Interactionally situated cognition: a classroom example

Stanton Wortham*

*University of Pennsylvania, Graduate School of Education, 3700 Walnut Street,
Philadelphia, PA 19104-6216, USA*

Abstract

According to situated cognition theory, cognitive accomplishments rely in part on structures and processes outside the individual. This article argues that *interactional* structures—particularly those created through language use—can make essential contributions to situated cognition in rational academic discourse. Most cognitive accomplishments rely in part on language, and language in use always has both representational and interactional functions. The article analyzes one classroom conversation, in order to illustrate how the interactional functions of speech can facilitate the cognitive accomplishments speakers make through that speech. By showing how closely cognition and interaction can interrelate, the article both supports theories of situated cognition and shows how cognition in at least some educational contexts cannot be extricated from enduring social structures and the construction of social identity. © 2001 Cognitive Science Society, Inc. All rights reserved.

1. Introduction

Situated cognition depends on various interlocking structures and processes, many of which lie beyond the individual mind. These structures and processes are found in others' knowledge as well as in physical and symbolic tools (Goodwin, 1995; Greeno, 1997; Hutchins, 1995; Wertsch, 1998). Advocates of situated cognition also cite *social interaction* as another potential source of structures that might contribute to cognition. Greeno, for instance, calls for "increasingly detailed analyses of structures of information that are produced by *the interactions people have with each other* and with the material and representational structures in their environments" (1997:15; italics added). A few have begun to study how contingent interactional structures can facilitate cognition (e.g., Garfinkel, 1967; Garfinkel & Sacks, 1970; Goodwin, 1984, 1995; Silverstein, 1985, 1998). Most of this

---

* Tel.: +1-215-898-6307.

E-mail address: stantonw@gse.upenn.edu (S. Wortham).

work has focused on task-oriented or casual talk. In this article, I explore how interactional structures and processes can facilitate cognition in rational academic discourse.

I focus on interactional processes that go on through *language use* in particular. Speech always both communicates information and contributes to interaction. All utterances function both to denote something about possible or actual worlds and to position speakers and audience members in some social space. Cognitive analyses of language most often focus on the denotational function of language—on how the reference and predication accomplished through speech can contribute to cognitive accomplishments. This article argues that, in some cases, the interactional positioning accomplished through speech can also contribute to cognitive accomplishments. To make this argument I describe a complex type of case, in which the denotational and interactional structures created through speech *mirror* or *double* each other. That is, in this sort of case speakers do what they say, through the same words that they use to say it (Wortham, 1994, 1997). The article shows how in such cases denotational and interactional structures can work together to facilitate cognition.

The first section below describes theories of situated cognition and the role extramental structures and processes can play in cognitive accomplishments. The second section focuses on deictics, a type of linguistic form in which the denotational and interactional functions of speech inevitably and systematically interrelate. Analysis of deictics establishes that the denotational and interactional functions of speech depend on each other, and this suggests that cognition might depend on the interactional functions of speech as well. The third section analyzes a particular verbal interaction in which both denotational and interactional structures contribute to the cognition involved—a classroom discussion in which teachers and students face the cognitive challenge of understanding an alien cultural practice. This section describes in detail the complex interactional positioning speakers accomplish in the classroom discussion. The fourth section argues that the interactional structures enacted in the classroom make essential contributions to the cognitive accomplishments made there. The final section summarizes the central point: even rational, academic cognitive accomplishments can be deeply interconnected with the complexities of social life.

2. Situated cognition

People succeed at cognitive tasks by virtue of mediating structures or processes. As analysts we explain people's successful actions by modeling the structures or processes relevant to completion of the particular task. Traditional cognitive science often analyzed the structure of the final performance—say, the skillful telling of a narrative—and concluded that a mental analogue of this entire structure must be the mechanism generating the performance. Many have questioned this approach (e.g., Greeno, 1997; Silverstein, 1993b; van Gelder, 1995), on two grounds. First, the mechanism producing the performance need not be as elaborate as an analyst's *post hoc* analysis of that performance—just as thermostats do not represent much about the nature of temperatures and human comfort zones. Second, the structures and processes that facilitate the performance might not all be located in the individual mind.

Many have recently argued that these two insights should lead us to a fundamentally different approach to studying cognition (Greeno, 1997; Hutchins, 1995; Looren de Jong, 1997; Salomon & Perkins, 1998). Looren de Jong distinguishes between a "Cartesian" psychology that posits an individual mind separate from and representing the world and a "naturalistic" psychology that sees the mind as embedded in the environment. Greeno distinguishes between a "cognitive perspective" that explains cognitive accomplishments with respect to structures and processes in the individual mind and a "situative perspective" that explains such accomplishments with reference to cognitive systems that stretch across physical, social and symbolic environments. All these advocates of a naturalistic or situative alternative admit that more work must be done in order to flesh out the alternative, and to assess its true promise, before we can conclude that a new approach is warranted.

Advocates of a situative approach do not deny the existence of individual minds, mental structures and processes. If cognition is situated, it is true that cognitive accomplishments are "not attributable to any individual" alone (Hutchins, 1993:35) and that "Knowledge" (with a capital K) should instead be attributed to the relations among various components of a person-society-environment cognitive system (Lave, 1993). But, as Wertsch (1998), Kirschner and Whitson (1997) and others argue, situative perspectives should not succumb to social determinism either. Cognitive accomplishments cannot be attributed solely to physical or social structures and processes. Many cognitive accomplishments do depend *in part* on individual mental representations (Salomon & Perkins, 1998) and sometimes on decontextualized algorithms (Greeno, 1997). In order to explain human cognitive accomplishments in general, however, we must cite more than individual mental structures and processes.

The central premise of situative accounts is that cognitive accomplishments result from "intact activity systems" that can include mental, social, physical and symbolic structures that all interrelate so as to allow successful action (Goodwin, 1995; Greeno, 1997; Hutchins, 1995; Latour, 1993). Borrowing a term from Lemke (1997), I will call these "ecosocial systems." This is not a new concept, of course. Bateson (1972) describes how cognitive accomplishments rely on a circuit of activity involving structures from the mind, the body, tools and the environment. Vygotsky (1997) describes how systems of mental processes, integrated with physical and symbolic tools, can lead to the development of higher mental functions. And Gibson (1979) describes how cognitive-perceptual accomplishments rely on structures in the world as well as structures in the mind. But recent descriptions of ecosocial systems are becoming more detailed and systematic, and they have begun to attract wider attention among cognitive scientists.

Recent advances include the rich descriptions of particular ecosocial systems provided by Goodwin (1995) and Hutchins (1995). Theorists have also made some progress in describing the components of ecosocial systems. Lave (1993) and Wertsch (1998) propose a three-level account, in terms of (1) the person or "intramental" structures and processes, (2) the activity or "intermental" structures and processes, that involve both tools and other participants in the cognitive task, and (3) the situation or socio-historical structures and processes. Engeström (1993) and Engeström and Cole (1997) offer a slightly different taxonomy of ecosocial systems' components, citing the subject, the object, the tools and the larger community.

Others, like Hutchins (1995), Latour (1993) and Wortham (1998), argue that many hetero-geneous types of structures and processes can participate in the ecosocial systems that facilitate cognitive accomplishments. Other types of relevant structures and processes might include the semiotic organization described by Walkerdine (1997), the ontogenetic and phylogenetic patterns described by Cole (1996) and the organization of physical space described by Hutchins (1995).

All advocates of situated cognition agree that cognitive accomplishments depend on systems that connect various structures and processes, including but not necessarily limited to aspects of the individual person, the tool-mediated activity and the socio-historical situation. Significant dispute continues, however, on at least three questions. The analysis of interactional positioning and situated cognition given in this article contributes to answering each of these three questions.

(1) Exactly what types of structures and processes can contribute to ecosocial systems and thus facilitate cognition? To answer this question will require convincing empirical demonstrations of how novel structures and processes contribute. This article con-tributes to the list of potentially relevant structures, by describing how a particular type of emergent interactional structure can sometimes contribute to cognitive ac-complishments.

(2) Do academic cognitive tasks, as opposed to nonacademic tasks, depend more heavily on individual mental structures and processes? Some describe cognition as a dialectic relationship between individual thought on the one hand and ecosocial processes on the other (e.g., Cobb, Gravemeijer, Yackel, McClain & Whitenack, 1997; Salomon & Perkins, 1998). Others criticize this view, arguing that the person represents merely one among many potentially central components of ecosocial systems (e.g., En-geström & Cole, 1997; Hutchins, 1995; Walkerdine, 1997). Clark and Toribio (1994) suggest that we might avoid this dispute by conceiving a *continuum* of cognitive *tasks*: some tasks, like the academic ones studied by Cobb et al. (1997), are more "repre-sentation-hungry" and thus will require more substantial contributions from individual mental representations, while for other tasks intramental structures will play a smaller role. By showing the importance of interactional structures in an apparently "repre-sentation-hungry" academic task, the case described in this article shows that the ecosocial systems used to complete at least some academic tasks can centrally depend on supraindividual structures.

(3) How central a role does socio-historical context play in facilitating cognitive accom-plishments? Engeström (1993; Engeström & Cole, 1997), Lemke (1997) and Walk-erdine (1997) argue that structures and processes from the collective social world play a more central role than most situated cognition theorists acknowledge. Lave (1993) claims that situated cognition theory can describe how *both* immediate situations and socio-historical contexts contribute to ecosocial systems. The case described in this article supports her claim, by describing how cognitively-functional interactional structure can emerge in particular situations, yet draw on institutional patterns of power and identity.

3. Deictics and interactional structure

Language plays an important role in most ecosocial systems, and spoken language plays a role in many. In fact, speech can contribute to cognitive accomplishments *in several ways*. First, the information represented by speech often contributes to the solution of cognitive problems. We can see this in Hutchins' (1993, 1995) classic example of navigating a military ship. The information required to navigate the ship circulates in a system composed of various crew members' minds and physical orientations, physical arrangements of the ship and the task environment, specialized navigational devices that provide bearings and symbolic tools like maps. The system also depends on the speech that crew members use to communicate. Speech does not represent the majority of the information required to navigate the ship, but it nonetheless plays an essential role in the system. At the same time as this or any speech represents information, however, it inevitably has interactional functions as well (Halliday, 1978; Jakobson, 1960). All speech positions speakers and audience members interactionally *at the same time as* it represents information about some actual or possible world. This raises a question. If the representational function of speech often plays a necessary role in ecosocial systems, and if speech inevitably establishes interactional as well as representational patterns, what influence do the interactional patterns have on cognition?

