

## DISCOURSE AND LEARNING IN MATH AND SCIENCE CLASSROOMS

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**Education 229D**

**3 units**

### **Catalog Description:**

*This seminar is an introduction to research on how language and other forms of communication influence what and how people learn. Students are introduced to influential theories of discourse from sociolinguistics, psycholinguistics, and the philosophy of language and learn about how they have been used to understand learning, especially in math and science classrooms. Students take turns helping lead discussion and complete a project relevant to the topic and their own research interests.*

### **Course Goals:**

1. For students to become conversant with classic theories about discourse in general and classroom discourse in particular.
2. For students to become conversant with a sample of educational research that applies these theories, especially within mathematics and science classrooms.
3. To help students begin developing expertise in one subtopic about discourse and learning that is especially germane to their research interests.
4. Together, to put students one step closer to being able to contribute to this field.

### **Course Activities:**

#### **1. Actively reading and discussing each week's papers:**

- See the attached schedule of readings. Most weeks we read one theory paper and two applications of it to math and/or science education.
- Students will take turns helping facilitate discussions. Three days before each class meeting, the facilitator will post one question about each reading on bSpace. Everyone else will respond to each question by the afternoon before class. Facilitators should check in with me about their plans in the prior week so we can coordinate.
- In the first part of the course you will also complete two thinkpieces to help you consolidate the readings so far and get you thinking about a course paper (see #2)
- In the last four weeks of the course, I may substitute in readings from the supplementary lists instead of those currently specified if it is clear they are better tuned to the research interests of the students taking the seminar that semester.

**2. Completing a course project that's relevant to the seminar while advancing your own goals. You'll work on this in stages:**

- At the end of the first two sections of the seminar, you will write a proposal of what you would like to do and we will discuss it until we have worked out something to our mutual satisfaction. Projects can be empirical and/or theoretical in nature.
- During the last part of the course, you will complete additional readings specific to your project and provide regular updates to the seminar about your progress.
- Finally, you will turn in a full draft of your project well before the final version is due so you can get everyone's feedback before revising it and turning it in.

**Grading and Course Requirements Fulfilled:**

1. Grades are based on the quality of your performance on the following assignments:
  - 10%: Initial oral and written responses to readings and the ideas of classmates
  - 20%: Thinkpieces, proposals, handouts, and other later drafts of your ideas
  - 70%: Final draft of course project paper
2. Early on in a course I like to provide assignments in which you get feedback, but that do not count heavily towards your grade. Once you've gotten feedback and revised your work, then it counts much more for your grade.
3. You may take this course for a S/U grade, although be aware that PhD students need to limit the number of S grades on their record to graduate and that this course will not satisfy any requirements unless you take it for a letter grade.
4. This course currently satisfies:
  - The GSE core course requirement for LLSC or POME PhD students
  - The advanced elective within the Linguistics or Society, Culture and Cognition concentrations within the undergraduate Cognitive Science major; and
  - Is pending approval for the EMST/SESAME "Individual and Social Perspectives" requirement.

## SCHEDULE OF READINGS AND ASSIGNMENTS

### A. Foundational Readings About Discourse, Part I: Interaction

#### **WEEK 1: Introductions and an activity to get things rolling**

*Source of activity:* Clark, H. H. & Wilkes-Gibbs, D. (1986). Referring as a collaborative process. *Cognition*, 22, 1-39.

