptual than writing in the air and generally did not include the pen as part of the gesture. Speakers most often embodied the group document to demonstrate organizational concepts, using their hands to represent different sections of the document or different items on the page. The relationship of one hand position to the next resembles the spatial relationship of information on a page. For
instance, when Mark proposes that they revise a question on their survey, Keith clarifies, “Oh, you mean as separate questions” and makes two horizontal hand gestures—the second below the first—to mimic the spatial layout of two separate questions, one positioned immediately below the other. This type of gesture was made eight times—six times by Keith, once by Natalie, and once by Mark. Tellingly, the one time Mark (unanimously considered the group computer expert) made this gesture, he was discussing the PowerPoint presentation and not the written report (see Transcript 2 at 9 min, 37 s).

While writing in the air almost always describes the text from the writer’s perspective, embodying the group document may have allowed group members to transition from a writer’s perspective to that of a reader. Transcript 1 illustrates the differences in viewpoint between the two types of gestures. At 8 s, Keith mimes the act of writing on the interaction space between himself and Natalie as he writes in the air to represent the recommendations the group will compose. Here, Keith seems to be imagining the group document from a writer’s viewpoint by embodying the act of composition. However,
almost immediately afterward, at 13 s, he switches perspective and embodies the document itself when he gestures to indicate specific sources the group might recommend. This gesture consists of two identical hand movements, the second positioned immediately below the first, and appears to represent the position of separate items in a bibliography listed down a page. This gesture could equally represent the act of writing these items on separate lines or the act of reading the list of sources on the finished page.

This distinction between reader and writer viewpoints parallels McNeill’s (1992) differentiation between character-viewpoint gestures, in which the speaker directly embodies the represented action, and observer-viewpoint gestures, in which the speaker is removed and acting as an observer of the event or action. When speakers write in the air, they appear to be actively involved in composing the text. When speakers embody the document itself, they seem to bridge both character and observer viewpoints, presenting the text both as something to be composed and as an object to be read. In this sense, gestures embodying the document seem to represent a more finished state of the text than those that mime the physical act of writing.

**Pointing to integrate texts within the group conversation space.** Solitary writers point at documents—including the document under composition—to help themselves manage and integrate information from multiple sources (O’Hara et al., 2002). Speakers similarly point when conversing to establish common conceptual points of reference and integrate competing viewpoints (McNeill, 1992; Sauer, 1999). Pointing reduces the cognitive strain involved in complex tasks by spreading communication across the speaker’s environment and reducing the need for internal representations of ideas or objects (Roth, 2002). Because pointing is central to both complex writing tasks and conversation, we would expect pointing to be pivotal in collaborative group writing by helping group members share and negotiate distributed knowledge and text representations.

Not surprisingly, then, pointing was the most common conversational gesture type made by Keith, Mark, and Natalie, comprising a third of all conversational gestures made by this group.

As with the writers in Haas and Witte’s (2001) analysis, the writers here used pointing to negotiate differences between existing and future documents to be composed. Because the student writers here were engaged in the initial planning stages of their group document, most of their pointing gestures referred to future states of the document. Here, individual group members came to stand in for the
sections of the document they would write. For instance, when referring to a section listing Internet sources, group members pointed at Mark, who agreed to compose this section. Thus, many of the pointing gestures made during this planning session conflated individual authors with the texts they had agreed to write.

Transcript 3 shows how group members used pointing and other gestures to discuss how they would integrate different sections of the proposal into a common document. Keith first uses a deictic (pointing) gesture to show similarities between information Mark is currently looking at on the computer and research Keith and Natalie did earlier. Each time Keith mentions the Internet, he uses his pen to point toward Mark’s computer to help the group establish common points of reference. As the discussion continues, Keith’s deictic gestures shift from referring to source documents to representing the future documents group members will write. He uses Mark and Natalie to stand in for the Internet research and the traditional book research sections of the proposal. Thus, when Keith makes a gesture extending his hands out to both group members at approximately 3 min, 26 s, it is easy to imagine that he is holding the final text in front of him. This impression of integration is reinforced when Keith draws a circle in the air with the pen he has been using for pointing. When he leans down to write at 3 min, 35 s, Keith appears to be commemorating the integrated document described in the group conversation space to paper.