One possible answer is "none." While speech contributes to cognition through the information it represents, the interactional events might constitute a separate and cognitively-irrelevant layer of human activity. If one of the crew members described by Hutchins (1993, 1995) were to insult others by presupposing higher status for him or herself while verbally informing other crew members of the ship's position, for instance, the fact of the insult might not change the cognitively-relevant information communicated. The insult might *disrupt* the cognitive activity, if crew members get distracted and fail to make their contributions to the ecosocial system that yields knowledge of the ship's position. But even in such a case the interactional pattern would remain *extrinsic* to the system. While I would agree that some interactional patterns are extrinsic to ecosocial systems in this way, this section argues that in many cases interactional patterns make central and systematic contributions to representation and thus to cognition. Speech can contribute to cognitive accomplishments in at least two ways—by representing information and by establishing cognitively-relevant interactional patterns.

In order to understand how interactional patterns created through speech can contribute to cognition, we need a more precise vocabulary for describing language use. Silverstein (1993a) provides several useful concepts. A "discursive interaction" is a social event of using language. Interactional participants and outside analysts try to understand the meaning of a discursive interaction by modeling its coherence. That is, participants and analysts try to understand the various segments of the discursive interaction as recognizable components of some established type of speech event—understanding, for instance, that a series of utterances was a narrative of personal experience because they can model them as describing a setting, complicating action, resolution and coda. Participants and analysts use two basic types of models in understanding the meaningful coherence of discursive interaction: "denotational text" and "interactional text." When participants and analysts understand a discursive interaction as a denotational text, they model the linguistic expressions that

compose that interaction as having particular referential and predicational values that contribute to some coherent message. For instance, the next section analyzes a classroom discussion as a type of denotational text—an argument, with several components, through which the teachers showed how an alien practice (Spartan infanticide) was similar in some respects to some contemporary Western practices. Denotational texts are ultimately interactional accomplishments, insofar as participants must coconstruct and/or ratify each other's presuppositions about what is in fact being denoted (Garfinkel & Sacks, 1970; Goodwin, 1979). But this coconstruction yields a model of what has been *denoted* or *represented*, not what has been enacted. When participants and analysts understand a discursive interaction as an interactional text, they model the linguistic expressions that compose that interaction as having indexical values that collectively presuppose a recognizable type of interaction (an insult, a joke, etc.). In ratifying an interactional text, participants presuppose that they have been *enacting* a particular type of interactional event.

I argue that speech can contribute to cognitive accomplishments through its interactional as well as its denotational functions. The interactional texts presupposed or enacted in particular discursive interactions can make essential (intrinsic) contributions to the cognitive accomplishments that those acts of language use can facilitate, *in two ways*. First, aspects of interactional text almost always make an essential contribution to denotational text, and the information represented in denotational text often makes important contributions to ecosocial systems. I make this first argument in the rest of this section, with reference to linguistic forms called deictics. Second, the social positioning enacted as interactional text in particular discursive interactions can *itself* provide patterns that contribute to ecosocial systems and thus facilitate cognition. Sometimes speech contributes to the accomplishment of cognitive tasks not only through its denotational or representational content but also more directly through the interactional positioning the speech accomplishes. I make this argument in the following two sections, by analyzing a particular classroom interaction.

The first argument involves deictics. Deictics are linguistic forms that occur in all known human languages, and they are ubiquitous in speech. The category includes personal pronouns, demonstratives (English *this/that*), spatial and temporal adverbs (*here/there, now/then*), verb tense, aspects of certain verbs' meaning (e.g., *come/go*), and so on. Deictics "single out objects of reference or address in terms of their relation to the current interactive context in which the utterance occurs" (Hanks, 1992:47). Deictics presuppose some aspect of interactional text as the warrant or backing for their denotational value. *We* provides an example. For hearers to understand what a particular utterance of *we* refers to, they must know something about presupposed social groups that include the speaker. *We* presupposes a radial geometry centered on the speaker, with the speaker a member of some group. People referred to as *they* lie beyond some boundary, while people referred to as *we* lie inside the boundary with the speaker. Hearers can only understand what a particular token of *we* refers to by presupposing something about the relevant social groups in the speaker's world. Relevant information will often include the structure of the larger society, including the ethnic identity, generational cohort or regional origin of the speaker, for example. The particular interactional alignments that may have been presupposed or created in the discursive interaction up to this point determine which of these presupposable social groupings will

be relevant to fixing the denotational value of *we* in this particular instance of use. The existence and ubiquity of deictics thus shows that in many cases interactional patterns (e.g., who belongs in the same social group as the speaker) are intrinsically related to the denotational meaning of language in use. Without the interactional information, there would be no denotation.

Hanks (1990), Irvine (1992, 1996) and Silverstein and Urban (1996) note that deictics' denotational meaning cannot be *computed* by plugging contextual information from the interactional event of speaking into presupposed models and rules. Successful denotation is, instead, *accomplished* by using presupposed models and rules as resources for establishing denotational coherence in particular interactions. We can see this in non-normative but denotationally successful cases like the "royal *we*." So the information denoted or represented by any utterance that contains deictics *both* (1) depends on information from the interactional text—for example, who is being presupposed as a member of the speaker's social group at the moment *we* is uttered—and (2) is a contingent accomplishment made by speaker and audience (Garfinkel, 1967; Garfinkel & Sacks, 1970; Hanks, 1990). Coherent denotational text depends on coherent interactional text, and coherent denotational text gets accomplished in particular discursive interactions. Note that these two claims both differ from the one made in the following two sections, where I argue that interactional textual structure—*apart from its contributions to denotational text*—can also contribute to the ecosocial systems that facilitate cognition. In other words, speech can contribute to cognitively-functional ecosocial systems in at least three ways: denotational text can contribute information; interactional text can contribute to the accomplishment of denotational text, as in the case of deictics, and the resulting denotational text can contribute information; and the social positioning that constitutes interactional text can by itself contribute to ecosocial systems, as described in the next two sections.

Of course, the case of deictics shows that in actual discursive interactions neither denotational nor interactional text ever exists by itself, independent of the other. Just as the denotational function of language depends on interactional structures, the interactional functions of language depend on denotational structures. By virtue of referring to some social group that includes the speaker, for instance, a particular use of *we* can potentially create or reinforce solidarity among members of a group. In a bid to create community among an ethnically diverse group of students, a teacher might refer to him or herself plus all the students as *we*. If others in the class come to presuppose this usage, the very occurrence of this verbal pattern might be central to creating the desired community. This use of *we* to create social solidarity would not happen unless the deictic *denoted* the relevant group. Thus the denotational and interactional functions of deictics, and of language use more generally, depend on each other. Successful use of deictics to denote depends on interactional patterns in the event of speaking, and successful use of deictics to create or modify interactional patterns depends on the denotational values that tokens of those forms have in use.

Deictics show that some interactional structures established through language use are intrinsically related to the denotational meaning of that language use. And because ecosocial systems often depend on information communicated using the denotational function of language, some cognitive accomplishments will necessarily depend on interactional patterns

partly created through speech. This suggests that the interactional functions of speech do not form a separate layer of human activity that can be ignored in cognitive analyses. The rest of this article argues that the interdependence between language's denotational and interactional functions can go far beyond deictics to more complex, emergent interactional-denotational structures. In some cases, speakers create more extensive interactional structures through speech. Like deictics, these structures both depend on the denotational value of that speech and contribute to it. The case described below will show that sometimes these more complex interactional structures not only contribute to the denotational value of speech but also contribute more directly to the ecosocial system and the cognitive accomplishments that the speech makes possible.

4. A participant example

This section describes a thirty-minute classroom conversation. In this particular discursive interaction, teachers and students both accomplish a cognitive task and enact a complex interactional event. I argue that the interactional positioning they enact makes important contributions to the ecosocial system that allows them to accomplish the cognitive task. This section introduces the conversation and describes both the cognitive agenda set by the teachers and the interactional events created through the conversation. The following section argues for the interdependence of the cognitive accomplishments made through and the interactional structure enacted in the classroom conversation.

I have selected a classroom conversation for this analysis, in order to show that interactional patterns can make substantial contributions to cognition even in academic tasks. Lave (1993, 1996) and others have argued that cognitive tasks in school do not differ in kind from "informal" or practical cognitive tasks. Even formal academic learning, Lave claims, depends on ecosocial systems that involve structures drawn from extramental tools and social practices. This challenges the more common claim that academic cognitive tasks are often more "representation-hungry" (Clark &Toribio, 1994) and that people solve such tasks by relying more heavily on intramental representations. The case described here shows that successful completion of academic cognitive tasks can partly depend on interactional and larger social patterns. While there might well be a continuum of more and less representation-hungry tasks, we should not assume that academic tasks necessarily rely on fewer ecosocial components.

In order to show how interactional text in this classroom conversation facilitated the cognition accomplished there, we need a methodological approach to analyzing interactional text. The modeling of interactional text that we do as analysts is what Silverstein (1993a) calls "denotationally explicit." That is, later in this section I will do my best to compose a denotational text that explicitly describes the interactional event enacted by teachers and students in their discussion. But in the real-time classroom interaction this particular interactional text was "denotationally implicit." Teachers and students did not explicitly denote what they were doing to and with each other. Instead, they used various cues in their speech to signal the interactional event they were enacting. Garfinkel and Sacks (1970), Silverstein

(1976, 1985, 1998) and Wortham (1994, 1996; Wortham & Locher, 1996) describe how patterns of *indexical* cues in language can emerge and cohere, so as to establish one model of the interactional text as most plausible. In many cases—like the classroom discussion under consideration—speakers *orient to* such indexical cues and the interactional texts they support, but speakers do not consciously recognize or explicitly articulate the interactional text or the significance of particular cues. In such cases, participants and analysts infer the interactional textual patterns that particular cues support by examining whether *subsequent* cues came to presuppose the same patterns as previous cues (Garfinkel & Sacks, 1970; Goodwin, 1984; Sacks, Schegloff & Jefferson, 1974; Silverstein, 1976).