#### **WEEK 2: Grounding theory and its applications to education**

Clark, H. H. & Schaefer, E. F. (1989). Contributing to discourse. *Cognitive Science*, 13, 259-294. [36 pages] *This is the core article that is applied in the 2 papers below.*

Barron, B. J. (2000). Achieving coordination in collaborative problem solving groups. *Journal of the Learning Sciences*, 9(4), 403-436. [34 pages] *Here Barron focuses on the grounding of attention, among other things to understand why some of her trios collaborated more effectively than others. A companion article in the Journal of Educational Psychology focused on details of the statistical comparisons that provided a basis for her to pick these particular pairs as case studies.*

Baker, M., Hansen, T., Joiner, R. & Traum, D. (1999). The role of grounding in collaborative learning tasks. In P. Dillenbourg (Ed.), *Collaborative learning: Cognitive and computational approaches* (pp. 31-63). Amsterdam: Pergamon / Elsevier Science. [34 pages] *After grounding theory became used frequently in Human Computer Interaction research, it was then brought into the Computer-Supported Collaborative Learning (CSCL) community, with this paper being one of the main ways CSCL researchers found out about it. Now that the CSCL conference is part of the International Society of the Learning Sciences (ICLS), I expect that grounding will begin to be used even more in the learning sciences.*

*Supplementary readings about grounding theory:*

Anderson, A. H. (2006). Achieving understanding in face-to-face and video-mediated multiparty interactions. *Discourse Processes*, 41(3), 251-287. *Finally a paper looking at how groups of three or larger ground their understanding!*

Bangerter, A. & Clark, H. H. (2003). Navigating joint projects with dialogue. *Cognitive Science*, 27(2), 195-225. *This is the most recent piece on the idea that people also 'ground' what it is that they are doing together at the level of "joint projects", which build upon conversational contributions. This piece focuses on markers of transitions between and within joint projects. However, the best piece introducing joint projects is Chapter 7 in Clark (1996) below.*

Clark, H. H. (1996). *Using language*. Cambridge, UK: Cambridge University Press. *This is the comprehensive source about all aspects of grounding theory, which are put in relationship to each other here. Key chapters to check out include: Chapter 6 about multimodal signaling, and Chapter 7 about joint projects, the last of which is online.*

- Clark, H. H. and Brennan, S. B. (1991). Grounding in communication. In L. B. Resnick, J. M. Levine & S. D. Teasley (Eds.), *Perspectives on socially shared cognition* (pp. 127-149). Washington, DC: American Psychological Association. [23 pages] *Focuses on how grounding changes depending on medium and purpose. Very relevant for those interested in technology-mediated communication or for thinking about how interactions change depending on what people are trying to do together.*
- Schober, M. F. & Brennan, S. E. (2003). Processes of interactive spoken discourse: The role of the partner. In A. C. Graesser, M. A. Gernsbacher & S. R. Goldman (Eds.), *Handbook of discourse processes* (pp. 123-164). Mahwah, NJ: Erlbaum [42 pages]. *This review article, written years later by two of Clark's former students and editors of the journal Discourse Processes, gets into the issue of what it means for an interaction to be interactive, and all the controversies that have arisen about that.*

*Supplementary readings on applications of grounding theory to education:*

- Beers, P., Kirschner, P. A., Boshuizen, H. P. A. & Gijsselaers W. H. (2007). ICT-support for grounding in the classroom. *Instructional Science*, 35, 535-556. [22 pages] *A more recent application of grounding theory to CSCL focused on designing classroom systems to support more effective grounding.*
- Fong, C. (2007, March). *Identity issues in ESL chat rooms: Grounding positioning statements in Linguistics Colloquium*, Cornell University, Ithaca, NY. *This revision of Carlton's course paper from the fall 2006 Discourse and Learning seminar applies Clark's idea of joint projects to analyze identity negotiations in an ESL chat room.*
- Rummel, N. & Spada, H. (2005). Learning to collaborate: An instructional approach to promoting collaborative problem solving in computer-mediated settings. *Journal of the Learning Sciences*, 14(2), 201-241. [41 pages]

### **WEEK 3: Approaches from pragmatics: Face-threatening acts and implicatures**

- Brown, P. & Levinson, S. (1978). Universals in language usage: Politeness phenomena. In E. N. Goody (Ed.), *Questions and politeness: Strategies in social interaction* (pp. 56-99, 107, 136, 219). Cambridge: Cambridge University Press. [47 pages]
- Grice, H. P. (1967/1987/1989). Logic and conversation. In P. Grice, *Studies in the ways of words* (pp. 22-40). Cambridge, MA: Harvard University Press. [19 pages]