Thus, group members used pointing to negotiate and integrate the as-yet-to-be-composed sections of the proposal into an understanding of the final document. The group dealt with the conceptual difficulty of discussing nontangible future texts by allowing individuals to stand in for the texts that they would write. This use of deixis helped reduce the cognitive burden involved in representing all of these texts mentally and showed the relationship of the individual sections of texts to the final, integrated document.

Pointing to maintain one’s place within the group interaction space. Writers working in isolation frequently point to documents while writing as a means of maintaining their place or position in the document (O’Hara et al., 2002). Haas (1996) also notes that writers often shuffle and play with source documents even when not mentally engaged with them. She hypothesizes that these writers wanted a way to maintain physical engagement with these documents, even when their attention was directed elsewhere.

One interesting feature of this conversation was that members seemed to point toward the conversational space as a means of
signaling their engagement in this text. Transcript 4 illustrates how Mark temporarily removed himself from the group conversation to look information up on the computer but points toward the group conversation space to signal to his teammates that he has not abandoned the group conversation. The beginning of Transcript 4 shows that Mark is slow to respond to Keith’s questions because he is focused on the computer. Perhaps aware that his involvement in the computer might be misinterpreted by his teammates, Mark uncaps his pen and points toward the group conversation space, maintaining an extremely awkward position. As Figure 2 illustrates, Mark twists so his right arm crosses his body to point to the group interaction space while his left hand manipulates the computer mouse. Despite its awkwardness, Mark adopts this pose three times during the conversation analyzed, holding the pose for 1 to 9 seconds at a time.

Transcript 3

Pointing to Integrate Multiple Documents

| Keith  | (3:00) Well, there’s stuff on the Net [Points pen in general direction of Mark’s computer]. A little bit, I mean uh |
| Natalie | (3:03) There’s actually a lot of stuff on the Net [Brings hand up to scratch face] |
| Keith  | (3:04) It’s the stuff we did. [Points pen at Natalie] for the (1 undecipherable) |
| Natalie | (3:06) Right [Nodding] |
| Keith  | (3:06) And that stuff’s still on there [Sweeps pen around to point at Mark’s computer] Um, but uh <pause>, I guess we can recommend sites too. It’s not a bad idea. Since we’re doing the Barnes and Noble thing [Points pen at Natalie]. Can you do the Net thing? [Sweeps pen around to point at Mark]. Just find uh, a few Net sites that aren’t useful and a few that are. |
| Mark   | (3:20) Yeah. Yes. |
| Keith  | (3:22) Say uh maybe five [Bends down to pick up soda can. Drinks.] |
| Mark   | (3:25) Five [Writes] |
| Keith  | (3:26) A nice round number [Puts soda can back on floor.] That way we can cover both. [Leans back and gestures with both palms open to include both Mark and Natalie]. That’s a good idea [Waves pen in circle]. And then um [Flips pen around in his hand] That’s all the bases covered. [Brings hand holding pen in to his chest and then extends it in Natalie’s direction.] Isn’t that all we wanted to hit? |
| Natalie | (3:34) Yup. |
| Keith  | (3:35) [Clicks pen on and leans down to his notepad to write] |

NOTE: See the appendix for transcription conventions.
By pointing at the group interaction space while looking up information on the computer, Mark signals to his teammates that the two texts are related. When he uncaps his pen at 43 s, prior to turning to the computer, Mark further represents his participation as an active writer of the group document—even while tuning out the group conversation. Mark’s deictic gesture is analogous to how solitary writers point at one text while actively involved in another to draw connections and maintain their positions in multiple documents.

