

Socio-Cognitive Analysis of Socratic Dialogue

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ABSTRACT

Our work involves close analysis of Socratic dialogue in Sokratiska and Paideia Seminars (Billings and Fitzgerald, 2002; Pihlgren, 2008), grounded in socio-cognitive theory. Similar to Socratic dialogue, The Sokratiska and Paideia Seminars are defined as “a collaborative, intellectual dialogue about ideas and values, based on a text, facilitated by open-ended questions, resulting in enhanced conceptual understanding” (Roberts and Billings, 2008). By examining both quantitative and qualitative aspects of thinking in dialogue, we have found important socio-cognitive patterns. In developing systems for analysis we have identified the following important features:

- Ratio of teacher to student talk (turns and time)
- Content of talk (textual ideas, personal connections)
- Use of gestures and various means of non-verbal communication
- Levels of cognition (recall to synthesis)

In addition, we have found a curious interpersonal cognitive processing which frequently occurs in seminar dialogue, prompting new individual and collective thinking. This, we believe, poses an important challenge to existing theory on thinking.

Keywords: Interpersonal processing, seminars, socio-cognitive theory, Socratic dialogue, thinking

INTRODUCTION

A growing body of literature suggests a strategic approach to measuring thinking, one that takes a socio-cognitive perspective. Briefly stated, a socio-cognitive view includes a “way of thinking and speaking” (Langer, 1987). It implies that we become more literate thinkers not just alone with a book or a pen but also in a social context. Indeed, Lev Vygotsky, a seminal thinker in the area of socio-cognitive theory, argued that all higher order thinking skills appear on two levels: First, on an *interpersonal* or social level, and

then, and later, on an *intrapersonal* or individual level (Vygotsky, 1978). From this view, dialogue between teacher and students, and among students, is crucial in the development of broad literacy skills, as well as in the development of higher levels of thinking.

Our previous work has involved close analysis of Socratic dialogue in Sokratiska and Paideia Seminars (Billings and Fitzgerald, 2002; Pihlgren, 2008), grounded in socio-cognitive theory. The main purpose of the U.S. study (Billings and Fitzgerald, 2002) was to examine

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types of discussion in Paideia Seminars (a U.S. concept). The main results of this study show, that the observed discussions reflected the teacher's transitional status in conducting dialogic discussion, with some features of the "ideal" Paideia Seminar dialogue presented and some features of "teacher-fronted" discussion represented. The objective of the Swedish study (Pihlgren, 2008) was twofold: To analyze the intended rationales of educational seminars from different traditions using Socratic dialogue, and to examine how the stated positive effects of the dialogue were achieved in Sokratiska Seminars (a Swedish concept). The study showed that various Socratic traditions aim at helping participants to internalize intellectual and dialogical habits of mind. It also showed that the skilled participants shifted their interaction towards an inquiring dialogue over time and that intricate "silent" moves (gestures) helped maintain a productive and egalitarian dialogue culture. By examining both quantitative and qualitative aspects of thinking in dialogue, we have in both studies found important socio-cognitive patterns. In developing systems for analysis we have identified the following important features:

- Ratio of teacher to student talk (turns and time)
- Content of talk (textual ideas, personal connections)
- Use of gestures and various means of non-verbal communication
- Levels of cognition (recall to synthesis)

Our findings suggest correlations between Socratic dialogue practice and participants' ability to deal with conflicting ideas. On both the individual and collective levels, dealing with socio-cognitive *conflict*, or disagreement, helps discussants view and digest varying perspectives, and in turn to adjust or refine their own interpretation on an issue (Almasi 1995; Danielewicz, Roberts and Noblit, 1996).

LITERATURE REVIEW

The Paideia Seminar, evolving out of the work of American philosopher Mortimer Adler (1980), is defined as "a collaborative, intellectual dialogue about ideas and values, based on a text, facilitated by open-ended questions, resulting in enhanced conceptual understanding" (Roberts and Billings, 2008). Similarly, Socratic dialogue as an educational practice draws from a wide range of universal traditions, building critical thinking through a collaborative examination of paradoxical issues. The traditions of Leonard Nelson (1965) in Germany, and of Hans Larsson (1925) and Oscar Olsson (1911) in Sweden describe a set of methodological steps to attain similar objectives (Pihlgren, 2008). The Swedish tradition is almost identical to the Paideia Seminar as a method, and is here referred to as Sokratiska Seminars. Both types of seminars use an open, collaborating, interpreting and critically analyzing dialogue, a Socratic dialogue. All the Socratic traditions lean heavily on Aristotle's (1998) idea, that intellectual habits of mind can be trained, and that this training will result in the individual attaining intellectual virtues, which will later result in practical wisdom, i.e. to be able to make productive choices, when confronted with a multitude of (incongruent) ideas (Pihlgren, 2008).