*Choice:*

- Person, N. K., Kreuz, R. J., Zwaan, R. A., & Graesser, A. C. (1995). Pragmatics and pedagogy: Conversational rules and politeness strategies may inhibit effective tutoring. *Cognition and Instruction*, 13, 161-188. [28 pages] *Explicitly builds upon the pragmatics theories above.*

\*OR\*

- Lampert, M., Rittenhouse, P. & Crumbaugh, C. (1996). Agreeing to disagree: Developing sociable mathematical discourse. In D. R. Olson & N. Torrance (Eds.), *The handbook of education and human development* (731-764). [34 pages] *Does not explicitly build upon them, but what if it had done so, especially the idea of "face-threatening acts?"*

*Possible activity:* Video excerpts from Engle & Greeno (1994).

*Supplementary readings related to pragmatics:*

- Baquedano-Lopez, P. & colleagues. [Their AERA 2006 paper that critiques politeness theory]
- Engle, R. A. & Greeno, J. G. (1994). Managing disagreement in intellectual conversations: Coordinating social and conceptual concerns in the collaborative construction of mathematical explanations. In A. Ram & K. Eiselt (Eds.), *Proceedings of the Sixteenth Annual Conference of the Cognitive Science Society* (pp. 266-271), Hillsdale, NJ: Erlbaum.
- Goffman, E. (1967). On face-work: An analysis of ritual elements in social interaction. In *Interaction ritual: Essays on face-to-face behavior* (pp. 5-45). New York: Pantheon Books. *Some of the fundamental ideas behind Brown & Levinson's work appear first here. Goffman's essays are a genre unto themselves. They introduced tons of ideas and compelling examples that numerous later researchers followed up on in their work.*
- Linde, Charlotte (1988). The quantitative study of communicative success: Politeness and accidents in aviation discourse. *Language and Society*, 17(3). *A particularly compelling example when issues around politeness can affect people's lives in irrevocable ways.*

#### **WEEK 4: Discourse processing and learning from texts**

- Zwaan, R. A. & Radvansky, G. A. (1998). Situation models in language comprehension and memory. *Psychological Bulletin*, 123(2), 162-185. [24 pages]
- Graesser, A. C., Person, N. K. & Hu, X. (2002). Improving comprehension through discourse processing. *New Directions for Teaching and Learning*, 89, 33-44. [12 pages] *Explicitly builds upon work in discourse processing to consider what its educational implications might be.*
- Chi, M. T. H. (2000). Self-explaining expository texts: The dual processes of generating inferences and repairing mental models. In R. Glaser (Ed.), *Advances in instructional psychology* (pp. 161-238). Mahwah: Erlbaum. [78 pages] *This work has been highly influential in education, with this paper the capstone piece about this research. The paper doesn't directly refer to Zwaan & Radvansky, but there are interesting parallels and contrasts to be drawn between them.*

*Supplementary readings on discourse processing:*

- Chi, M. T. H., Siler, S. A., Jeong, H., Yamauchi, T. & Hausmann, R. G. (2001). Learning from human tutoring. *Cognitive Science*, 25, 471-533. [63 pages]
- McNamara, D. S., Kintsch, E., Songer, N. B. & Kintsch, W. (1996). Are good texts always better? Interactions of text coherence, background knowledge and levels of understanding in learning from text. *Cognition and Instruction*, 14(1), 1-43. [43 pages]. *A classic, non-intuitive result: in some cases for some students, texts that are less coherent support learning more than those that are more coherent!*
- Pickering, M. J. & Garrod, S. (2004). Toward a mechanistic psychology of dialogue. *Behavioral and Brain Sciences*, 27(2), 169-190. Plus the 21 critical responses to it plus the authors' revisions of their ideas in their response to the responses.
- Tanenhaus, M. & Trueswell, J. (2004). Eye movements as a tool for bridging the language-as-product and language-as-action traditions. In J. Trueswell & M. Tanenhaus (Eds.), *Approaches to studying world-situated language use: Bridging the language-as-product and language-as-action traditions* (pp. 3-37). Boston: MIT Press. *This chapter and the book in*