**Relationship of interaction space to final document.** Keith makes multiple gestures during this conversation that suggest that the task of writing the group document is a simple matter of transferring information from the conversational space into written prose. Transcript 5 shows the group discussing the similarities between the format of the document the group will write and a report Mark wrote for another class. Keith intimates that “[We] already have it done. . . . All we’ll have to do is tra. . . . uh, put the different data in.” As he makes this observation, Keith cups his hand in a container gesture (McNeill, 1992) and moves this container from the group conversation space to the

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**Figure 2.** Mark twisting his body to point to the group interaction space while looking up text on the computer.
computer. Keith’s gesture indicates that all the group needs to do is transfer the conversation they have just been having into the container of Mark’s existing document. Even his use of the word “data” to describe the information in the group’s proposal suggests that Keith sees the group task as a straightforward information transfer (Bereiter & Scardamalia, 1987) of the conversation he has been dominating into written prose. Later, on the same day, Keith makes a similar rhetorical move as he explains that the task is “nothing huge. The basic stuff we’re talking about. Just that on a pamphlet.” At the same time he says this, Keith makes a container gesture with his hand to encompass the group conversation space. This gesture again implies the unproblematic transfer of the group conversation space to written (in this case pamphlet) form.

Other evidence provides support for the hypothesis that Keith perceived the relationship between the conversational text and the final written document as unproblematic. Keith states in his final interview that in the discussion this day he “gave out the [survey] questions” that
Transcript 5

Discussing Transfer of Conversation Into Written Report Format

Mark (5:28) [showing group members a document on the computer screen] OK. Well, what do you think about the overall format? Do you want to do something like this?

Keith (5:32) What is it? [Drinks soda]

Mark (5:34) It's uh [Moves closer to computer] a proposal I did earlier in a course. These, uh

Keith (5:38) <3 undecipherable> [Puts down soda can while Mark speaking then crosses his arms on his notepad]

Mark (5:39) [Flips pen in hand then brings it up to his face. Clicks pen on]

Keith (5:40) [Flips pen in hand then brings it up to his face. Clicks pen on]

Mark (5:42) Your table of contents

Keith (5:43) Yeah

Natalie (5:46) Yeah

Mark (5:47) The intro

Keith (5:49) What is this for? What class?

Mark (5:50) Methods. <pause>This is for (2 words undecipherable) class

Keith (5:53) [moves hand holding pen in front of him and looks at it. chuckles] Already have it done, that would be cool. All we'll have to do is tra . . . , uh, put the different data in. [makes a cupping gesture with his hand and moves from group conversation space to direction of the computer. Rests cheek on palm.]

Natalie (5:57) Yeah. [laughs]

Mark (5:58) It's totally different

Keith (5:59) I know I realize, but it's the same format, right? [points toward computer.] So all we have to do is rewrite it [leans back in chair and plays with pen]. That's what I do with my labs [makes open palm gesture in Mark's general direction]. Same lab and I rewrite the stuff every time [moves hands vertically on either side of his upper body, suggesting a box]

NOTE: See the appendix for transcription conventions.

Natalie and Mark later typed up (Interview with Keith, April 24, 2003, p. 11). The use of the verb “gave out” suggests a physical quality to the conversational text. (Keith also claimed that he “dictated” the questions, although an actual perusal of the transcript shows that he and Mark discussed many of these questions back and forth and never agreed on an exact wording. At another point in the project, Keith insists that Natalie could not have been confused over the group plans because she had taken notes that day. Thus, Keith seemed to admit little room for interpretation or ambiguity in transferring
conversational texts into written form—a perspective that seemed manifested in several of his gestures).

**Analysis Part II: Control of the Conversational Space**

The first part of this analysis focused on how this group established a conversational interaction space with their gestures that functioned in many ways like a physical document. The following analysis focuses on how Keith was able to control this interaction space through his use of space, timing of writing events, and noise.

**Space.** Solitary writers working on complex tasks make extensive use of the space around them to physically juxtapose and chunk together paper documents. In fact, writers often complain when they do not have sufficient physical space to organize their documents (O’Hara et al., 2002). Writers working collaboratively also make use of the space available to organize and show the relationships among various documents. Cross (2000), for instance, shows how writers working on a large-scale collaborative project used the space of an entire conference room to conceptualize the relationships of individual parts to the entire document.