An analyst's reading of an interactional text, like the one given here, is an interpretation that explains as many patterns in the data as possible. The data in this case include primarily the transcribed conversation and also my ethnographic fieldnotes and experience with these teachers and students. I argue that my interpretation of this interactional text is more plausible than other possible interpretations, because it makes salient and explains more robust patterns of indexical cues, denotational contents, and other facts about the context than other interpretations do. As described by Silverstein (1985, 1998) and Wortham (1996; Wortham & Locher, 1996), interpretation of interactional text does not rely on an impressionistic gathering of cues and patterns that fit the analyst's account. Instead, sophisticated analysts first identify all occurrences of cues that regularly play an important role in establishing interactional text. Acceptable interpretations account for most of the patterns identified in this initial phase of data analysis. Space limitations prevent me from giving a full description of the analysis in this article. See Wortham (1994) for a more detailed analysis of the indexical cues that support my interpretation of this particular discursive interaction.

The half-hour classroom conversation analyzed here took place in a ninth grade history class in an urban US school. I did more than two years of ethnographic work in this school, and I observed this particular class about fifty times over one academic year. See Wortham (1994) for more extensive background information on the setting. Two teachers are running this particular classroom discussion, Mr. Smith (abbreviated "MrS" in the transcripts) and Mrs. Bailey ("MsB"). They are both white and middle-class. There are fifteen students: ten Black girls, two Black boys, two White girls and one White boy. All the students who speak in this half-hour discussion are black. In preparation for this class session students have read selections from Plutarch's "Life of Lycurgus" (taken from Bailkey, 1987). This text describes the ancient Spartan political system, in which the welfare of the whole society was placed above the welfare of the individual. Sparta was ruled by a committee of elders, called "Ephors," who made decisions on behalf of the community. In this classroom conversation the students object strongly to one particular Spartan practice. Plutarch describes how, when a citizen had a baby, she had to bring the baby to the Ephors for judgment. If they felt the child was sickly, such that it would likely be a burden on the society, the Ephors forced the mother to leave the infant outside to die of exposure.

The students object to this Spartan practice on both moral and rational grounds. They claim it is immoral to kill innocent children, regardless of their physical health. And they argue that it is irrational to make judgments about whether newborn children will grow to be sickly adults. One student, Jasmine (abbreviated "JAS"), makes both arguments in the following excerpt. (Transcription conventions are in the appendix.)

```
        MrS:        [      and if you bring someone in=
        JAS:        [[3 syll]
        MrS:  =there that isn't going to do their share as the wall
              of Sparta. you're giving that- that person, something
    5         that could be used better bu- by someone else. I- I
              sort of think that's perfectly right   [   if a baby=
        JAS:                                         [that's not-
        MrS:  =can't hack it you get rid of it. that's going to be a
              problem in the future.=
   10   JAS:  they- they not equal if- if she had a baby and hers
              lived and I had a baby and mine didn't. we not equal.
        MsB:  yeah you're right. you didn't produce a healthy baby.
        MrS:  that's [right
        JAS:         [how do you know that. they just say that one
   15         ain't healthy. and then lookit. mine probably grew up
              to be taller and [ stronger
        MrS:                   [because they're the Spartan Ephors
              [ who make a decision. the Ephors know what makes a=
        JAS:  [and [  5 syll  ]
   20   MrS:  =good Spartan because they're sixty years old and
              they've seen an awful lot. and they know what makes a
              good soldier. they've been in it from the time they
              were seven.
```

In order to make her arguments, Jasmine introduces herself as a hypothetical Spartan mother in lines 10–11. She also nominates another student—"she," which according to my fieldnotes from the interaction refers to another student named Erika—as a second hypothetical Spartan mother. This hypothetical example and the topic of infanticide serve as the focus of the discussion for the next thirty minutes. With her example at lines 10–11, Jasmine argues that the Spartan practice is immoral. She claims that a mother whose baby is killed is being treated unequally. At lines 14–16 Jasmine also uses the example to argue that the Spartan practice was irrational: her apparently sickly newborn, she claims, might grow up to be healthier than Erika's good-looking newborn. By killing a child who might turn out to be healthy, the Spartans are defeating their own goal of building a stronger society.

   Despite the fact that the teachers give counterarguments to both of Jasmine's claims (at lines 12–13 and 17–23), I suspect that Jasmine's example pleases the teachers. Evidence for this comes from their tone of voice and from my notes about their animation at this point in the discussion, as well as the fact that they worked to maintain this example as the topic for thirty minutes. I know from my year-long interaction with them that these teachers enjoy having students involved in conceptual arguments, and in Jasmine's example they see not only evidence of student engagement but also an opportunity to further their pedagogical aims for the class. I argue that they have three cognitive goals for this classroom discussion. First, they want students to understand the reasoning behind the Spartans' practice of infanticide. They believe that this practice is partly rational, and they want students to

understand how reasonable people could have justified that practice to themselves. Strong evidence for this first pedagogical goal comes from the teacher's repeated attempts to defend the Spartan system, over the thirty-minute discussion. I also observed these teachers, on many occasions over the entire academic year, playing devil's advocate in this way to get students to reflect more deeply on the plausible and implausible aspects of an unfamiliar practice or argument. They consistently tried to overcome students' claims that alien practices are bad or wrong simply because these practices are different from ours. In the passage above, Jasmine moves beyond such a simple argument. The teachers pattern has been to probe more complex arguments like Jasmine's, in order to explore what might be reasonable and unreasonable about the alien practice.

These teachers strive to find reasonableness within alien practices because they want students to learn from history things that might be relevant to our lives today. Thus their second goal in this discussion is for students to use the extreme sociocentrism of the Spartan case to understand the general question that all societies face—namely, to what extent should citizens subordinate their individual desires for the good of the state? The teachers' third goal is to help students reflect on similarities between the Spartans' and contemporary US society's goals. From my conversations with them, and from their behavior later in this class discussion, I know that the teachers believe Spartans shared at least some goals and beliefs with contemporary Americans. They seize on Jasmine's example, and later in the discussion introduce other cases drawn from contemporary US society, in order to help students discover goals and beliefs that we and the Spartans share—even though we no longer practice infanticide. By helping the students see these common goals, they intend to help students understand both how the Spartan practice of infanticide might have been reasonable in some respects and how all societies face questions about furthering the common good.

In addition to their persistence in pursuing this example and the larger concepts it illustrates, further evidence that the teachers did in fact hold these pedagogical goals comes from the educational philosophy that these teachers subscribe to. Following Adler (1982) and others, they ask students to read "great books" from diverse cultural traditions (cf. Wortham, 1994, 1995). According to this educational philosophy, students will see in the great books universal human issues that will illuminate their own lives. Thus the teachers approach the text about Sparta with the expectation that it will be relevant to important questions that contemporary societies and the students themselves face.

From the teachers' point of view, then, this classroom discussion will be cognitively successful insofar as the students come to understand three things: how Spartans could have convinced themselves that infanticide was reasonable; how all societies must balance individual desires with the common good; and how contemporary US society also makes some decisions to promote the common good at the expense of individual desires, just like the Spartans. It is not clear from the evidence presented below that the students ever understand how infanticide might have been reasonable. And there is only limited evidence that the students understand the abstract point about all societies—although this is a longer-term goal that the teachers probably did not expect to reach in one class. But there is substantial evidence in the conversation that several students do understand the analogy between the US and Sparta, with respect to the issue of promoting the common good. I argue

that both the denotational and the interactional texts make essential contributions to this understanding.

Immediately after Jasmine gives her example, the teachers try to persuade her that her baby will in fact be a burden on the larger society. At the end of the excerpt given above (in lines 17–23), Mr. Smith claims that the Spartan Ephors are experienced enough to tell which children will grow to be a burden on the society and which will not. As I have just argued, the teachers' larger pedagogical goal at this point is to convince students that Spartan practices might have been reasonable in some respects, by helping students see that concern for the social good makes sense. Mrs. Bailey continues the teachers' argument, by imagining the burden Jasmine's unproductive baby will become in the future.

```
        JAS:  if she had a baby and- and hers lived and mine died
              we not equal. and if they want it to be- everybody to
              be equal then I [ should've got to kept ] mine too.
        MsB:  what- wait a second. you're baby's going to grow up and
  5           be this unhealthy runt.         [    her baby's going to grow=
        STS:                                  [hahaha
        MsB:  =up and be: healthy
        JAS:  I'm equal to her then
        MsB:  yeah you're equal. but you know take it twenty years in
 10           the future. her baby's going to have to do what for
              your baby. your baby's going to do what. lay around.
         ST:  hahahaha drinking beer
        STS:  haha[haha        haha      hahaha        haha
        MsB:       [drinking beer, eating their- their bean soup.
```

Mrs. Bailey imagines the consequences, if Spartan society had favored the individual good of sickly children over the good of the whole. Jasmine the hypothetical Spartan mother might have been happy to have her child saved, but the whole society would end up supporting this sickly child later.

Fig. 1 represents the rudimentary denotational and interactional patterns that are emerging at this point in the discursive interaction. The outermost rectangle represents the interactional event taking place among teachers and students. When Jasmine gives her example, teachers and students occupy their traditional roles in having a classroom discussion, with the teachers teaching and the students learning about ancient history. The teachers have also positioned themselves, as "devil's advocates," as if they favored Spartan practices. And Jasmine has positioned herself against Spartan practices. This apparent conflict between the teachers and Jasmine over the morality of infanticide might be merely an academic device the teachers are using to illuminate the subject matter, or it might signal a deeper interactional conflict.