*which it is included is working to create connections between Clark's perspective ("language-as-action") and traditional work on discourse processing in psycholinguistics ("language-as-product"). This chapter does so by examining eye movements.*  
 van Dijk, T. A. & Kintsch, W. (1983). *Strategies of discourse comprehension*. New York: Academic Press.

**END OF WEEK 4: First thinkpieces due 3 days after week 4's class; post them on bSpace for other members of the seminar to read:**

*Respond to the readings so far, explaining how they relate to your current research interests. In addition, please speculate about different possibilities that you are considering for your course project, relating them when possible to the topics we've already discussed and/or those we will be discussing later. About 4-6 pages double-spaced. An informal style is fine.*

**WEEK 5: Gumperz' interactional sociolinguistics + responding to others' thinkpieces**

Gumperz, J. J. (1992). Contextualization and understanding. In A. Duranti & C. Goodwin (Eds.), *Rethinking context* (pp. 229-252). Cambridge, UK: Cambridge University Press. [24 pages]

Kelly, G., Crawford, T. & Green, J. (2001). Common task and uncommon knowledge: Dissenting voices in the discursive construction of physics across small laboratory groups. *Linguistics and Education, 12*(2), 135-174. [40 pages]

+

Two thinkpieces written by your classmates to be selected for you to read by Randi on 2/19. Be ready to share your responses with the authors during class.

*Supplementary readings:*

Gumperz, J. J. (1982). Contextualization conventions. In *Discourse strategies* (pp. 130-152). Cambridge, UK: Cambridge University Press. [23 pages]

Gumperz, J. J. (1982). Socio-cultural knowledge in conversational inference. In *Discourse strategies* (pp. 153-171). Cambridge, UK: Cambridge University Press. [29 pages]

Bleicher, R. E., Tobin, K. G., & McRobbie, C. J. (2003). Opportunities to talk science in a high school chemistry classroom. *Research in Science Education, 33*, 319-339. [21 pages]

**B. Research About Discourse Structures, Especially in Classrooms**

**WEEK 6: Different perspectives on the ever-present and oft-discussed IRE/IRF/ triarchic/recitation-style lesson structure**

Mehan, H. (1979). The structure of classroom lessons. In *Learning lessons* (pp. 35-80). Cambridge, MA: Harvard University Press. [46 pages] *Still, one of the most influential studies of classroom discourse that everyone needs to know about to be considered part of this research community.*

- Nassaji, N. & Wells, G. (2000). What's the use of 'triadic dialogue'? An investigation of teacher-student interaction. *Applied Linguistics*, 2(3), 376-406. [31 pages] *These and other Gordon Wells' pieces have emphasized the multiple functions to which IRE discourse structures can be put, contesting usual assumptions that IRE discourse is inherently limiting in a negative way for learning.*
- Nathan, M. J., Eilam, B. Y & Kim, S. (2007). To disagree, we must also agree: How intersubjectivity structures and perpetuates discourse in a mathematics classroom. *Journal of the Learning Sciences*, 16(4), 523-563. [41 pages] *This directly builds upon IRE, CA, Clark, Gee's stanzas, and indirectly on politeness*