Keith, Mark, and Natalie used their group interaction space as the primary means for conceptualizing their group document. This space was constrained by the physical layout of the computer classroom and by the fact that other groups also were present in the room and discussing their own projects. To hear above the general noise of the classroom, group members had to sit fairly close to one another. Moreover, they needed to position themselves where they could easily access computers, backpacks, and notebooks that contained materials related to the class. Thus, the physical interaction space available to this group was fairly limited.

Keith clearly exerted more control over this interaction space than did either of his two teammates. He not only made more than twice as many gestures and five times as many adaptor movements as his teammates (see Table 2) but was also more expansive than his teammates in these movements. Keith’s gestures often extended beyond the immediate space of his body, and he frequently moved his chair to position himself closer to one or the other of his teammates, thus covering more floor space than the other two team members. Several times, Keith even intruded on the physical space of his teammates; for instance, leaning over to tap Mark on the knee or to write on Mark’s notepad.
Figure 1 illustrates some of the contrasts between how Keith and Natalie occupied the group conversation space. The hand in which Keith holds his pen is positioned nearly a foot away from his notepad, whereas his other hand rests on his leg just below the opposite side of the notepad. By contrast, Natalie holds her notepad close to her body. Both hands grip the paper and her pen is in physical contact with the notepad. She remains relatively motionless as she participates in the conversation and her pen rarely travels beyond the perimeter of her notebook. Where Keith occupies a large space and is in constant motion, Natalie appears to be occupying as little space as possible. Her tight posture contrasts with Keith’s expansiveness. Moreover, whereas Keith makes frequent use of his rolling chair, Natalie is seated on a couch without wheels and is thus forced to remain stationary during the conversation. As a consequence, she is always the group member farthest away from the bank of computers lining the wall—a position that becomes salient when the group turns to look at Mark’s computer screen.

Mark’s use of interaction space falls somewhere between Natalie’s and Keith’s. Similar to Keith, Mark frequently moves in his chair, shifting between his teammates and the computer. Mark is also somewhat more expansive in his gestures than Natalie, making a higher proportion of gestures that extend beyond the center of his body.

If the ability to manipulate the group interaction space influenced how group members perceived one another’s written contributions to the collaborative document, then Natalie’s tendency to keep her limbs close to her body and her seat in a stationary chair may have put her at a disadvantage. The fact that Natalie was not visibly shaping the group conversational text may have given her teammates the impression that she was not contributing to the group document. This perception may, in turn, have facilitated her teammates’ tendency to later overlook her actual written contributions.

Writing and conversational floor. Almost all writing during this meeting took place while Keith—the group’s most dominant speaker and the member perceived as the best writer—occupied the conversational floor. As the transcripts above indicate (see Transcript 1 at 8 s and Transcript 4 at 17 s and 34 s), Keith himself wrote while he controlled the conversational floor. Thus, when Keith took notes during this conversation, his note-taking was highly visible. Table 3 analyzes the number of seconds each group member wrote while individuals were speaking. Rows indicate who was writing and columns indicate who controlled the conversational floor.
More than 85% of this writing took place while Keith maintained sole control over the floor. Only once did Keith write while he shared the floor with another speaker (Mark)—and this shared floor took place when Keith physically wrote his e-mail address down on Mark’s notepad. By contrast, neither Mark nor Natalie wrote while they themselves were speaking. Keith’s ability to control the floor while group members wrote seems to create a natural segue between his speech and the writing that took place. By contrast, Natalie’s writing appeared to take her out of the conversation, giving the impression that she is taking dictation (a point Keith made in his final interview). Although Mark’s use of the computer similarly removed him from the conversational text, he found ways to signal his engagement in the conversation and also was successful in gaining recognition as the group’s technical expert.

Gesturing with pens. When a pen formed a primary part of a speaker’s gesture—such as when the speaker used a pen to write in the air or to point at a teammate—the impression that the speaker was actively writing on the group conversation space was heightened. Table 4 provides a breakdown of just those gestures that primarily involved pens, showing that Natalie made far fewer pen gestures than did either of the two men.

Table 4 shows that Natalie only made 1 gesture (comprising 4% of the gestures reported in Table 2) involving a pen. By contrast, Mark made 6 pen-based gestures (comprising 18% of the total gestures reported in Table 2) and Keith made 29 (comprising 39% of the gestures reported in Table 2). Thus, the two men (and Keith in particular) were more likely to use gestures that suggest authorship.