The Paideia and the Sokratiska Seminar are a structured discussion focused on a text. By text here we mean a tangible document or artefact, it may or may not be a print document, it could be a work of art or a scientific diagram. The text serves as a common reference point and should include at least two or more key ideas or concepts. Participants are guided through a close reading of the text, often with note taking before the formal dialogue begins. Likewise, before a Paideia and a Sokratiska Seminar, participants are asked to reflect and focus on particular aspects of the dialogue process ("dialogical virtues", Lindström, 2000). There are commonly group and individual participation goals set (such as asking a genuine question, referring to the text, using others' names).

The facilitator of a Paideia and a Sokratiska Seminar poses both planned and spontaneous questions about the ideas and concepts in the text. Questions planned prior are designed to help participants move from a fairly simple thought process to a deeper and more sophisticated analysis. Throughout the Paideia and Sokratiska Seminar dialogue, the facilitator refrains from evaluating the comments of participants and instead nurtures a sense of comfort with intellectual risks. The kinds of discussions that occur within the seminar “are characterized by having open-ended questions, using textual references to support ideas, producing rigorous, intellectual dialogue, examining challenging and ambiguous texts, and fostering open participation” (Orellana, 2008). In this way, the seminars work as a process of taking participants from simple comprehension and recall, through analysis and synthesis, finally reaching a deeper understanding of the ideas through evaluation and creative thinking.

More specifically, the seminar “text” is used to facilitate taking a distance from the Self, when discussing the ideas. This tool reflects the Socratic *elenchus* as Popper (2007) describes: The cumulative refuting interpretation is a systematic and critical analysis of the ideas, sorting out those which do not pass the test. The adjusting part of refuting interpretation is a result of a creative, intuitive process, where new “bold” ideas are found and tested (Lindström, 2008). This is meant to apply both to the individual and to the group (see *Fig. 1*).

The interpersonal and intrapersonal processes are considered interdependent: the individual influences the group and vice versa (Pihlgren, 2007). The group actions will gradually be internalized by the individual: The interpersonal thinking modes will teach the individual a thinking disposition, a habit becoming a virtue and later part of character (cf. Aristotle). This “apprenticeship” seems to suggest the group as a “master”, making use of “multiple zones of development” (Brown 1994; Kumpulainen and Mutanen, 1999). Someone in the group is always a bit further ahead in understanding. The dialogical virtues, trained by group and individual participation goals, function as a promoter of this internalization taking place by fostering an open atmosphere. The space created must be safe for taking intellectual risks.

RESEARCH ON SPECIFIC ASPECTS OF DIALOGUE THAT SUPPORT THINKING

Various research studies explicitly link the quality of questioning in a discussion with the intellectual quality of responses (Tobin, 1987; Nystrand, 2006). In particular, dialogic phenomena described as “maieutic frames” uncovers more fully how open-ended questions lead to cognitive conflicts within the seminars. Maieutic frames provide important scaffolding to guide participants to look for answers beyond the literal, to identify logical errors, and misinterpretations of the text. From there,

	Intrapersonal thinking process	Interpersonal, contextual thinking process
Cumulative interpretive process	Confirming and deepening OR refuting one’s own idea or understanding	Group working together to find evidence and to confirm OR refute previous ideas or understandings
Creative adjustment interpretive process	Changing one’s own idea or understanding as a result of a new idea found and tested by self or other participant	Group discussion leaves previous assumption, idea or understandings and builds further dialogue on a new idea being presented and tested by some participant

Fig. 1: Intellectual process in seminar

students built arguments in response to or as a rebuttal against other participants' claims, and in so doing, they used references as either data or backings to validate their arguments (Orellana, 2008). This dialogic event, emergent from quality questions, requires participants to assess alternative modes of looking at ideas, to think of hypothetical consequences, and to explore atypical causes (Orellana, 2008).

Another important aspect of dialogue revolves around the social language roles assumed by participants. Certainly, "what the teacher does and does not do, is pivotal" (Billings and Fitzgerald, 2002). In traditional classroom discussion, the teacher controls the discussion and the majority of students follow suit. However, as the teacher shares power and authority, students are invited to assume more active, even challenging roles where the level of cognitive engagement is wider spread. A third significant aspect of seminar dialogue is

the rules of engagement. These include treating other participants with respect, to listen to what is said with interest, without interrupting, and with an interpretive mind, to stick to the subject, and to support one's arguments. How the dialogue unfolds is clearly related to what participants are able to accomplish intellectually: intellectual habits rely heavily on dialogical virtues. While playing the seminar game, skilled participants acted as one; and participants were able to cooperate to involve many participants (Pihlgren, 2008). Learning the rules of dialogue occurs in three stages: 1. understanding what the seminar game is about, 2. testing the game by focusing on the rules, and 3. focusing on the intellectual content.