*Supplementary readings:*

- Mehan, H. (1979). Looking inside schools. In *Learning lessons* (pp. 1-34, refs. 213-222). Cambridge, MA: Harvard University Press. [35 pages]
- Candela, A. (1999). Students' power in classroom discourse. *Linguistics and Education*, 10(2), 139-163. [35 pages] *This article, which builds upon Wells' work on the different ways IRE can be employed, also builds upon the Conversation Analysis tradition to see ways in which children in a science class can use their agency to make choices that provide them with more power even when an IRE structure is maintained.*
- Cazden, C. (1988). Variation in lesson structure. In C. Cazden, *Classroom discourse: The language of teaching and learning* (pp. 53-80). Portsmouth, NH: Heinemann. [28 pages]
- Wells, G. (1999). Putting a tool to different uses: A reevaluation of the IRF sequence. In G. Wells (Ed.), *Dialogic inquiry: Towards a sociocultural practice and theory of education*. Cambridge: Cambridge University Press. *IRF is Wells' term for IRE where F is feedback & E evaluation. This is also called "triarchic dialogue"*

## **WEEK 7: Participation/participant structures/frameworks that go beyond IRE**

- Erickson, F. (1982). Classroom discourse as improvisation: Relationships between academic task structure and social participation structure in lessons. In L. C. Wilkinson (Ed.), *Communicating in the classroom* (pp. 153-181). New York: Academic Press. [29 pages]
- O'Connor, M. C., & Michaels, S. (1996). Shifting participant frameworks: Orchestrating thinking practices in group discussion. In D. Hicks (Ed.), *Discourse, learning, and schooling* (pp. 63-103). New York: Cambridge University Press. [41 pages]
- Enyedy, N. & Goldberg, J. (2004). Inquiry in interaction: How local adaptations of curricula shape classroom communities. *Journal of Research in Science Teaching*, 41(9), 905-935. [31 pages] *Builds on both Erickson and mildly on O'Connor & Michaels to compare two science classrooms in terms of discourse norms as well as ways in which the teachers help to dynamically structure the interactions.*

*Supplementary readings:*

- Forman, E. & Ansell, E. (2002). Orchestrating the multiple voices and inscriptions of a mathematics classroom. *Journal of the Learning Sciences*, 11(2&3), 251-274. [24 pages] *This paper focuses on ways that teachers can use inscriptions (roughly, external representations) to create classrooms in which student can have mathematical arguments with each other.*

- Goodwin, M. H. (1990). *He said, she said: Talk as social organization among black children* (pp. 1-26, 190-225). Bloomington, IN: University of Indiana Press. Focus on Chapter 8, skimming chapters 1 & 2 for methodological background info as needed [36 pages full read, 27 skim]
- O'Connor, M. C. & Michaels, S. (1993). Aligning academic task and participation status through revoicing: Analysis of a classroom discourse strategy. *Anthropology and Education Quarterly*, 24(4), 318-335. [18 pages]
- Tabak, I. & Baumgartner, E. (2004). The teacher as partner: Exploring participant structures, symmetry, and identity work in scaffolding. *Cognition and Instruction*, 22(4), 393-429. [37 pages].

### **WEEK 8: Classroom discourse from a Bakhtinian perspective building on Vygotsky**

- Wertsch, J. V. & Smolka, A. L. B (1993). Continuing the dialogue: Vygotsky, Bakhtin & Lotman. In H. Daniels (Ed.), *Charting the agenda: Educational activity after Vygotsky* (pp. 69-92). London: Routledge.
- Koschmann, T. (1999). Toward a dialogic theory of learning: Bakhtin's contribution to understanding learning in settings of collaboration. *Proceedings of CSCL-99*.
- Scott, P. H., Mortimer, E. F. & Aguiar, O. G. (2006). The tension between authoritative and dialogic discourse: A fundamental characteristic of meaning making interactions in high school science lessons. *Science Education*, 90(4), 605-631. [27 pages] *Builds on Bakhtin, Wertsch and also Gumperz as well as my work*