Table 4 shows that only four of Natalie’s conversational gestures and adaptor movements (comprising 12% of the gestures and adaptor movements)
movements reported in Table 2) involved a pen. By contrast, close to 40% of both Keith and Mark’s movements involved pens. Moreover, it is worth noting that Keith was the only group member to make iconic gestures that involved pens. Many of these iconic gestures involved writing on the group interaction space and projected a sense of authorship.

Moreover, the number of times Keith and Mark gestured with a pen greatly exceeds the number of times they actually put pen to paper to write, as shown in Table 2. By contrast, Natalie exhibited the opposite trend, having many more writing events than gestures involving pens. Thus, Natalie not only made far fewer gestures than did her male teammates but the gestures she did make were less likely to suggest the act of writing.

Transcript 6 contrasts how Keith and Natalie use the pen while occupying the group conversational space. This conversational segment shows Natalie at her most assertive. She leans forward to suggest how the group might divide up speaking roles during the final presentation, pointing her pen at Keith as she speaks (this is the one time that Natalie points a pen at another person). However, almost immediately afterward, she retracts this gesture, ensconcing the pen under her palm. Moreover, she waits until well after Keith has regained control of the conversational floor (almost 20 s) to write down her idea. Whereas the group’s eyes are on Keith when he writes at 5 min, 20 s, no one is looking at Natalie when she writes 10 s later.

Pointing at other people with a pen suggests a kind of authority (e.g., newscasters and pundits on television often wield pens even though they clearly have no intention of writing during the program), as if one is directing others or writing them into a text of one’s own making. Keith is clearly comfortable assuming this type of authority, pointing his pen at other individuals or objects 20 times during this
conversation, often in the context of directing people to perform certain actions (see, e.g., Transcript 2). Natalie, however, appears less comfortable assuming this authority, immediately retracting her one deictic pen gesture. One possible consequence of this failure to assert her authority over the group conversational space may be that Natalie seems to be writing less than the others—even though, ironically, Natalie spends almost as much time writing as both of her teammates combined.

Noise with pens. As group members conversed, they frequently made noise with their pens: clicking their pens on and off, tapping pens against notepads and body parts, noisily removing and replacing pen caps. When speakers make such noisy movements with pens, the effect can be to draw attention to themselves as writers.

The last column of Table 5 shows that Keith made approximately 10 times more noise-making pen movements than did Mark and Natalie. Many of these movements consisted of clicking the pen off and on to punctuate or accentuate acts of writing. For instance, in Transcript 1 at 13 s, after Keith writes in the air, he brings both hands together to click his pen off, only to click it back on again (also with both hands) 2 s later as he writes on his notepad. The primary function of these deliberate pen clicks seems to be to call attention to the end of

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Transcript 6

**Natalie Retracting Her Pen-Based Pointing Gesture**

Natalie (5:07) *Like [leans forward] you could talk about the [points pen towards Keith] uh [flips pen around in her hand so it points at ground] well, I could talk about the faculty a little bit [points toward self with hand] each one of the parts we were concentrating on [makes a palm-down gesture toward the center of the group] we could talk a little bit about that, I guess [brings hand up to scratch her ear]*

Keith We can always streamline that, you know [flips hand]

Natalie Yeah

Keith When we end up getting to it because there might not be much to talk about in certain areas.

Natalie Right [turns to find something in her notebook]

Keith (5:20) *But uh, yeah [bends down to scratch his leg] So basically we're going to divide up all the speaking [Writing] um, divide up all the research [picks up soda can] You're going to do the intro [Points pen at Mark]*

Natalie (5:30) *[Picks up notepad and writes]*

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NOTE: See the appendix for transcription conventions.
one writing segment and the start of another. Similarly, we see Keith at Transcript 3 at 3 min, 35 s, clicking his pen on as he leans over his notepad to write. Mark makes similar movements, capping his pen when he reads off his notepad only to uncap it seconds later to write down a note. Because there is no reason why the pens should not remain “on” throughout the entire conversation, the primary purpose of these on/off noises seems to be to punctuate the conversation and call attention to writing events.