These key studies on dialogue illuminate the impact of questions, socio-linguistic roles, and cultural rules on individual and collective cognition. It can be summarized that through these determining factors, Paideia and Sokratiska

TABLE 1
Paideia seminar transcript coding matrix

Paideia seminar transcript coding matrix					
Number	Source	Form	Relation	Cognitive process	Cognitive content
	Facilitator/ Participant	Statement/ Question	Stick / Roll	Clarify Analyze Speculate Synthesize Apply Evaluate Generalize Compare Affirm	Text Self Group Other topic Others/ the world Process
Total talk turns	Ratio of teacher: student talk	Ratio of statements: questions	Popcorn vs Continuity	Thinking levels	Focal point(s) Ideas Values
Balance in participant talk; Length of turns	Who is in control/ or leading	Questions that generate additional thinking	Building on others' comments	Close analysis to inform evaluation	Relationship to thinking levels

Seminars supports critical thinking, encourages growing in understanding and integrating new ideas into your own, it challenges what you think, and allows a flow of interaction from other students, reminding us of forgotten knowledge (Pihlgren, 2008, Robinson, 2006).

MATERIALS AND METHODS

In Sweden, 16 seminars with five to sixteen year old students were video taped over a three year period, three tapes on each group: In the beginning, in the middle and at the end of the period. The groups varied from 7-20 participants, in all 101 students. In the U.S. three seminars with eighteen tenth graders were video taped during a school year. In both studies, the facilitators of the seminars were the students' ordinary teachers. The video tapes were transcribed, the talk turns were numbered. In the Swedish study, the gestures and glances were also noted. In the U.S. study the transcripts were analyzed by coding and sorting according to socio-linguistic themes including questions, content of talk, and levels of thinking (Billings and Fitzgerald, 2002). The coding categories for examining the socio-cognitive aspects of classroom dialogue are presented in Table 1.

In the Swedish study, the participants' body language and group interaction were also analyzed closely through a phenomenological approach (Pihlgren, 2008). In this paper, we have attempted to merge both these analytical approaches by analyzing the same material, four excerpts from the Swedish study, and thereby highlight the intricate socio-cognitive moves and interpersonal cognitive processing that were found in our respective studies. The transcripts were chosen from the Swedish study, as this used transcription tools that could be used for the chosen analyses (the U.S. study did not include detailed gesture transcriptions). These four particular transcripts were chosen because they include features that were found typical in the original studies. They were also chosen to illustrate seminars in different age groups. More information on each particular seminar excerpt is given below. All the names used in the transcripts are pseudonyms.

RESULTS AND DISCUSSION

Included below are four examples of seminar transcript excerpts from Swedish classrooms. Following the transcripts we offer narrative analysis highlighting the dialogic features related to cognitive processing. Finally, we provide a summary table and discussion of the quantitative aspects of all four transcripts.

Sequence 1a: Five-Year-Olds Discussing "Pippi Longstocking"

The participants are discussing a children's book by the Swedish author Astrid Lindgren, "Pippi Longstocking". In this particular chapter, Pippi, who is the strongest girl in the world, dressed in funny clothes and with bright orange braids, has just moved to the little town and to impress the children living there she tells fantastic stories.

This sequence is filmed 2 minutes after the seminar has started and lasts for 43 seconds. Most of the children have participated in seminars before; however, it is Martin's first seminar. The facilitator has asked the opening question which is: "Would you like to have Pippi for a friend?" A girl (Saari) has answered the opening question by saying that you have to protect yourself against Pippi since she is the strongest girl in the world. After that, another girl (Anita) stated that she would like to have Pippi as a friend since she is the strongest girl in the world. There is then an interruption concerning seminar rules from one boy (Martin). There is a cut in the transcript for 1 ½ minute and the next part of the sequence lasts for 35 seconds. Tom has answered the opening question, saying he agrees with Martin that he doesn't want Pippi as a friend because she is a girl.

1. Saari: I think (?) it's a good
2. Facilitator: It's GOOD to be her friend
3. (6) /Facilitator writes on her note pad/
4. Martin: You forgot the D in the beginning /He leans forward, facilitator looks at him and then back at her notes/
5. Facilitator: m (.) d'you know (.) /She looks at Martin, shakes her head, raising her

eyebrows/ I'm just sitting here an' making kinda jotnotes /She waves her right hand, leans forward, shakes her head/ I'm not writing wholly fully just small (.) /She screws her eyes up, looks towards Johanna/ scribbling (.) /She "writes" in the air, smiles. Martin puts his hands to his face, wriggles his hands and puts them down/

6. Facilitator: Martin then why (.) /She nods, point with her pen towards Martin/ do you think would you like her as a friend? Or wouldn't you /She shakes her head/
7. Martin: Nope /He puts his hands to his face, shakes his head/
8. Facilitator: NO? /She shakes her head, writes on her note pad. Idun starts "writing" on the table/
9. Martin: Never
10. Facilitator: NEVER (.) why never
11. Martin: Becau:::se (.) she's a girl (↑) /He turns towards Tom, smiles. Tom looks alternately at Martin and facilitator/
12. Facilitator: But if she was a boy then /She nods a little/
13. Martin: ((giggles)) /He puts his hands to his mouth/
14. Facilitator: If it was a boy /Anita shakes her head/
15. Tom: No /He shakes his head/
16. Martin: No /He shakes his head a little/
17. Tom: Nope /He shakes his head/
18. Martin: No /He shakes his head a little/
19. Facilitator: NO (.) okay (.) OKAY /She nods and glances over the group/

Martin breaks the seminar rules by not keeping to the subject (4). After this happens, there is a pause of 6 seconds where the facilitator writes on her note pad and the group is concentrated on her writing, looking at the note pad, most of them leaning forward. Almost all glances are focused on the facilitator or her note pad during this part with only two quick

glances from Anita and Saari on Martin. The facilitator looks at Martin, the note pad and at Johanna alternately, probably considering how to handle the situation. The facilitator then puts the seminar back on track with a question addressed to Martin about whether he would have wanted Pippi as a friend. Martin seems a bit uneasy even though his answer is a prompt no. He puts the hands to his face. When he answers that he will not, because Pippi is a girl, he turns to Tom (11). This seems to make Tom uneasy; he looks back and forth at the facilitator and Martin.