#### *Next readings:*

- Bakhtin, M. M. (1982). *Discourse in the Novel*. In *The Dialogic Imagination* (pp. 259-422) . Especially check out pages 274-301 and pages 331-367, which are most cited.
- Leander, K. M. & Brown, D. E. (1999). "You understand, but you don't believe it": Tracing the stabilities and instabilities of interaction in a physics classroom through a multidimensional framework. *Cognition and Instruction*, 17(1), 93-135.
- Rosebery, A. Warren, B. & Conant, F. R. (1992). Appropriating scientific discourse: Findings from language minority classrooms. *Journal of the Learning Sciences*, 291, 61-94. *One of the most influential early discourse analyses within science education, one that I built upon in my 2002 paper with Faith Conant.*
- Wertsch, J. V. (1998). *Mind as action*. Oxford: Oxford University Press.
- Wertsch, J. V., & Toma, C. (1995). Discourse and learning in the classroom: A sociocultural approach. In L. P. Steffe & J. Gale (Eds.), *Constructivism in education* (pp. 159-174). Hillsdale, NJ: Erlbaum.

### **C. Synthesizing Our Progress So Far and Planning Course Papers**

#### **END OF WEEK 8: Second thinkpieces, including full-blown project proposals, due 3 days after Week 8's class**

*As before, first respond to the readings so far, explaining how they relate to your current research interests (about 3-4 pages double-spaced). Then, write a proposal (about 3-4 pages double-spaced) for what you would like to do for your course paper. Course papers can be based either on empirical or theoretical work. In any case, be sure to specify:*

- *The gist of the topic you will be focusing on*

- *How it relates to the course*
- *How it relates to your ongoing research interests*
- *The next action items, including readings that you would to pursue to make progress on this paper.*

### **WEEK 9: Discussion of thinkpieces and proposed projects**

### **WEEK 10: Analysis of two review articles to compare how you are putting the field together so far with how others have synthesized it as well as to find additional references that are relevant to your projects**

Cazden, C. B. & Beck, S. W. (2003). Classroom discourse. In A. C. Graesser, M. A. Gernsbacher & S. R. Goldman (Eds.), *Handbook of discourse processes* (pp. 165-197). Mahwah, NJ: Erlbaum [33 pages].

Hicks, D. (1995-1996). Discourse, learning, and teaching. *Review of Research in Education, 21*, 49-95. [47 pages]

*Supplementary review article:*

Gee, J. P. & Green, J. L (1998). Discourse analysis, learning, and social practice: A methodological study. *Review of Research in Education, 23*, 119-69. [51 pages] *This very complex but worthwhile paper goes beyond what we have read as much as it synthesizes it. I've been building on the notion of intercontextuality in my own work on socializing transfer-of-learning.*

+ Share 1 page handout about one additional paper you read for your course project

### **D. Making Sustained Progress on Course Projects While Group Discusses a Last Set of Readings**

**Each week during this time period will include time for two activities:**

- 1) Project updates:** Each student shares a 1-page handout that summarizes a key reading, or updates the group on their empirical work (if relevant), and requests feedback. Besides helping to advance your project, through other members of the seminar you'll learn about other areas of research in discourse and learning.
- 2) Discussion of a reading:** We will select one long (or possibly two shorter) readings to read and discuss as a group each week. Readings will be drawn from the list below as well as the "next readings" lists from prior weeks depending on the interests shared by multiple students in the seminar and topics of course projects.

### **WEEK 11: Discourse Work Arising Within Hybrid Theories in Math and Science Education, Part I**

Hogan, K., Nastasi, B. K., & Pressley, M. (2000). Discourse patterns and collaborative scientific reasoning in peer and teacher-guided discussions. *Cognition and Instruction, 17*(4), 379-432. [54 pages] *One of the most complex and sophisticated set of interlocking codings of classroom discourse that I've ever seen. Hard to fully digest in one reading, but there are tons of coding schemes here that could be adapted to other studies.*

### **WEEK 12: Discourse Work Arising Within Hybrid Theories in Math and Science Education, Part II**

Cornelius, L. L. & Herrenkohl, L.P. (2004). Power in the classroom: How the classroom environment shapes students' relationships with each other and with concepts. *Cognition and Instruction, 22*(4), 467-498. *Builds on Wertsch's simultaneously Vygotskian and Bakhtinian perspective. Plus some Cohen.*