Group members also frequently tapped their pens against their notebooks. Sometimes this movement seemed to be a way to get group members’ attention, such as when Keith taps his notebook when calling the instructor over or when he taps Mark’s notepad when asking for a copy of his notes. Sometimes such tapping seemed to be a manifestation of nervousness or assertiveness. For instance, when the group begins discussing the final presentation, Natalie begins tapping on her notepad as she becomes more assertive in the conversation. This tapping continues even after Keith interrupts her and seems to help prepare Natalie temporarily to take control of the conversation, as illustrated in Transcript 6.

It is also worth noting that these noise-making pen gestures sometimes occurred when others were speaking. Previous research suggests that gestures that are not cotemporaneous with speech are rare: McNeill (1992), for instance, claims that in 100 hours of recorded narratives, only one gesture was made by a listener. Table 5 shows that Keith made clicks or other noises with his pen on six occasions while other people were speaking. These noise-making events seemed to occur when others introduced new documents into the conversation. For instance, Transcript 4 at 5 min, 40 s, shows Keith clicking his pen as Mark shows the group a report he had written for another class. As the group continues to discuss this document, Keith clicks his pen

<table>
<thead>
<tr>
<th>Participant</th>
<th>Keith Floor</th>
<th>Mark Floor</th>
<th>Natalie Floor</th>
<th>Natalie and Instructor Floor</th>
<th>Silence</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Keith</td>
<td>20 (30 s)</td>
<td>3 (4 s)</td>
<td>2 (2 s)</td>
<td>1 (1 s)</td>
<td>8 (10 s)</td>
<td>34 (47 s)</td>
</tr>
<tr>
<td>Mark</td>
<td>4 (7 s)</td>
<td></td>
<td></td>
<td></td>
<td>4 (7 s)</td>
<td></td>
</tr>
<tr>
<td>Natalie</td>
<td>1 (1 s)</td>
<td>1 (7 s)</td>
<td></td>
<td></td>
<td>2 (8 s)</td>
<td></td>
</tr>
</tbody>
</table>

Table 5
Number of Noise-Making Pen Gestures and Adaptors by Who Controlled Conversational Floor
several more times, both during pauses in the conversation and again while Mark is speaking. Similarly, when Natalie explains the due dates to the group, Keith clicks his pen over her speech (and he does a similar action when talking with the instructor). These audible clicks have the effect of drawing attention away from the speaker and momentarily resting it back on the person manipulating the pen.

DISCUSSION

This analysis extends traditional notions of the composing process to include activities and spaces that exist beyond and prior to verbal and written texts. In the Flower and Hayes (1981) cognitive process model of writing, one component of the writing process consists of the act of translating, which is described as the process of putting ideas into visible language. Witte (1987) convincingly argues that an important subprocess of translating is the phenomenon of pretexts—or mentally stored trial locutions. Pretexts, moreover, form an important link between translating, planning, and transcribing ideas into written form. In a much later analysis, Haas and Witte (2001) build on this idea of pretext by observing that gestures may function as pretexts that help collaborating writers translate emerging, abstract ideas into an embodied representation.

Consistent with Haas and Witte (2001), this analysis found that gestures served as embodied pretexts that helped collaborating writers plan, visualize, and evaluate their group document. Gestures allowed the group members to discuss how various units of information related to one another and enabled the group to envision how this information might be organized and integrated. Gestures also allowed group members to visualize their shared document from both a writer’s and reader’s perspective. The extralinguistic support that gestures provided—similar to the linguistic pretexts that Witte (1987) studied—helped group members develop a template for extended written text. By allowing group members to spread their communication across their physical surroundings, gestures reduced the cognitive burden of manipulating internal, verbal representations of the text much as linguistic pretexts reduce some of the burden of translating abstract ideas into formal written prose. Much as Roth (2002) found that science students’ gestures preceded and facilitated their abilities to describe scientific concepts in verbal and written form, so might writing students’ gestures play a similar role in
helping them acquire an extralinguistic “text sense” (Haas, 1996) of their document that precedes and facilitates the development of written prose.