Here we now have the boys with opposing points of view as well as the earlier differences stated by the girls. Both intrapersonally and interpersonally, it seems these young children are considering various points of view while evaluating the ideas of strength and friendship.

Sequence 1b (Continuation of Sequence 1a, One and a Half Minute Later):

1. Facilitator: Would you like Pippi as your friend?
2. Tom: Nope /He shakes his head/
3. Facilitator: No? And why not? /She writes and turns her head towards Tom. Tom raises himself up in the chair/
4. Tom: She:'sa girl (↓)
5. Facilitator: No but (.) you have friends that are girls /Martin puts his hands to his mouth/
6. Tom: Mm sometimes yah (.) bu' not Pippi /He leans back and puts his hand to his neck/
7. Facilitator: Not Pippi, but if she was (.) boy then /She turns her hand to her neck, Tom shakes his head/
8. Tom: Not (.) no
9. Facilitator: But but is it really so Mart (.) eh Tom that you think so /She smiles and nods, raises her eyebrows/
10. Tom: Yes
11. Facilitator: You who usually play a lot with the girls

12. Tom: Mm atleast instead smaller boys it doesn't matta if it's a girl or a boy /He fingers on the microphone cord/
13. Facilitator: So it doesn't matter /She shakes her head/
14. Tom: Mm
15. Facilitator: Okay
16. Martin: Pippi (.) one orange 'air and (?) /He signs braids by his ears/
17. Johanna: **TOM** /Tom turns his head towards Johanna and back/
18. Facilitator: Yes
19. Martin: and braids standing right out
20. Johanna: **TOM**
21. Facilitator: but isn't that good then /Tom turns his head to Martin and back to facilitator/
22. Tom: No
23. Martin: GOD no:

Tom alters his idea about why he does not want to be Pippi's pal from saying that it is because she is a girl (4) to that it doesn't matter if she's a boy or a girl (12). This shift in the young boy's perspective, from both a social and a cognitive viewpoint is fascinating. Tom may be willing to take this new path because of learned confidence with the seminar process. He has had considerably more experience with the rules of dialogic discussion, whereas this was Martin's first seminar.

Martin, however, presents a completely new idea, that hasn't been considered in the seminar before – that he wouldn't consider having Pippi as a friend because of her looks (16, 19) and Tom agrees with him. These shifts and turns in a very short period of time suggest students consideration if not, integration of new perspectives. These adjusting ideas influence the rest of the dialogue.

Sequence 2: Grade 1 Discussing "Ronny and Julia"

This group of first graders discusses a chapter from a Swedish book for children (by Gahrton & Unenge). Ronny and Julia are friends, but the other boys tease Ronny, saying he has cooties (in Swedish "girl germs"). This makes Ronny sad and worried and he is not sure he wants to play with Julia anymore.

The sequence is filmed 25 minutes after the seminar has started and lasts for 1 minute 12 seconds. It is preceded by the facilitator asking if it's possible to know if someone is anxious. One boy (Christian) has been tapping the table with his eraser. The facilitator moves into questioning students to think about their discussion process and how they did with their personal goals.

1. Facilitator: D'youknow Christian you're diSTURBING the others theyhave think it's really to think an' /She shakes her head. Christian stops "stamping"/ (.) something else an' /Christian drops his eraser into the middle of table, leans over quickly and grabs it/
2. Diana: Christia:n
3. Christian: To thishere chickenPOX /All except Igor and David look at Christian/
4. Abel: ((giggles))
5. Otilia: ((giggles))
6. Facilitator: What'ya say /She leans forward/
7. Christian: Heas **CHICKEN**pox
8. Facilitator: Heas CHICKENpox
9. Abel: ((laughs))
10. Christian: eh have done
11. Facilitator: Can you get chickenpox 'cause you're worried /She and Kasper smiles/
12. Abel, Nancy, Kasper, Mickan, Markus: ((laughs)) /Otilia smiles/
13. Kasper: Nohooo