#### *Supplementary Readings Related to Weeks 11 & 12:*

Barron, B. (2003). When smart groups fail. *The Journal of the Learning Sciences, 12*(3), 307-359. [53 pages] *Provides even more carefully-done analyses of collaborative processes, building upon Barron (2000) from earlier in the course. Well-cited article.*

Engle, R. A. (2006). Framing interactions to foster generative learning: A situative explanation of transfer in a community of learners classroom. *The Journal of the Learning Sciences, 15* (4), 451-498. *Builds on idea of intercontextuality from Gee & Green (1998) and framing from Bateson, Goffman, Tannen and others to propose additional ways transfer-of-learning can be supported. Also builds on Clark's notion of grounding to track changes in content established in common ground at different points in time along with who substantively contributed to that content.*

Engle, R. A. & Conant, F. R. (2002). Guiding principles for fostering productive disciplinary engagement: Explaining an emergent argument in a community of learners classroom. *Cognition and Instruction, 20*(4), 399-483. *The empirical focus of this paper is explaining why a particular unplanned discussion "took off" in a science classroom. It draws from a variety of sources in math and science education.*

Engle, R. A., McKinney de Royston, M. & Langer-Osuna, J. (submitted). Toward a model of differential influence in discussions: Negotiating quality, authority, and access within a heated classroom argument. *Builds upon the argumentation topic as well as Clark's notion of joint projects, ideas about identity, turn-taking, Leander's paper, etc.*

Leander, K. M. (2001). "This is our freedom bus going home right now": Producing and hybridizing space-time contexts in pedagogical discourse. *Journal of Literacy Research, 33*(4), 637-679. [43 pages]

Tabak, I. & Baumgartner, E. (2004). The teacher as partner: Exploring participant structures, symmetry, and identity work in scaffolding. *Cognition and Instruction, 22*(4), 393-429. [37 pages]. *Also builds on Wertsch's perspective and other neo-Vygotskians.*

### **WEEK 13: Talk-In-Interaction from a Conversation Analysis (CA) perspective**

Schegloff, E. A., Jefferson, G., & Sacks, H. (1977). The preference for self-correction in

the organization of repair in conversation. *Language*, 53, 361-382. [22 pages] *A classic piece about how people collaboratively negotiate and fix "mistakes" in conversation that also helps one to see an example of CA methods in action.*

*Supplementary readings:*

Levinson, S. (1983). Conversation analysis. In *Pragmatics* (pp. 294-320). Cambridge: Cambridge University Press. [27 pages] *For newcomers, this perspective is explained surprisingly very lucidly and comprehensively in Levinson's classic graduate text on pragmatics despite the fact that CA is an ethnomethodological theory from interactive sociology rather than one from pragmatics within linguistics.* McDermott, R. P., Gospindoff, K. & Aron, J. (1979). Criteria for an ethnographically adequate description of concerted activities and their contexts. *Semiotica*, 24(3/4), 245-275.

Schegloff, E. A. (1989). Reflections on language, development, and the interactive character of talk-in-interaction. In M. Bornstein & J. S. Bruner (Eds.), *Interaction in human development* (pp. 139-153). Hillsdale, NJ: Erlbaum. [15 pages]

Sacks, H., Schegloff, E. & Jefferson, G. (1974). A simplest systematics for the organization of turn-taking in conversations. *Language*, 50, 696-735. *The piece on turn-taking that one either needs to adopt or react to when doing further work about this phenomenon.*

Schegloff, E. A. (1991). Conversation analysis and socially shared cognition. In L. B. Resnick, J. M. Levine & S. D. Teasley (Eds.), *Perspectives on socially shared cognition* (pp. 150-171). Washington, DC: American Psychological Assoc.