However, although gestures seem to provide crucial support for collaboratively planning a document, their material form might ironically mislead students into thinking that they are closer to the final product than they in fact are. Several of the gestures performed by Keith, Mark, and Natalie embodied the group document, presenting it as a finished text to be read. This jump forward to a completed document was most evident in the gestures that mimed the act of clicking through a series of PowerPoint slides (see Transcript 2). Such gestures elide over the act of composing the PowerPoint presentation, representing it as a fait accompli that simply required a manual act of clicking. Although such gestures are useful in reducing the anxiety surrounding a public presentation, they are also potentially dangerous in that they minimize the work involved in composing.

This potential of gestures to minimize the work of composing also is exemplified in Keith’s use of container gestures to suggest the straightforward transfer of the conversational interaction space into written form (see Transcript 5). Keith here presents the real work of composing as occurring in the conversational space that the group has used to plan and embody their finished document. Keith indicates through his gestures and speech in Transcript 5 that the group just needs to transfer this information from the conversational space into the template (or container) of Mark’s previous proposal.

The close proximity of gestures to the physical act of writing might thus possibly contribute to problems commonly experienced in collaborative writing groups. For instance, it is possible that some students are unmotivated to produce written texts in their teams because they see the written document as secondary to the primary text of the conversational space. More important, gestures also might help us understand why students’ evaluations of their teammates’ contributions to a writing project often seem to bear little relationship to what those individuals actually produced (Morgan, 1994; Wolfe & Alexander, 2005). For instance, all three students on this team described Keith as a highly skilled writer despite never having seen any writing that he produced. At the same time, Natalie’s teammates ranked her as the least skilled writer on the team, claiming that she had produced very little writing for the project—a perception that was highly inaccurate. In fact, Natalie made more than six written contributions to the project, ranging from the letter of transmittal to an independently
produced trifold pamphlet implementing the group’s recommendations, but in the final interviews, Mark could name only two, and Keith one, of Natalie’s smaller contributions.6

McNeill (1992) found that people who listened to narratives that deliberately used misleading gestures (e.g., a gesture might indicate the direction “up” when the speaker actually uttered the word “down”) tended to recall the gesture over the spoken text. Thus, it seems possible that a group of inexperienced writers might recall writing gestures more than written texts when describing contributions to a project. Tellingly, when Natalie and Mark were asked to explain why they described Keith as an exceptional writer, both students cited his verbal abilities (see Wolfe & Alexander, 2005, for a more thorough treatment of this situation), suggesting that these students may have conflated the conversational text with actual written documents. Further research is needed to test the hypothesis that gestures made during discussions of collaborative documents might affect perceptions of writing abilities and written contributions.

Conversational Floor and Control

This analysis also contributes to our understanding of conversations in work groups by examining how writing materials and adaptor movements intersect with conversational texts. As mentioned earlier in this article, previous gesture research has tended to neglect adaptor movements. Yet movements such as fidgeting with a pen or drinking a soda form a significant proportion of the activity that goes on in a work-related group. In the group analyzed here, adaptor movements actually exceeded gestures.

One important difference between adaptor movements and gestures is that adaptor movements often take place while other people speak. For instance, more than 40% of adaptor movements here were made while other teammates spoke, compared to approximately 10% of conversational gestures. Moreover, many adaptor movements involve noise (such as tapping a pen against the hand). Such movements may draw other group members’ attention, thus making attempts to enter or control the conversation more visible. Further research might test the hypothesis that people who make large numbers of adaptor movements have an advantage in gaining the conversational floor by attempting to correlate successful gains of the conversational floor with the number of adaptor movements made by speakers.
The conversational floor also interacted with actual acts of writing in this group. Writing during team meetings can convey power—because the writers can have major influence over what is said—or powerlessness—because writing takes writers out of the mainstream of the conversation and can relegate them to inscribing what others say (Morgan, 1994). In this group, Natalie tended to write while other teammates were talking, thus giving the impression that she was transcribing what others said. This impression may have contributed to the team’s tendency to overlook or dismiss Natalie’s written contributions because they saw her as performing mechanical work (i.e., transcription) rather than creative work (i.e., writing). By contrast, Keith wrote almost exclusively while he was in control of the conversational floor—a practice that (along with his frequent use of the pen when gesturing) seemed to call attention to himself as author of the group’s text. By appearing to simply write down what others say, Natalie seems to have rendered herself less visible and established herself as a noncreative contributor to the group manuscript—even though examination of the writing she produced suggests that this is not the case.