14. Christian: The eraser has got chickenpox
15. Facilitator: The ERASER has I thought it was Ronny ya meant who was all spotty / Nancy turns to Christian and smiles. Bella looks at the camera/
16. Mickan: ((laughs))
17. Markus: But then maybe it can infect you
18. Facilitator: But listen **if** you notice that a friend is this worried or sad or something like Ronny was what can you do then / Kasper nods/
19. Markus: Cheer'em up
20. Facilitator: What did'ya say
21. Markus: cheer them up can d
22. Facilitator: Cheer them up how do you do that
23. Markus: an' can give something orah (3)
24. Facilitator: What do you think you should give then /Facilitator writes/
25. Markus: (1) a flower or whatever
26. Facilitator: Yea you think something a gift or something /She shakes her head/
27. Christian: A **DRAWING** /He leans over the table with his arms out. Facilitator nods once/
28. Facilitator: A drawing what else can you do
29. Christian: An **UGLY**
30. Facilitator: An ugly drawing /Carl looks at the camera/
31. Nancy: That wouldn't make you glad /She looks at Markus. Christian draws back/
32. Christian: B
33. (1)
34. Markus: If you make an UGLY drawing then you just had to daub an' then you getah /Carl nods/
35. Facilitator: An' that wouldn't make you glad what would you be /She nods and turns to Carl. Markus turns to David/
36. Carl: Yea but I (?)
37. Christian: Yea but if you are /He turns to facilitator and to Markus/
38. David: I daubed on my airplane
39. Facilitator: Some other come /She nods/
40. Carl: Yes /Christian's eraser taps twice/
41. David: Airplane /A tap is heard from Christians eraser/
42. Facilitator: Listen (.) I think we say like this (.) an' thanks very much for the conversation /She raises up in the chair. Nancy and Carl reaches for their pieces of paper. David puts down his piece of paper and Bella grabs her piece of paper with both her hands Christian drags his piece of paper towards his body. Otilia stretches out her hand over the table with her piece of paper. Diana puts down her piece of paper on table. Abel turns to Markus and then to Diana/
43. Christian: Yeaah
44. Diana: Now can we read out loud /She shakes her of piece of paper in front of her/
45. Facilitator: Those who want to (.) /She puts down her pencil and puts her hands together/
46. Diana: read out loud
47. Facilitator: can today can tell what they have /Markus raises his hand/
48. Carl: **OOPS**
49. Diana: I want to
50. Facilitator: on these notes here instead
51. Carl: Right
52. Facilitator: Otilia would you like to tell
53. Carl: That you could do
54. Abel: One doesn't have to
55. Carl: I WANT to /He jumps off his chair and goes out to the left/

The facilitator corrects Christian about his disturbing the seminar by making noise and a student (Diana) supports this (2). Christian answers the next question by making a joke

that his eraser has chickenpox (3). Many others laugh and seem to appreciate the joke (4, 5, 9, 11, and 12) even though Bella looks at the camera (15) as if she is worried if this is appropriate. The facilitator then treats the utterance as if it was a new seminar idea presented by posing a new seminar question (18). They now go on to discuss how one can help a friend who feels worried or anxious. Christian suddenly presents an idea highly connected to the previous seminar discussion. He suggests giving away a drawing (27) but immediately seem to change his mind and provokes by specifying that it should be an **UGLY** drawing (29). This time no one seems to think it's a joke, although at least Carl seems aware that it is a provocation, he looks at the camera (30). The facilitator chooses to repeat the sentence in a neutral tone (30). Nancy (31), Markus and Carl (34) on the other hand refute the idea in accordance with seminar practice.

There is now some confusion as to how to go on (35-41). Nancy, Markus, Carl, David and the facilitator seem to try to encourage each other to help find the way to carry on by looking at each other but the verbal interaction is disrupted. Contrary to their usual behavior, someone here is looking at a person who doesn't speak and the person speaks almost immediately after this. Nancy in 31 looks at Markus who speaks in 35, facilitator in 35 looks at Carl who speaks in 36, Markus in 35 looks at David who speaks in 38. The rest of the participants either look at the speaker or at their piece of paper (except for Abel who looks alternately at Nancy and Markus). Christian is trying to get into the interaction both by speech (32, 37) and by looking at the facilitator and Markus (37) but with no success. The group seems to work together to correct Christian with actions, rather than with words. They also seem to try to get the seminar back on track after he has tried to disturb it, by using looks and gestures, encouraging each other to speak to protect the dialogue from collapsing.

The facilitator finally ends the seminar, which causes most of the participants to touch or move their pieces of papers with personal goals (42). Diana asks if they now can read their notes (44) and they go on discussing the procedures

for this (47-55). As in earlier sequences of this seminar, the individual gestures and glances throughout the seminar show that participants are concentrated on their pieces of papers with personal goals, except when they find the verbal interaction interesting. For example, Otilia, who has been supporting the facilitator earlier, takes up her piece of paper in turn 16 and plays with it, glancing quickly back and forth to the facilitator for the rest of the sequence. Their gestures support the idea that they are trying to understand a new step of the seminar – goal-setting.

There is a range of questions posed by the facilitator, including management and coaching the social behavior for example: "D'you know Christian...?" (1). In addition, the facilitator poses thoughtful, open-ended questions like "- But listen **if** you notice that a friend is this worried or sad or something like Ronny was what can you do then" (18). Cognitively, some facilitator questions take the students to application and elaboration. "What do you think you should give then?" (24). likewise the facilitator asks an open and clarifying question: "What else can one do?" (28).