## **WEEK 14: Critical Discourse Analysis**

*This is an important new-ish alternative movement in discourse studies that everyone should know about.*

Luke, A. (1995-1996). Text and discourse in education: An introduction to critical discourse analysis. *Review of Research in Education*, 21, 3-48. [44 pages]

*Supplementary reading:*

Wodak, R. (2001). What CDA is about: A summary of its history, important concepts and its developments. In R. Wodak & M. Meyer (Eds.), *Methods of critical discourse analysis* (pp. 1-13). London: Sage.

## **E. Finishing Course Projects**

**END OF WEEK 14: FULL draft of course project paper posted on bSpace 3 days after Week 14's class for instructor and selected other members of the seminar to read**

**WEEK 15: In class discussion and feedback on drafts of course projects**

**ONE WEEK AFTER LAST CLASS: Final version of course paper due to instructor via email attachment**

## ADDITIONAL SUPPLEMENTARY READINGS ON OTHER TOPICS

### 1. Toulmin's Argumentation Theory and Its Developments in Science Education

*If one is studying argumentation, especially in science, one needs to either draw on Toulmin's framework or explain why one is not doing so:*

- Toulmin, S. (1958/2003) *The uses of argument*. Cambridge: Cambridge University Press. *Will read relevant excerpts of this classic.*
- Driver, R., Newton, P., & Osborne, J. (2000). Establishing the norms of scientific argumentation in classrooms. *Science Education*, 84(3), 287-312. [26 pages]
- Erduran, S., Simon, S., & Osborne, J. (2004). TAPping into argumentation: Developments in the application of Toulmin's argument pattern for studying science discourse. *Science Education*, 88(6), 915-933. [19 pages]
- Jimenez-Aleixandre, M. P., Rodriguez, A. B., & Duschl, R. A. (2000). "Doing the lesson" or "doing science": Argument in high school genetics. *Science Education*, 84(6), 757-792. [46 pages]

### 2. Multimodal Discourse From Multiple Perspectives

*There are multiple literatures here depending on which aspects one is focusing on and the theoretical approach that is used:*

- Ainsworth, S. (1999). DeFT: A conceptual framework for considering learning with multiple representations. *Learning and Instruction*, 16(3), 183-198.
- Alibali, M. W. & Goldin-Meadow, S. (1993). Gesture-speech mismatch and mechanisms of learning: What the hands reveal about a child's state of mind. *Cognitive Psychology*, 25(4), 468-523.
- Clark, H. H. (1996). Chapter 6: Signaling. In *Using language*. Cambridge: Cambridge University Press. *This work draws on Peirce's semiotics.*
- Koschmann, T. & LeBaron, C. (2002). Learner articulation as interactional achievement: Studying the conversation of gesture. *Cognition and Instruction*, 20(2), 249-282. [34 pages]
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comprehension. *Science*, 268(5217), 1632-1634. *From the discourse processing tradition, with some nods to Clark.*

### **3. Teacher Education and Professional Development Around Classroom Discourse**

*This is a huge and growing literature within every subject-matter specialization in education. Here are just a few current articles, with a focus on mathematics.*

Brendefur, J. & Frykholm, J. (2000). Prompting mathematical communication in the classroom: Two preservice teachers' conceptions and practices. *Journal of Mathematics Teacher Education*, 3, 125-153. *Does not explicitly cite the foundation work, but effectively builds upon IRE and Bakhtinian perspectives.*

Lampert, M. (2001). Teaching while leading a whole-class discussion. In *Teaching with problems and the problems of teaching*.

Nathan, M. J. & Knuth, E. J. (2003). A study of whole classroom mathematical discourse and teacher change. *Cognition and Instruction*, 21(2), 175-207.

Stein, M. K., Engle, R. A., Hughes, E. & Smith, M. S. (in press). Orchestrating productive mathematical discussions: Five practices for helping teachers move beyond show and tell. *Mathematical Thinking and Learning*. *Five practices to make it more manageable for teachers to be able to conduct whole-class discussions around open-ended tasks that both build on students' ideas and advance a curricular agenda. Situated in terms of mathematics only, but I personally think these ideas could apply to other content areas.*