Implications for Gender Research, Collaborative Writing Technologies

Although it is dangerous to draw conclusions about gender from such a small sample, this analysis is consistent with other research on gender and nonverbal communication that has found that men do more fidgeting, more manipulating of objects, and make larger, more expansive body movements (Hall, 1984) than do women. One hypothesis that emerges from this research is that such movements might give men an advantage in certain work settings.

Although previous research suggests that women make more expressive hand gestures than do men (Briton & Hall, 1995; Hall, 1984), this was not the finding here and it is useful to hypothesize why. The conversation here was very task-oriented and the gestures group members made often suggested authority—both in the sense that pointing at someone may suggest a kind of directive authority and also in the sense that many of the gestures suggested authorship. Women may be more hesitant to make such authoritative gestures than are men (cf. Natalie’s retraction of her gesture in Transcript 6). This analysis suggests the need for additional research on gender and gesture in formal settings akin to that on gender and interruptions.
Finally, this analysis may have implications for the design of computer technologies to support collaboration. Researchers working on video-mediated communication have been disappointed to find that video tends to undermine the impact of gesture (Heath & Luff, 1993). This study suggests that this undermining may not be unequivocally negative. By undermining certain attention-grabbing gestures, video-mediated communication might help equalize the conversational interaction space for speakers, much as Sproull and Keisler (1991) found that computer-mediated communication appeared to equalize status differentials in face-to-face conversation. This status-leveling function of computer-mediated communication may explain why women often prefer virtual teams over face-to-face teams (Lind, 1999). One challenge for technology designers may be how to design collaboration tools that can support functions that can support those gestures that are crucial to planning a document (such as pointing or embodying sections of the text) while minimizing those movements that might lead to inequitable conversational floor spaces.

APPENDIX

Transcription Conventions

(min:sec) Each turn begins with a counter (e.g., 0:50) indicating where in the 16-min, 40-s conversation the turn occurs.

[gesture] Italicized text enclosed within square brackets describes a gesture or other bodily movement.

overlapping speech Underlined text indicates overlapping speech and gesture.

<pause> Pauses are enclosed within angled brackets. If more than 1 s, the length of the pause is noted.

(2 undecipherable) Undecipherable conversation is noted within parentheses. The number indicates the approximate number of indecipherable words.

(descriptions) Text enclosed within curly brackets contains additional descriptive information about the conversation.

Lines connecting speakers' names indicate overlapping turns.
NOTES

1. The entire recorded conversation for this day was a little more than 34 min. The 16-min, 40-s cutoff was somewhat arbitrarily chosen as an approximate halfway point.
2. The primary sources of disagreement between the two raters were in distinguishing iconic gestures from beats and in distinguishing iconic gestures from touching self adaptor movements.
3. Although exact numbers are displayed, they should be taken as estimates primarily for comparison purposes (see the Data Analysis section).
4. Although Keith did not provide me with a copy of his notes and it is impossible to know for sure what he was writing here, in his final interview, he did confirm that on this day he was taking notes to record who was assigned to which tasks.
5. McNeill, however, worked from a narrator-centered context. Research on gesture in more interactive and material settings has found that listeners sometimes make gestures in collaboration with the speaker, although these gestures are still a minority (Furuyama, 2000).
6. It is worth noting that the instructor did not share these students’ assessments of one another’s writing abilities. In her interview, the instructor described Natalie and Mark as equally strong writers and claimed that she did not have enough evidence to judge Keith’s writing abilities because he failed to turn in any drafts he had produced for this project and she had only seen a resume and a few short memos that he had produced outside of the context of the project.

REFERENCES


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