Christian is obviously trying to disturb the seminar and the other participants. Suddenly he lets himself be included into the dialogical interplay, by suggesting that a drawing might be given away (27). He seems to regret this, and returns to his former strategy by suggesting an ugly drawing (29). This, however, is treated by both the facilitator and the other participants as a new, adjusting idea and is analyzed and refuted according to seminar procedure (30-35). Before Christian presents the idea, the seminar is working rather slowly, one statement building on another cumulatively. This adjusting idea, even though it is refuted, brings new life to the dialogue at the end of the seminar.

Sequence 4: Grade 7 Discussing a Newspaper Article on Dress Code

The newspaper article discussed by this group of seventh graders includes interviews of a principal, who has prohibited certain clothes and jewellery at her school because she finds them

improper and provoking, and of students, who go to her school.

The sequence is filmed 50 minutes after the seminar has started and lasts for 1 minute 30 seconds. It is preceded by the group discussing how school differs from working life and Mattis refers to a recent class, stating that it is also important for young people to know how to express themselves. After this sequence, the facilitator reviews the discussion and they evaluate their group goal.

1. Facilitator: It's isn't it SOMEones (.) job to inform the youngstersin is still on their way to become grown-ups (.) it must be SOMEones job to tell you HOW you (?) / She hits her palm with the other hand, turns to Anna A and nods. Anna A turns out her hands and take them back/
2. Anna A: Yes (.) it could be school's job but
3. Facilitator: And the home or /She bows to one side, turns her hand out, moves her hands up and down/
4. Anna A: School should b yea but /She shakes her head/
5. Facilitator: But not forbid is that what you're getting at /She turns to Mattis, nods/
6. Anna A: ba exactly school should inform but not forbid /She shakes her head, turns to Jakob/
7. Mattis: M
8. Johnny: M
9. Facilitator: M okay
10. Jakob: It think it's more the parents job it yeait yeait's sorta both and /He turns to Anna A, waves his hand. Facilitator turns to Jakob and nods. Anna A shakes her head/
11. Facilitator: Yes yea
12. Anna A: yea THOUGH the parents CAN forbid /She takes up her paper and turns it around. Jakob starts to write or draw, facilitator turns her pen out towards him/
13. Facilitator: If the parents don't
14. Ruben: But if the parents don't bid () uh (.) ah (.) not care so ah
15. Facilitator: If the parents don't inform then it's the task of the school is that howit fee' /She turns to Jakob and raises her hand towards him/
16. Anna A: Yes the SCHOOL AND parents should inform but the school should not forbid the parents should do that /She rises her hands in front of her, shakes her head, points towards her other hand, puts both hands to her mouth and shakes her head. Facilitator turns down her hand and looks at Anna A/
17. Facilitator: No yea the parents can choose that AS THEY LIKE /She shakes her head and turns to Anna A/
18. Anna B: If they are /She turns to Anna A and nods/
19. Anna A: If they are /She turns to facilitator and then to Anna B/
20. Facilitator: If they are (.) exactly /She claps, holding her hands by the side of her head/
21. Anna A: Yeah it's likethis
22. Mattis: Yes but at the SAME TIME it feels like th (.) now (.) parents CARE about this (.) it feels like (2) there they shouldhave told this earlier /Facilitator nods/ without the TEACHER sorta telling /Anna A looks at the camera/ (.) if they /He moves his hands up and down/
23. Facilitator: It should have been done at home andifnot done at home it ought to /She nods/
24. Mattis: Yes
25. Ruben: Well I thinkthis principal seems to CARE about the STUDENTS STILL although: /Lisa and Lucy look at the camera, Ruben shakes his head, Mattis looks at his paper and then at Lisa/ (.) a a:h (.) although everyone seems to think she is sort (.) really evil but
26. Facilitator: M /She nods/

27. Mattis: M
28. Johnny: But I think she /Mattis looks at Lisa/
29. Ruben: look sheso wanna grade s talkin' about grades /He looks at facilitator and then at article. Jakob nods/
30. Johnny: I think she is contradicting herself
31. Mattis: N what does silent Lisa think / He looks at Lisa and smiles. Johnny turns towards Lisa/
32. Ruben: Really /Lisa stops writing and turns to Mattis. Facilitator, Susanne, Sofia, Ruben, Jakob, Jan turns to Lisa. Lucy looks at Lisa's paper. Mattis looks at Lisa smiling. Facilitator smiles/
33. Lisa: I think (1) wrong /She moves her body, leans back, moves her fingers through her hair. Facilitator leans back and looks at her watch/
34. Matti: What you think you cannot think wrong
35. Lisa: Mm yeahbu it /She turns quickly towards Lucy/
36. Facilitator: Let's see we really have to sto:::p he:re ((laughs))/She leans over table with her arms out and smiles. Anna A turns to facilitator and then to the group, rises in chair and starts to write. Lisa turns out her hand and leans back. Lucy turns to Lisa and Ruben, leans back and smiles. Sofia moves her hand quickly over the table, "sweeping". Ruben leans back and smiles. Mattis turns his head to facilitator, nods and turns to Lisa. Johnny shakes his head and rises in chair. Jakob turns to Mattis and then to his paper. Jan turns to his paper and starts to write/draw/
37. Mattis: Mh typical
38. Lisa: M bu what does silent ja (.) m Janne (?)
39. Mattis: What?
40. Facilitator: Janne hasn't even been invited ONCE /Lisa nods and Mattis smiles/
41. Susanna: (?) /She smiles/
42. Lisa: Jack ((giggles))
43. Facilitator: (?)
44. Mattis: yeahbut Jacky has alr hasal already beenb in invited
45. Jakob: butyou youhave to talk for yourself then
46. Susanne: ((laughs))
47. Lucy: ((laughs, giggle in talk)) (?)