The two embedded rectangles in Fig. 1 represent aspects of the denotational text. The box labeled "textbook" represents the social roles described by the textbook and discussed by teachers and students earlier in the classroom discussion. The box labeled "example" represents the analogous three-part role structure described by Jasmine in her hypothetical example. The dotted lines between the two embedded boxes represent the analogy between the example and the text. The teachers and Jasmine are using the hypothetical example of
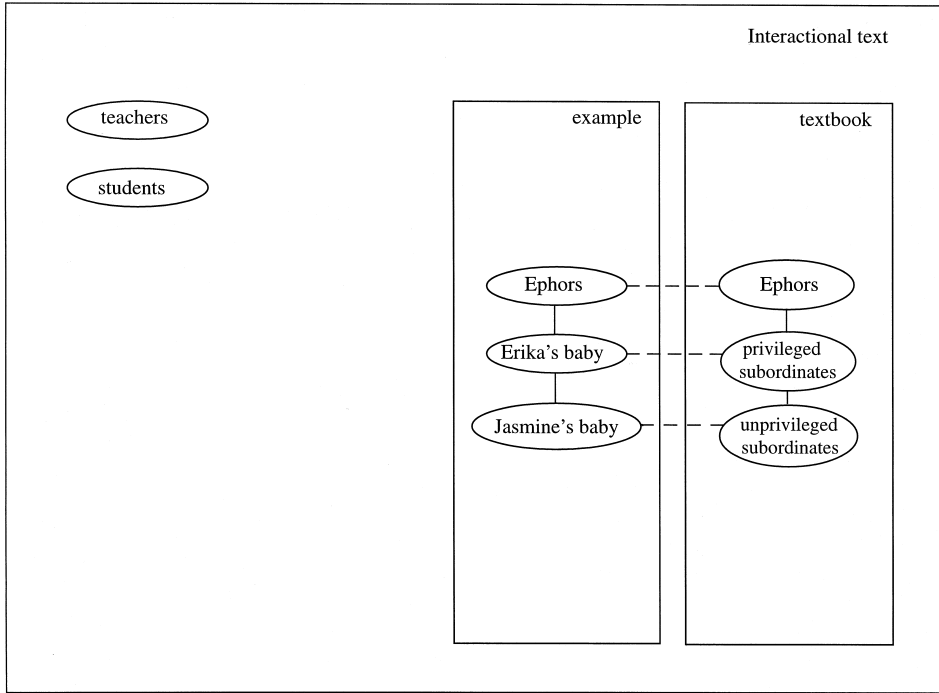
Fig. 1. The example of Jasmine's baby.

Jasmine's baby as a "base" and the case of Sparta as a "target" (Gentner, 1982; Markman, 1997). They set up the example to involve a one-to-one mapping from base to target with respect to the three entities represented in the diagram. They are discussing the relations among these entities in the hypothetical case of Jasmine's baby, with the teachers hoping to infer by analogy how the target case of ancient Sparta might have been partly reasonable and Jasmine hoping to infer that Spartan infanticide was unreasonable and immoral.

So far, then, the teachers occupy two interactional roles: as teachers responsible for teaching the subject matter and as devil's advocates who might favor infanticide for sickly infants. There are thus two interactional texts in play: a standard classroom discussion between teachers and students and a (mock) disagreement between the teachers and Jasmine. But there is some evidence even at this early point that a third interactional text is emerging as well. The example of Jasmine's baby includes some of the speakers participating in the narrating event itself (Jasmine and Erika, so far), and is thus what I have called a "participant example" (Wortham, 1994). This sort of example makes salient the implications that denotational text can have for interactional text, because such examples *double* the roles of certain participants. Jasmine, for instance, now has three identities in this classroom conversation—as a student participating in class discussion, as an opponent of Spartan infanticide and as a hypothetical Spartan mother. As we will see below, and as described at length in Wortham (1994), speakers can make comments about participants' hypothetical characters *within* a participant example and implicitly comment on *actual* participants. In this case, comments about Jasmine's character as a hypothetical Spartan have implications for the

interactional position of Jasmine the student herself. In other words, aspects of the denotational text that Jasmine introduces with her example become relevant to understanding her position in a third layer of the interactional text.

We can begin to see the example's interactional implications by recognizing the two types of relationships it includes. First is the relationship between the two hypothetical Spartan mothers—one of whom must leave her unhealthy-looking child to die of exposure, while the other gets to keep her child. This relationship has various characteristics, but as the example gets discussed further we will see that teachers and students increasingly presuppose this to be a relationship between unprivileged and privileged. The other relationship is between the mother and the Ephors. This is a relationship between the subordinate and the powerful. While fleshing out the analogy between Sparta and the example, which is work they do as part of the denotational text, Jasmine and the teachers discuss these relationships. Jasmine claims that the Ephors unjustly use their power to privilege Erika (at lines 1–3), while the teachers argue that the Ephors justly use their power and that Jasmine deserves her unprivileged position because she had an unhealthy baby (lines 4–5, 9–11).

These two types of relationships that get represented as part of the denotational text, as it turns out, *also* have implications for one layer of the interactional text that teachers and students enact. As the interaction proceeds the teachers sometimes enact the role of the powerful, one group of students sometimes enacts the role of the privileged, and another group of students (including Jasmine) sometimes enacts the role of the unprivileged. The cues that support this reading of the interactional text begin in the last passage presented. What sort of person would stereotypically say "your baby's going to do what? lay around. . . . drinking beer"? This accusation might index contemporary welfare critics, who often decry the alleged laziness of the welfare recipients whom taxpayers support. (The utterance indexically presupposes this social group, because members of the group characteristically speak in this way; cf. Peirce (1955) and Silverstein (1976) for a technical account of indexical presupposition). This particular index has the potential to influence and complicate the interaction among teachers and students, because the students come from a social group often stereotyped as lazy welfare recipients—lower class blacks.

Wortham (1994) argues that as the discussion proceeds and the interactional text unfolds, the teachers do in fact align themselves with contemporary US welfare critics. Furthermore, the passage above represents the beginning of a pattern in which the students' own social position becomes analogous to that of unprivileged Spartans. In addition to the denotational analogy between Jasmine's example and the case of Sparta, students *enact* a social position analogous to the unprivileged Spartans' and teachers *enact* a position analogous to the Ephors'. In the classroom and in contemporary America, just as in Sparta, we have relations between the privileged and unprivileged and between the powerful and the subordinate. Like Spartan mother who must submit their children to be judged, students must submit to teachers' judgments. And, as Spartan society did to unhealthy babies, American society often turns its back on the students' social group (lower-class blacks). This analogy begins to develop in the passage above when Mrs. Bailey characterizes Jasmine's baby as naturally inferior (an "unhealthy runt"), unproductive ("lying around") and intemperate. These terms index a particular type of social identity for the child and thus for its mother. Although Mrs. Bailey is explicitly talking about Sparta, her characterization of Jasmine's baby as a lazy

drunkard begins to sound like the contemporary American stereotype for some lower-class black welfare recipients.

I am not claiming that Mrs. Bailey's brief characterization of Jasmine's baby in this passage *definitively* positions her as a welfare critic and Jasmine as the type of "welfare mother" that welfare critics complain about. First, as described above, there are at least two other interactional texts in play: students and teachers are having a classroom discussion, with the standard goal of helping students learn the subject matter; and the teachers are playing devil's advocate by defending the Spartan practice of infanticide, and thus they are engaged in a (mock) argument with Jasmine. I claim that, *along with* these other two interactional texts, teachers and students might also be starting to presuppose an interactional text that positions the teachers as welfare critics. Second, the few cues in the passage above do not suffice to establish this third, "welfare critic" interactional text. The welfare critic and welfare mother social positions would have to be presupposed by many subsequent cues before analysts or participants could conclude that this third interactional text is in fact being enacted. The rest of this section, and the more comprehensive analysis in Wortham (1994), provide evidence from the transcript that many subsequent cues do in fact presuppose these social and interactional issues surrounding welfare.

This third interactional text, which positions the teachers as welfare critics and Jasmine as a welfare mother, involves an analogy between the relations in Sparta and role relations in the contemporary US. The teachers' argument that the Ephors were justified in killing unhealthy infants might presuppose that the teachers themselves are welfare critics who would feel justified in cutting off welfare recipients' benefits. I emphasize that this analogy between the students' and teachers' *actual* interactional positions and the social positions *represented* in the example differs fundamentally from the analogy between the example and Sparta. The analogy between the example and Sparta, as represented in Fig. 1, maps similarities *from one denoted realm to another*. The teachers and Jasmine use these similarities to pursue their arguments about the reasonableness and morality of Spartan practices. The emerging analogy between students' and teachers' own interactional positions and the example maps similarities between an *enacted* realm and a *denoted* realm. I will argue in the next section that this sort of analogy between enactment and denotation allows interactional textual structure to contribute to the cognitive accomplishments made through this classroom conversation.

With the addition of these new interactional positions for Jasmine and the teachers, they now each have three interactional identities that have been and might continue to be presupposed. The teachers are responsible for helping students learn the subject matter. They might be advocates for infanticide or some other sort of social engineering like the Spartans'. And they might be positioning themselves as welfare critics who oppose contemporary US social welfare policies. Jasmine is a student learning the subject matter. She opposes the Spartans' infanticide. And she might be getting positioned as a stereotyped welfare recipient. *Each* of these identities or positions is in play during the classroom conversation. The teachers *are* playing devil's advocate to prod students into thinking further about Sparta. But I argue that they are *also* positioning themselves as welfare critics, as shown by patterns of indexical cues that increasingly come to presuppose this positioning.

The following excerpt occurs a few minutes after the one presented above.

```
     MsB:            yeah but see you're- you- but that's the
                [     hitch isn't it? you've got this baby that's not=
     JAS: [I'm sayin'-
     JAS:           [I know. so [ 3 syll ]
 5   MsB: =healthy [and you're afraid's going to go in the army,
                [breathless inhalation] and why should the rest
                of us [s-   support your baby.
     STS:          [hahaha
     ST?: are you saying=
10   JAS: if they wanted them to be equal then even if my child
                was retarded or whatever he should go into the army too
```

If we examine this excerpt for its interactional implications, one utterance stands out: Mrs. Bailey's "why should the rest of us support your baby?" at lines 6–7. This indexes welfare critics again, because it expresses a sentiment often voiced by welfare critics. Note Mrs. Bailey's use of *us* in this utterance. For the first time Mrs. Bailey includes herself in the example, in a group opposed to Jasmine's. She attributes a definite social identity to Jasmine's baby: he is an unproductive freeloader, someone who needs to be supported by society. Mrs. Bailey and her social group—whoever is included in *us*—are taxpayers forced to support such people. Here Mrs. Bailey more explicitly positions herself, and implicitly Mr. Smith and other taxpayers, in a role analogous to the Ephors'. In both the text and the example the Ephors refuse to expend resources on unhealthy babies. Analogously, Mrs. Bailey herself seems to resent spending tax money on "unproductive" children.

I do not deny that Mrs. Bailey is playing devil's advocate here. She continues to defend Spartan infanticide, in order to reach her pedagogical goals. But she also raises a charged and salient issue from her own and the students' lives—the use of workers' tax payments to support nonworking people. Given that many of these students come from families on welfare, and that many working people resent paying taxes to support welfare recipients, by saying "why should the rest of us support your baby" Mrs. Bailey *also* potentially brings the social dispute between welfare critics and welfare recipients into play. Paralinguistic cues also seem to indicate Mrs. Bailey's commitment to the issue in this passage: both the tempo and volume of her speech increase markedly while she is making this point about supporting unproductive people. Both this passage, and the earlier one that described Jasmine's child as someone who would lie around drinking beer later in life, seem to presuppose the welfare-critic interactional text. If subsequent utterances continue to presuppose that teachers might be positioning themselves as welfare critics and students might be getting positioned as stereotyped welfare recipients, and the analysis in Wortham (1994) shows that they do, analysts and participants should be more likely to conclude that this third layer of the interactional text is in fact going on.

Fig. 2 represents the discursive interaction at this point. Utterances from the last two excerpts are included, utterances that Mrs. Bailey uses to describe Jasmine's hypothetical baby. As discussed above, these utterances index groups that both teachers and students recognize from their own society: welfare critics and stereotyped welfare recipients. Given this, the question becomes where teachers and students *themselves* stand with respect to these
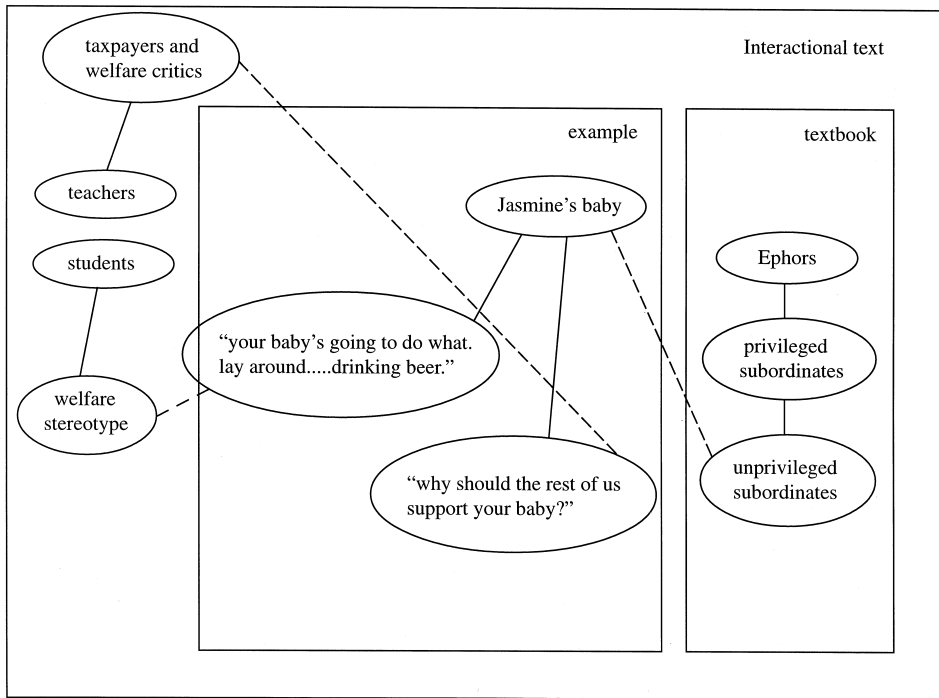
Fig. 2. Interactional presuppositions of the example.

presupposed groups. The last passage indicates that Mrs. Bailey aligns herself with the welfare critics, as an irate taxpayer. The fact that most of these students are lower class Blacks also makes it possible that they themselves are being aligned—through the too-common US stereotype—with Jasmine's hypothetical, unproductive baby. The dotted lines between the utterances in the "example" box and the "interactional text" box represent the indexical presuppositions carried by those utterances. As we have seen, a *pattern* of indexical cues, in these utterances and several others analyzed in Wortham (1994), has emerged to position teachers and students within a recognizable interactional text. We can summarize this interactional text in this way: the teachers inhabit the role of welfare critics and complain about (stereotyped) unproductive welfare recipients like the students. Note that this interactional text includes positions that get enacted in the larger society, positions that the teachers and students easily fall into. These teachers are not hostile, racist people in general, but they and the students do fall into a racist interactional text that comes to speak (or act) through them.

While this third interactional text is emerging, the teachers are still trying to convince Jasmine and other students that infanticide might be reasonable in some respects. They have a hard time convincing students that it would be acceptable to kill Jasmine's hypothetical baby, however. As they confess later in the discussion, the teachers themselves do not believe that infanticide is acceptable either. But they do want the students to see that Sparta's concern for the social good—while perhaps taken to an untenable extreme by the Spartans them-

selves—is nonetheless a reasonable goal. In trying to convince students of this, Mrs. Bailey introduces a third analogous realm into the denotational text, this one drawn from contemporary US society. Here the teachers get to their third goal for the class—to help students understand that the contemporary US should also sometimes favor the common good over individual desires. Mrs. Bailey argues that we have swung too far away from the Spartan model, allowing individuals to do whatever they want at the expense of the common good.

MsB: I mean- what is the <u>prob</u>lem with this Jasmine. we're- what do we
      do. Let anybody mate with everybody else in our society. We've got
      all of these <u>crack</u> babies. And all of these- you know babies that are
      born to <u>twelve</u>-year-olds and ar- are premature and therefore have all
5   these problems. we have mental incompetents mating with mental
      incompetents producing children. and going back to our discussions on
      the [2 syll] and- and Aristotle's *Politics*, I'm <u>ti</u>red of footing the bill for
      these people. if you can have a <u>healthy</u> baby <u>fine</u>. But why should <u>I</u> have to
      contribute to the support of <u>your</u> retarded kids and you just keep
10   producing them.
ST: go:d.

Here Mrs. Bailey shifts away from the (denotational) analogy between Jasmine's hypothetical baby and ancient Sparta. She begins to construct a new analogy between Jasmine's hypothetical baby and contemporary US society. In some respects, Mrs. Bailey's comments here still pertain to the hypothetical example of Jasmine's baby, as we can see in lines 8–9 when she refers to "your" kids. Jasmine's example—or an expanded version of it where the kids are "retarded"—is not only analogous to Sparta but also to some contemporary US social practices. The new analogous realm here must be the contemporary US, because "crack babies" are a distinctively modern phenomenon. Mrs. Bailey seems to be arguing that excessive concern for the rights of individuals (to have crack babies whenever they want, for example) has high costs to the common good. She is using the contemporary US here as a new base for an analogy. She and Mr. Smith have tried to argue by analogy, using the base of Jasmine's example, that Spartan infanticide was partly reasonable. But the students have not accepted this argument. So Mrs. Bailey introduces *another* analogous realm, from the contemporary US, in a second attempt to show how Spartan infanticide was rational insofar as it was meant to serve the common good.

In order to make this argument, Mrs. Bailey first points out the problems that contemporary US society has, because we do not pursue the common good as vigorously as Sparta did. In the last passage, she describes how contemporary US practices lead us to have many unproductive citizens who burden the society (lines 2–6). By letting these individuals pursue their own desires, without regard for the common good, contemporary US society makes a mistake. By analogy, the students might infer that Spartan attempts to promote the common good are not as unreasonable as they might seem. There is no evidence here that the students themselves make this inference, however. In fact, the student's response at line 11 seems more plausibly a reaction to the position of welfare critic that Mrs. Bailey continues to presuppose for herself in the interactional text at lines 7–10.

Then Mrs. Bailey goes on to argue that we in the contemporary US also pursue the

common good, although in different ways than the Spartans. Thus she sketches out the analogy between the US and Sparta further, by showing how both societies try to promote the common good in their own ways.

```
     MsB:  yeah prosperity is money riches wealth. OK. how do- how
           do we become a rich, nation. a powerful nation.
     CAN:  work hard? work for it.
     MsB:  you've got   [to work for it.
  5  CAS:              [[ 4 syll ] good education
     MsB:  you've got to have a good education. why.
```

Here Cassandra suggests a contemporary American practice designed to improve citizens' productivity: education. Mrs. Bailey pursues this point, because it fits her argument. Like the Spartans, we are concerned about the common good. We are not willing to kill children who might be unproductive, so we provide education to help all children join the economic system and contribute to the society. A few minutes further into the discussion, Mrs. Bailey and Mr. Smith more explicitly state their argument.

```
     MsB:                          when- when I- we want a society of
           productive individuals but we also say anyone that's
           born has a right to survive. (1.0) K- now what do we
           want to do with all these surviving individuals. what's
  5        in the best interest in our society?
     CAS:  use them.
     MsB:  to use them to make them productive. which means we
           might have to do a few things in between right? we
           might have to give them an education. we might have to
 10        also what? (3.0) job training. create jo:b programs.
     MrS:  make them healthy. (1.0)
     MsB:  give pre-natal care.
     MrS:  make certain they have homes.
     ST?:  no
 15  STS:  [hahahahaha              haha
     MsB:  [talk about sex education in- in- in classes so
           that kids are not producing children at an- at too
           early an age. (1.0)
     CAS:  talk about diseases.
 20  MsB:  talk about diseases. set up health plans. You see we're
           about the same thing as the Spartans are about in some
           ways. except we started with a different sense of who
           should live. we're trying to make people productive
           too.
```

Here the teachers spell out the differences and similarities between Sparta and the contemporary US. They were willing to kill sickly babies, while we are not. But the Spartan practice of infanticide can be understood with reference to a goal both societies share: to have citizens

that contribute to the social good. Contemporary US society invests resources toward this goal, through education and social welfare programs.