Anna A, Ruben, Mattis and the facilitator are the most verbally active in this sequence. In turns 2-21 the utterances are quick and with a lot of interruptions. Anna A is pressing her point that it's the parents' responsibility to foster the child but that school also has a role in informing. The quick conversation seems to end in consensus, Anna A, Anna B and the facilitator all agreeing almost simultaneously uttering the same words (18-20). However, Ruben has earlier tried to point out that their way of reasoning might fail if parents don't take their responsibility (14) although he expresses it vaguely. The point is partly taken by the facilitator (15) but is lost when Anna A restates her earlier point. Mattis however tries to elaborate Ruben's point (22) saying hesitatingly that the parents do not seem to have taken their responsibility. Ruben points out that the principal (who has forbidden jewelry and provoking clothes at her school) seems to act with good intentions (25, 29). Mattis abruptly interrupts this line of reasoning by asking what "silent Lisa" thinks (31). The question seems to surprise and offend Lisa (33), who reacts negatively both in speech and gestures and later by imitating Mattis' wording but direct them towards Jan, who has been silent during long parts of the seminar (38). The rest of the participants also seem to react strongly to Mattis utterance, chiefly by checking out how Lisa will take it by looking at her (32). He is breaking the rules, not by asking Lisa the question, but probably by calling her "silent", and also by interrupting the flow of the discussion. The same thing doesn't happen when Lisa directs the same

line towards Jan. Here, the participants all look at Lisa or Mattis and seem to take it as a joke (38). Lisa is probably not intending on commenting Jan, but is answering Mattis. Jan looks down on his article and makes no move showing that he has even heard it. When the facilitator ends the seminar (36) the group reacts by joking, laughing, and by gesturing, there seem to be an almost simultaneous move or shake out of the circle, as if a game is over.

Anna A, Susanne, Sofia, Ruben, Mattis and Lisa seem to look at most of the talkers intensely during most of the sequence and so does Lucy from turn 22, whereas Anna B, Jakob and Jan only look up from their papers around the “silent Lisa” passage and Jack only in turn 17 and 25.

Anna A looks at the camera (22) when Mattis emphasis the word TEACHER, explaining that school might have an obligation and Lisa and Lucy look at the camera (25) when Ruben is defending the principal. It seems as if they are looking at the camera when school values are questioned or discussed. The facilitator in this sequence looks more intensely at the participants with very few glances at the article or the paper. When Jakob is trying to get into the discussion (10), she seems to want to encourage him in by glances and gestures (10-15). In turn 33 she checks the watch, almost immediately resulting in her closing the seminar.

We consider this a truly dialogic segment because of the ratio of teacher to student talk.

TABLE 2
Transcript summary matrix

	Sequence 1a		Sequence 1b		Sequence 2		Sequence 3	
Total talk (Talk turns and time)	19 turns 43 seconds		23 turns 35 seconds		40 turns 62 seconds		36 turns 75 seconds	
Source (Talk turns and %)								
Facilitator	8	42%	10	43%	15	37%	12	33%
Students	11	58%	13	57%	25	63%	24	67%
Form								
Statement	14		17		27		30	
Question	5		6		13		6 (2 by student)	
Relation								
Stick	17		22		36		33	
Roll	2		1		4		4	
Cognitive Process								
Clarify	Evaluate		Apply		Analyze		Evaluate	
Analyze								
Speculate								
Synthesize					Apply			
Apply								
Evaluate								
Generalize	Apply		Evaluate		Evaluate		Apply	
Compare								
Affirm								
Cognitive Content								
Text	Self		Self		Other		Others/ The world	
Self								
Group							Text	
Other topic	Group				Self			
Others/ the world							Process	
Process					Other			

The actual questions posed show that the students have acquired sophisticated dialogic skills of thoughtful, shared inquiry. The cognitive levels of this discussion are primarily within evaluation and application. In addition, the students enjoy creative ownership of the process as illustrated by their inclusive thinking. The prevailing idea in the beginning of the sequence is that parents have the responsibility for children's upbringing, not school. Ruben has earlier tried refuting this idea, or at least elaborating it, by pointing out that this can't be the case if parents fail to take the responsibility. Mattis is trying to incorporate this idea into the discussion, which tends to display a cumulative group process, where Anna A, Anna B, and the facilitator are supporting, refining, and elaborating the previously presented ideas. Ruben makes a new attempt to challenge this cumulatively built idea, by presenting a completely new one: that the principal is forbidding the clothes because she cares about the students, an adjusting idea, that might have changed the line of discussion if it hadn't been lost. A summary of our socio-cognitive analysis of the transcripts are shown in Table 2.