At this point the teachers try to close the discussion of Jasmine's example and Spartan infanticide. As described in Wortham (1994), the students resist this closure and continue to protest against the injustice of killing unhealthy babies. I argue in Wortham (1994) that this continued resistance provides further evidence that the students are presupposing or orienting to the interactional text that involves welfare critics and stereotyped welfare recipients. But the teachers override the students' objections and go on to another topic. The fact that the teachers close the discussion at this point likely indicates that they have accomplished at least some of their pedagogical goals. They did not get students to admit that Spartan infanticide was reasonable in any way. But they did show students how US society tries to promote the common good, just like Sparta. At least one student (Cassandra) seems to understand this point, as indicated by her contributions to the last passage.

When she introduces the third analogous realm of the contemporary US into the denotational text, Mrs. Bailey also continues to presuppose the "welfare critic" interactional text. In fact, the new denoted information allows her and Mr. Smith to flesh out this interactional text further. Note that, by this point in the discursive interaction, the teachers have dropped their roles as devil's advocates. They now have only two interactional roles in play: as teachers responsible for the subject matter and as welfare critics. Their positions as welfare critics become presupposed even more strongly in the following excerpt, which picks up the discussion right after the six-line excerpt presented on page 55 top.

```
        MsB:  yeah prosperity is money riches wealth. OK. how do- how
                do we become a rich, nation. a powerful nation.
        CAN:  work hard? work for it.
        MsB:  you've got   [to work for it].
  5     CAS:             [[ 4 syll ] good education
        MsB:  you've got to have a good education. why.
         MR:  like some um, like some of them Asian women are taking
                over 'cause they are smart.
        STS:  Asians Asian girls hnh
 10     MsB:  because they work hard?
        STS:  [ 2 sec overlapping comments ]
        MsB:  they just don't work harder than you do.
         MR:  they work hard but they smart too.
        JAS:  they have to be smart to learn all them signs.
 15     STS:  hahaha [[ overlapping comments and laughter ]
        MrS:          [if- if that's the case Martha. if that's- if
                that's the case because they're smart and they work
                hard, then because you're not smart you don't work hard
                maybe [we should throw you in the glen early to give=
 20    ST?:          [[ 6 syll ]
        MrS:  =them the benefit?
        ST?:  [ 2 syll ] that smart
```

```
        CAN:   there's this- there's this boy I know he just came
                  from- India and stuff and I swear °you know° he- he
   25             learned how to speak English in about a month. like
                  this. [snaps fingers] smart.
        MrS:   so why should we waste time with you. I think we'd best
                  go to him and work with him. and he'll be our best
                  future citizen.=
   30   MsB:   make them the Helots.
        STS:   [hnhhnh
        MrS:   [that's right. I like that idea.
```

Analyzed just in terms of denotational text, this passage fleshes out Mrs. Bailey's argument about the common good. But the third analogous realm introduced in the denotational text, which helps the teacher to make an argument about the rationality of various social practices, also has interactional implications. The students nominate contemporary Asians as productive members of US society in a position analogous to Erika's healthy baby (at lines 7ff.). Asians in the US, like Erika's baby, will allegedly work hard and contribute to the society. Less talented and diligent students will not work as hard and will not contribute as much. When we consider the implications of this segment for the interactional text, it becomes clear that this passage continues to presuppose the "welfare critic" interactional positioning that started earlier. The students themselves contribute to this, but the interactional text nonetheless positions them in stereotyped and insidious ways. (Because they act against their on interest in this way, I conclude that they are not aware of the interactional implications their comments might have.)

The passage contains several clues that the students' and teachers' own social positions—and, more generally, issues surrounding race relations and welfare programs in contemporary America—are also interactionally in play. In lines 16–29, Mr. Smith connects the relationship between these (black) students and Asian students to the relationship between Jasmine's and Erika's hypothetical babies. He does this, for example, by talking about throwing these students "in the glen" at line 19. His use of this phrase indexically presupposes Plutarch's use of the same phrase, when Plutarch says that unfit Spartan babies were left outside "in a glen" to die. Mr. Smith presupposes an analogy here between the relationship of Asian to black students and the relationship of healthy to unhealthy Spartan babies. In doing so, he positions students like Jasmine as less well endowed: Asian students are smart and they work hard; other students are dumb and lazy. He also follows Lycurgus in claiming that society should turn its back on underendowed children.

Mrs. Bailey's comment at line 30—"make them the Helots"—captures and summarizes the implications of this passage for the interactional text. To understand this comment we first need another piece of background information. The Helots were serfs or slaves who farmed the land around Sparta, allowing Spartan citizens a life of leisure. Helots outnumbered Spartans ten to one, so citizens always feared a revolt. The reading describes two ways Spartan citizens reduced the threat: they periodically snuck out of the city at night and murdered Helot men; and they invited strong, eloquent Helots into the city on the pretense of honoring their talents, then they killed them.
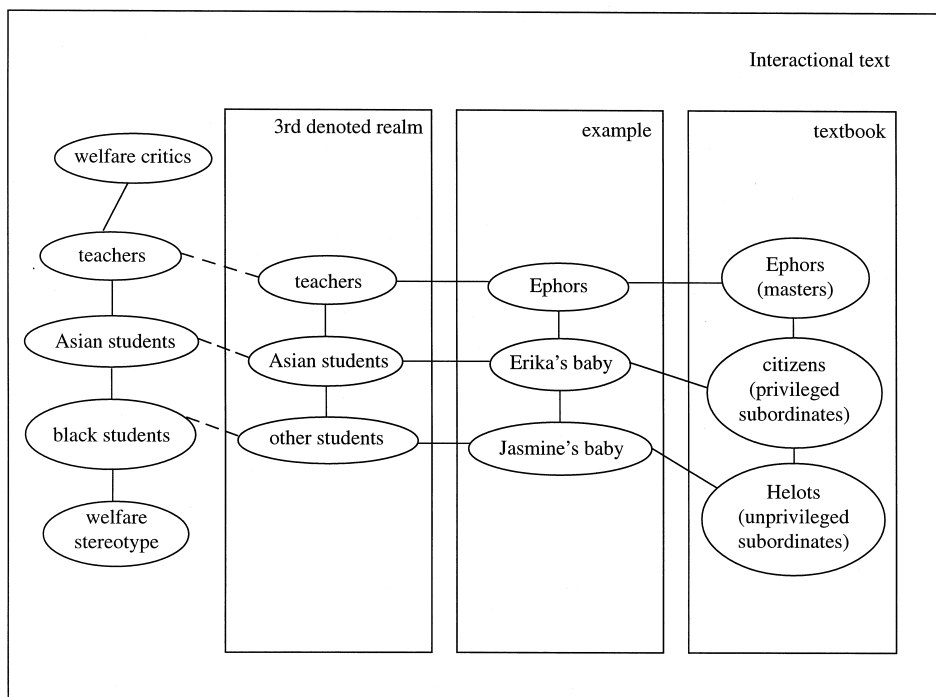
Fig. 3. Interactional implications of the example.

Fig. 3 includes this information in its representation of the denotational text. The class discusses three social groups in Sparta: those in power (Ephors), the privileged (citizens) and the unprivileged (Helots). The figure makes clear that the example of Jasmine's baby, and the analogous realm including Asian students and contemporary US society, both involve analogous three-part sets of social groups. Within the denotational text, then, there are three analogous realms: the textbook, the example and contemporary US social relations. As discussed above, the teachers use these analogies to argue that the US and Sparta have some things in common—particularly the goal of defending the common good.

The figure also represents a fourth realm that has the same structure as the other three—the "welfare critic" interactional text that establishes social positions for teachers and students. The figure shows that the teachers and students themselves occupy roles analogous to those in Sparta and the example. In discussing how society should treat the unprivileged, teachers and students are not only discussing past, hypothetical events. They also position themselves with regard to contemporary questions about how powerful and privileged people (like the teachers) should treat unprivileged people (like some of the students). As represented in the figure, the teachers end up siding with welfare critics and discouraging overinvestment in the unprivileged.

Mrs. Bailey encapsulates this interactional pattern when she proposes making the students Helots. With this comment she casts white teachers and Asian students as superior to black students, in the same way that Spartan Ephors and privileged citizens were superior to

Helots. This both points out black students' subordinate position and provides a potential justification for it—in terms of inferior capacities. Expressed bluntly, in the interactional text the teachers' positioning communicates the following to the students: (1) productive people like us are tired of paying taxes for "freeloaders" like you; (2) you are members of an unproductive social group that does not deserve equal rights; (3) those in power like us will decide which of you are potentially productive and deserve to enjoy the benefits of society. (This obviously summarizes thirty minutes of interactional work coarsely; cf. Wortham (1994) for more detailed analysis.) I emphasize that none of these three "points" is *denoted*. Teachers and students *enact* an interactional event that communicates these things through the interactional positions presupposed and created by their speech.

So the analogy between the fourth realm represented in Fig. 3—the interactional text—and the other three denoted realms *differs fundamentally* from the other analogies. Instead of using one representation to infer things about another, the teachers used a representation to facilitate their interactional positioning. The teachers aligned themselves with the indexically presupposed group of welfare critics, and they positioned students alongside the indexically presupposed group of stereotyped welfare recipients, by using the three-part relationship (between the powerful, privileged subordinates and unprivileged subordinates) that was set up in the *denotational* text. The academic content of the classroom discussion—which itself composed a coherent denotational text—contributes essential organization to the interactional text. But the interactional text is not simply derived from denotational text. Teachers and students did not denote all the interactional positioning that they presupposed about welfare critics and stereotyped welfare recipients. Instead, they enacted this interactional text through the deployment of indexical cues. The next section argues that this enacted interactional text contributed to students' understanding of the subject matter.

5. Cognition and enactment

I argue that the analogy between denotational and interactional text in this case does more than help the teachers to accomplish their interactional positioning. The interactional text in the classroom discussion of Spartan infanticide also makes essential contributions to the academic understanding accomplished in that discussion. In order to make this argument, "academic understanding" must mean more than 'accurate mental representations' or 'denotationally explicit accounts of the subject matter.' Academic understanding in a classroom discussion occurs when people participate competently in intelligible academic discourse about an issue. Such competent participation inevitably involves some accurate mental representations and some denotationally explicit talk about the subject matter. But at least in some cases conversation that illuminates academic content depends on mental, denotational *and* interactional structures for its coherence. As Greeno et al. (1998), Lave (1993) and others have argued, academic success requires competent participation in academic practices—not simply the production of decontextualized representations or denotational accounts.

The Spartan infanticide discussion shows how denotational and interactional text interrelate so as to illuminate the academic content raised by the teachers. The teachers wanted students to understand why Spartan infanticide might have been reasonable in some respects.

Their strategy was to show students that Spartans were concerned for the common good more than for individual rights. In order to communicate this more general point, the teachers introduced an analogy with contemporary US practices like compulsory education. They wanted students to understand that we are also concerned to promote the common good and that our society might err in overemphasizing individual rights at the expense of the common good. The teachers made many denotationally explicit comments that contributed to these points, but they and the students also enacted interactional patterns that contributed.

Spartans discarded unhealthy infants for the common good. In the US, we discard allegedly unproductive citizens by denying them a decent education and other opportunities to succeed. Students and teachers *enacted* this pattern from the contemporary US, by falling into the roles of (stereotyped) lazy black welfare recipients and welfare critics. Spartan society invested in privileged members—like healthy infants and Spartan citizens—and discarded or exploited allegedly unproductive infants and Helots. In the US, we also sometimes distinguish between privileged and unprivileged members. Students and teachers *enacted* this contemporary pattern as well, by falling into the roles of allegedly "model" minorities and "unproductive" minorities—whom we often support differentially by sending them to different tracks in school, for instance. Teachers and students fell easily into the roles of welfare critics and stereotyped welfare recipients—and into the roles of teachers who appreciate diligent Asian students and black students who either resent or envy Asian students' academic success—because they often see these interactional positions adopted around them. These role positions and their associated racist stereotypes are part of our culture. That is, people in the US regularly presuppose or enact them (unfortunately). Many of the students, and perhaps in some respects the teachers as well, do not mentally represent the nuances of the welfare debate and of black-Asian relations in the contemporary US. But they know how to *enact* these relations.

The classroom discussion created an analogy between ancient Sparta and the contemporary US in part because teachers and students enacted the three-part role structure of powerful-privileged-underprivileged that occurs in Sparta and in our own society. Teachers and students did denote some aspects of this three-part role structure, but others they simply enacted. So the teachers reached their goal of sharing commonalities between the US and Sparta in part as they and the students enacted the positions of powerful/disempowered and privileged/unprivileged. In other words, the analogy between the interactional text and the three denotational textual realms allowed the interactional text to facilitate cognition. The "base" in the analogy was enacted as much as it was represented, and the enacted positions allowed students to understand similarities between the US and Sparta.

The teachers likely did not intend the interactional text to do the work it did. Like most of us who participate in academic conversation, they probably expected the denotational text to do all the work. Nonetheless, students understood something about why Sparta discarded apparently unhealthy infants, because they *enacted* how the contemporary US also pushes aside some citizens by judging them as unproductive and (e.g.) denying them access to decent education. Students understood how all societies must demand that some individuals sacrifice for the good of the whole, because they *enacted* how people like them often must give up their aspirations because the society does not nurture and use their talents.

In these last two sentences, I use "understood" in a broad sense. I doubt that students or

teachers mentally represented or could have explicitly formulated the full analogy between the denotational and interactional texts. (I wish that I had been fully aware of the interactional text myself as I observed this class session, because then I would certainly have interviewed them afterwards to find out how much they could articulate. Unfortunately, I sat through the whole discussion without any conscious awareness of what was going on. Analyses like the one presented in this article often require transcription and reflection for weeks or months after the event). I find it more plausible to model teachers' and students' understanding of "unproductive" citizens in the US and Sparta as an emergent property of an ecosocial system—one that includes the denotational information communicated by language, some mental representations, the larger social patterns that teachers and students participate in and implicitly recognize, and the interactional text created through their interaction. In other words, both the interactional text and the denotational text were necessary but not sufficient for helping students understand the analogy between the US and Sparta. The cognitive accomplishments in this conversation were facilitated in part by the interactional *enactments* of the three role positions of powerful, privileged, and unprivileged groups of people. Evidence for this comes from the fact that students and teachers participated in and oriented to the interactional text that involved welfare critics. Students as well as teachers produced indexical cues that presupposed this interactional text, and in doing so they participated fluently in the partly-represented, partly-enacted analogy between the US and Sparta.

I am not claiming that the interactional patterns that contributed to understanding in this case could not have been made denotationally explicit. Students could have learned about all the commonalities between Sparta and the US by denoting them explicitly. But in this case they did not, and in cases like this interactional structure can make essential contributions to cognitive accomplishments. Because all speech has some interactional functions, I suspect that interactional processes contribute to ecosocial systems more often than we might think.

One might object that, for teachers and students to denote and enact the three role positions of powerful, privileged and unprivileged as they did, they must have had a more comprehensive underlying mental schema that captures all the relations depicted in Fig. 3. One might argue, further, that the indexical cues speakers produced and responded to triggered aspects of this underlying mental background knowledge. While I cannot formally refute such an explanation, I find it unparsimonious. We now have substantial evidence that speakers create complex patterns of indexical cues and robust interactional texts in many kinds of discursive interaction (e.g., Garfinkel, 1967; Garfinkel & Sacks, 1970; Goodwin, 1984, 1995; Irvine, 1992, 1996; Silverstein, 1985, 1998; Silverstein & Urban, 1996; Wortham, 1994, 1996). Why should we posit mental structures to "explain" this level of organization? People enact interactional patterns that they do not mentally represent, just as they walk without mentally representing all the complex movements required. Instead of positing redundant mental structures, I suggest that we flesh out our descriptions of emergent interactional textual structures and begin to explore how they might contribute to larger ecosocial systems. I am not claiming that interactional structures *by themselves* allow cognitive accomplishments, nor am I claiming that interactional texts play a more important role than denotational texts or mental representations. Instead, I claim that interactional texts sometimes contribute as one component of the ecosocial systems through which cognitive accomplishments occur.

If they are not mental representations, however, what kind of entities are indexical cues and interactional texts? Bechtel (1998) and Clark and Toribio (1994) argue that even "low-level" (i.e., implicit or nonsymbolic) aspects of cognitive systems are nonetheless "representations" in that they carry information. Greeno (1997) argues that nonmental aspects of ecosocial cognitive systems compose or contribute to "structures of information." Indexical cues are clearly "representations" in this broad sense, because they function semiotically to signal information. Interactional texts are participants' often implicit construals of indexical patterns as indicating recognizable types of coherent events. But describing indexical cues as representations and interactional texts as construals of representations should not lead back to a dualist account of cognition. Indexical signs differ in kind from symbolic ones (Peirce, 1955). Symbols conventionally represent certain aspects of some possible world, often independent of context, while indexical cues simply point to aspects of their context. In general, interactional texts are not mediated by symbolic representations of what is going on. People simply enact some event by producing and orienting to patterns of indexical cues. Although this process involves representation in a broad sense, it should not be assimilated to the more common models of symbolic cues and denotational text.

In understanding the role interactional text can play in cognition, then, one can draw only partly on the analogy of "distributed cognition." In distributed cognition a group knows how to do something, even though no one individual could do it alone, because various individuals carry various pieces of the relevant knowledge. Interactional texts are like this, insofar as the cognitively-relevant structure they contribute is distributed across a group. Jasmine by herself could not have enacted the full set of powerful, privileged and unprivileged role positions. But interactional texts differ from distributed cognition because the structure distributed across the group is not primarily "knowledge"—in the sense of denotational text or symbolic representations. The group enacts a pattern through coordinated indexical signaling. That pattern is a type of tacit knowledge, a type that generally involves things we can enact but not articulate. As argued by Greeno et al. (1998) and Lave (1993), such *participation* in social practice can contribute to cognitive accomplishments. By enacting the roles of "unproductive" citizens and those in power who judge them, students and teachers contributed to their understanding of the similarities between the US and Sparta—in the broad sense of "understanding," where it means to contribute competently to discussion that illuminates some academic issue.

In addition to showing how interactional text can contribute to academic cognitive accomplishments, the classroom discussion of Sparta analyzed in this article also shows how larger social processes can participate in ecosocial systems. Greeno et al. (1998) and Lave (1996) argue that cognitive accomplishments involve and can transform social identities. The kind of person participants are, they argue, influences what and how participants learn. And what participants learn can shape the kind of people they become. The classroom discussion of Sparta illustrates both these processes. The understanding accomplished in the conversation depended on an analogy between role relationships in Sparta and those common in the US. Students and teachers were able to *enact* roles analogous to those found in Spartan society because of their *own* social positions in the US. If Jasmine and her peers had been upper middle class suburban students and Mrs. Bailey had been an inner city resident, they

would surely not have enacted the interactional text that they did. Thus the social identities of participants were integral to their cognitive accomplishments. And those cognitive accomplishments probably reinforced and perhaps even shaped students' and teachers' social identities. Being positioned as unproductive and parasitic—if the students were to experience this regularly—may well shape their own and others' senses of who they are.

6. Conclusions

The analysis given in this article contributes in three ways to discussions of situated cognition. First, it shows that complex interactional textual structures in classroom conversation can contribute to situated cognition. The positioning that teachers and students enacted in their discussion of Sparta contributed to their understanding of the analogy between the US and Sparta—and perhaps to their understanding of social power relations and the common good. Any argument by example faces the question of generalizability, however. How often do complex interactional texts of the sort described in this article facilitate understanding? Clearly the interactional text in the Spartan infanticide discussion is both particularly complex and closely tied to the denotational text. Many interactional texts are simpler and less sociologically interesting, and many interactional texts do not make such central contributions to denotation and cognition. Wortham (1994) reports that, when "participant examples" serve as catalysts for discussion, they often generate rich interactional texts of the sort described in this article. This happens because participant examples *double* participants' roles and thus set up potential analogies between interactional and denotational texts. Wortham (1997) describes the uniqueness of participant examples in which speakers enact what they describe—that is, in which the denotational and interactional texts run parallel. We can expect that discursive interactions that facilitate such parallels (autobiographical narrative is another; cf. Wortham, 2001) will often have interactional texts that contribute to cognitive accomplishments. Although this sort of elaborate parallel between denotational and interactional texts may be somewhat unusual, the cases described by Irvine (1996) and Silverstein (1998) show that complex interactional texts contribute to denotational text more often that we might expect. All cognitive accomplishments that depend on speech rely to some extent on interactional structure, as established by the case of deictics. But many cognitive accomplishments rely on interactional text, more directly, with the extent of this dependence ranging on a continuum up to complex cases like the one described in this article.