Talk and Source: Turns, Time, Teacher and Students

Overall, there is a simple pattern across the four seminar transcripts. The ratio of teacher to student talk time shifts with the age and experience of the group. The teacher facilitating dialogue with the younger students must talk and coach the process more actively. And with the older more experienced students, the teacher talks a smaller percentage of the time, showing that the students are more capable of controlling the discussion in a productive fashion.

Form: Statements and Questions

Our analysis of the talk form suggests subtle but important features. While the sequence with the first grade students illustrates more questions, the seventh grade segment includes two questions posed by students. Considering the importance of questioning in the thinking process, this is an

important note. That is, when we see students beginning to ask questions to the group, we expect the thinking is moving toward more inclusion and sophistication.

Relation: Stick and Roll

The continuity of discussion topic may or may not correlate with thinking levels, but this is an interesting feature of dialogue to consider. We notice that the younger students seem content to stick with one topic for the discussion sequence. However, the older students tend to roll onto new topics more frequently.

Cognitive Process and Content

Across the transcript sequences, all students exhibited a blend of individual and collective thinking. We must credit the seminar process, the text and the questions with this outcome. In addition, we found patterns of increasingly broad content with the older students.

CONCLUSION

The actual sequence of events in the discussions is clearly related to increasing levels of cognitive engagement. Across the transcript sequences, the teacher and students display awareness to the rules of the game. This shared understanding provides a safe environment for intellectual risk-taking, even though this environment is threatened from time to time by participants (and by the teacher). The safe environment is built and maintained by the participants' and the seminar facilitator's use of gestures and glances, while the critical intellectual process is supported and maintained by verbal interaction.

Towards an Extended Theory of Group Thinking and Further Research

Our key findings begin with the fundamental realization that dialogic instruction, one with a discernable, progressive shape is correlated with critical and creative thinking. Our work, and recent research presented on the similar seminar activities, suggests a personal thinking

process contributing to what can be explained by theories of the socio-cognitive, collective process. The Aristotelian idea of training habits of mind, which will result in intellectual virtues and later in practical wisdom, seems to be a similar way to look at what is going on in the seminar dialogue. In both theories the group dialogue works as a “master” on an interpersonal level (cf. Vygotsky), showing the individual how to cope with differing ideas, how to analyze and sort these out, and how to choose the most productive ones and refute the others. This is later internalized as an intrapersonal, individual skill or virtue. This process can also explain some of the differences between the age groups. The younger students are more dependent on the grown-up for guidance (cf. Rogoff, 1990).

However, there are two modes of “group thinking” displayed in our seminar material. One is “cumulative”, where one statement builds on the former statements, complementing, adding, and elaborating on the previously presented ideas. The other one mode is “adjusting”, presenting new bold ideas, that haven’t been heard before in the seminar. We believe that thinking gets “adjusting” instead of “cumulative” because of some single idea of a participant. This is shown in the above referred sequences at some specific points: Martin’s idea of not wanting Pippi as a friend because of her looks (sequence 1), Christian’s idea of presenting someone with an ugly drawing (sequence 2), and Ruben’s idea that the principal is actually caring for the students by forbidding challenging clothes and jewellery. This presenting of adjusting ideas seems less bound to age.

The Aristotelian idea does not entirely give an answer to what is happening when the adjusting ideas occur. Neither does socio-cultural theory. Piaget (1971) introduces two modes of thinking: accommodating (similar to the cumulative) and adjusting. His theory implies that thinking is an internal process, with a series of developmental steps from concrete to abstract. This is contradicted in our research, where even the young individuals clearly learn from the group process and also presents adjusting ideas in the discussion. Research show that intellectual

facilities like making assumptions matures at the age of four (Gärdenfors, 2000) and that skills of thinking and argumentation improved with training (Kuhn, 1991). This supports our idea that the age differences of the studied groups are due to differences in experience, rather than biological maturity.

But how do the adjusting ideas occur? Socio-cultural theory, as well as Aristotle’s ideas, must be married with theories on intuition in thinking if we should be able to interpret these “bold ideas” coming up from (almost) nowhere in the discussion. We would have to refer to Popper (2007), Lindström (2008) and Larsson (1904), who claim that there is an irrational and emotional element in the thinking process: Creative intuition is an active part of discovering solutions. This is a continuous process in science, Popper states. Popper (2007) and Lindström (2008) conclude that this critical problem solving strategy is creative and is used by artists as well as by scientists. This comparison between the creativity of art and science is also made by Shlain (1991).

This calls for an extended theoretical approach when analyzing the thinking developing in Sokratiska or Paideia seminars. It’s a challenge for future researchers on the Sokratiska and Paideia seminars, and on similar dialogical learning activities.

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