Second, this article establishes that in some cases the understanding of academic subject matter can rely in part on complex interactional and social structures. Even apparently "representation-hungry" tasks (Clark & Toribio, 1994) sometimes get accomplished with the substantial aid of nonmental ecosocial structures. One might ask, however, whether this *should* be the case. In academic discourse, should we not base our arguments and our understanding on denotational text as much as possible? This may be so, although it is a normative and not a scientific question. But in practice all academic discourse inevitably has interactional functions, and analysts should try to understand how interactional texts empirically do contribute to the understandings achieved through that discourse. Interactional text might be too pervasive, and too productive, to be targeted for elimination.

Finally, the analysis given in this article shows that even academic cognitive tasks can both depend on and contribute to enduring social and cultural structures (as claimed by Engeström (1993), Lave (1996), Lemke (1997) and Walkerdine (1997)). It was not accidental that lower class black students were the ones positioned as unproductive and parasitic and that middle-class white teachers were the ones positioned as welfare critics. Students and teachers were able to enact this pattern so easily, when this interactional text fit into and complemented the ecosocial system, because in our society they often see and experience lower-class blacks and middle-class whites being positioned in this way. We cannot analyze the ecosocial system in that classroom, nor could students and teachers have made the cognitive accomplishments they did, if the larger social structure had been significantly different. At least in some cases, then, analyses of situated cognition cannot ignore social structure.

Acknowledgments

Appendix

Transcription conventions

'-'	abrupt breaks or stops (if several, stammering)
'?'	rising intonation
'.'	falling intonation
'__'	(underline) stress
(1.0)	silences, timed to the nearest second
'['	indicates simultaneous talk by two speakers, with one utterance represented on top of the other and the moment of overlap marked by left brackets
'='	interruption or next utterance following immediately, or continuous talk represented on separate lines because of need to represent overlapping comment on intervening line
'[. . .]'	transcriber comment
':'	elongated vowel
'°. . . °'	segment quieter than surrounding talk
','	pause or breath without marked intonation
'(hh)'	laughter breaking into words while speaking

References

Bailkey, N. (1987). *Readings in ancient history*. Lexington, MA: D. C. Heath.

Bateson, G. (1972). *Steps to an ecology of mind*. NY: Ballantine.

Bechtel, W. (1998). Representations and cognitive explanations. *Cognitive Science, 22,* 295–318.

Clark, A., & Toribio, J. (1994). Doing without representing? *Synthese, 101,* 401–431.

Cobb, P., Gravemeijer, K., Yackel, E., McClain, K., & Whitenack, J. (1997). Mathematizing and symbolizing. In D. Kirschner & J. Whitson (Eds.), *Situated cognition*. Mahwah, NJ: Lawrence Erlbaum.

Cole, M. (1996). *Cultural psychology*. Cambridge: Harvard University.

Engeström, Y. (1993). Developmental studies of work as a testbench of activity theory. In S. Chaiklin & J. Lave (Eds.), *Understanding practice*. NY: Cambridge University.

Engeström, Y., & Cole, M. (1997). Situated cognition in search of an agenda. In D. Kirschner & J. Whitson (Eds.), *Situated cognition*. Mahwah, NJ: Lawrence Erlbaum.

Garfinkel, H. (1967). *Studies in ethnomethodology*. NY: Prentice Hall.

Garfinkel, H., & Sacks, H. (1970). On formal structure of practical actions. In J. McKinney & A. Tiryakian (Eds.), *Theoretical sociology*. NY: Appleton Century Crofts.

Gentner, D. (1982). Structure-mapping. *Cognitive Science, 7,* 155–170.

Gibson, J. (1979). *The ecological approach to visual perception*. Boston: Houghton Mifflin.

Goodwin, C. (1979). The interactive construction of a sentence in natural conversation. In G. Psathas (Ed.), *Everyday language*. NY: Irvington

Goodwin, C. (1984). Notes on story structure and the organization of participation. In J. Atkinson & J. Heritage (Eds.), *Structures of social action*. NY: Cambridge University.

Goodwin, C. (1995). Seeing in depth. *Social Studies of Science, 25,* 237–274.

Greeno, J. (1997). On claims that answer the wrong questions. *Educational Researcher, 26,* 5–17.

Greeno, J., & The Middle School Mathematics through Applications Project Group. (1998). The situativity of knowing, learning and research. *American Psychologist, 53,* 5–26

Halliday, M. A. K. (1978). *Language as social semiotic*. London: Edward Arnold.

Hanks, W. (1990). *Referential practice*. Chicago: University of Chicago.

Hanks, W. (1992). The indexical ground of deictic reference. In A. Duranti & C. Goodwin (Eds.), *Rethinking context*. NY: Cambridge University.

Hutchins, E. (1993). Learning to navigate. In S. Chaiklin & J. Lave (Eds.), *Understanding practice*. NY: Cambridge University.

Hutchins, E. (1995). *Cognition in the wild*. Cambridge: MIT.

Irvine, J. (1992). Insult and responsibility. In J. Hill & J. Irvine (Eds.), *Responsibility and evidence in oral discourse*. NY: Cambridge University.

Irvine, J. (1996). Shadow conversations. In M. Silverstein & G. Urban (Eds.), *Natural histories of discourse*. Chicago: University of Chicago.

Jakobson, R. (1960). Closing statement: linguistics and poetics. In T. Sebeok (Ed.), *Style in language*. Cambridge: MIT.

Jakobson, R. (1971). Shifters, verbal categories and the Russian verb. In R. Jakobson, *Selected writings (Vol. 2)*. The Hague: Mouton. (Original published 1957).

Kirschner, D., & Whitson, J. (1997). Editors' introduction. In D. Kirschner & J. Whitson (Eds.), *Situated cognition*. Mahwah, NJ: Lawrence Erlbaum.

Latour, B. (1993). *We have never been modern*. Cambridge: Harvard University.

Lave, J. (1993). The practice of learning. In S. Chaiklin & J. Lave (Eds.), *Understanding practice*. NY: Cambridge University.

Lave, J. (1996). Teaching, as learning, in practice. *Mind, Culture & Activity, 3,* 149–164.

Lemke, J. (1997). Cognition, context and learning. In D. Kirschner & J. Whitson (Eds.), *Situated cognition*. Mahwah, NJ: Lawrence Erlbaum.

Looren de Jong, H. (1997). Some remarks on a relational concept of mind. *Theory & Psychology, 7,* 147–172.

Markman, A. (1997). Constraints on analogical inference. *Cognitive Science, 21,* 373–418.

Peirce, C. (1955). Logic as semiotic. In J. Buchler (Ed.), *Philosophical writings of Peirce*. NY: Dover (Original published 1897).

Sacks, H., Schegloff, E., & Jefferson, G. (1974). A simplest systematics for the organization of turn-taking in conversation. *Language, 50,* 696–735.

Salomon, G., & Perkins, D. (1998). Individual and social aspects of learning. *Review of Research in Education, 23,* 1–24.

Silverstein, M. (1976). Shifters, linguistic categories, and cultural description. In K. Basso & H. Selby (Eds.), *Meaning in anthropology*. Albuquerque: University of New Mexico.

Silverstein, M. (1985). On the pragmatic "poetry" of prose. In D. Schiffrin (Ed.), *Meaning, form and use in context*. Washington: Georgetown University.

Silverstein, M. (1993a). Metapragmatic discourse and metapragmatic function. In J. Lucy (Ed.), *Reflexive language*. NY: Cambridge University.

Silverstein, M. (1993b). Of dynamos and doorbells. In K. Beals (Ed.), *What we think, what we mean, and how we say it*. Chicago: Chicago Linguistics Society.

Silverstein, M. (1998). The improvisational performance of "culture" in real-time discursive practice. In K. Sawyer (Ed.), *Improvisation*. Norwood, NJ: Ablex.

Silverstein, M., & Urban, G. (1996). The natural history of discourse. In M. Silverstein & G. Urban (Eds.), *Natural histories of discourse*. Chicago: University of Chicago.

van Gelder, T. (1995). What might cognition be, if not computation? *The Journal of Philosophy, 92,* 345–381.

Vygotsky, L. (1997). *The collected works of L. S. Vygotsky (Volume 4: The history of the development of higher mental functions)* (translated by M. Hall). NY: Plenum. (Complete Russian edition published in 1987).

Walkerdine, V. (1997). Redefining the subject in situated cognition theory. In D. Kirschner & J. Whitson (Eds.), *Situated cognition*. Mahwah, NJ: Lawrence Erlbaum.

Wertsch, J. (1998). *Mind as action*. NY: Oxford University.

Wortham, S. (1994). *Acting out participant examples in the classroom*. Philadelphia: John Benjamins.

Wortham, S. (1995). Experiencing the great books. *Mind, Culture & Activity, 2,* 67–80.

Wortham, S. (1996). Deictic mapping. *Journal of Pragmatics, 25,* 331–348.

Wortham, S. (1997). Denotationally cued interactional events. *Semiotica, 114,* 295–317.

Wortham, S. (1998). Heterogeneously distributed cognition. In M. Gernsbacher & S. Derry (Eds.), *Proceedings of the twentieth annual conference of the Cognitive Science Society*. Mahwah, NJ: Lawrence Erlbaum.

Wortham, S. (2001). *Narratives in action*. New York: Teachers College Press.

Wortham, S., & Locher, M. (1996). Voicing on the news. *Text, 16,* 557–585.