Arguing with Peers: Examining Two Kinds of Discourse and Their Cognitive Benefits

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Abstract: This study examines the extent to which meta-level regulation of argumentive discourse goals and strategies relates to improvement in argumentive discourse skill. A 7-month intervention was designed to provide dense experience in argumentive discourse and to promote meta-level regulation of discourse. Pairs of academically disadvantaged eighth graders conducted electronic dialogs with opposing pairs on a series of social topics. Analysis of intra-dyad discussion over the course of the intervention showed that participants producing a high proportion of meta-level utterances were more likely to show improvement in argumentive skill. This finding suggests that enhanced meta-level awareness of the strategies and goals of argument, along with rich engagement in argumentation, promote skill development.

Introduction

The idea that students profit from collaborative learning continues to gain popularity, and some, although not extensive, empirical evidence exists to support it. The mechanisms involved, however, have not been well established. I seek to learn more about these mechanisms in the present work. The domain in which I conduct the work, argumentation, is one based in collaborative social interaction. Indeed, this social exchange, as suggested elsewhere (Kuhn, Goh, Iordanou & Shaenfield, 2008, Sampson & Clark, 2009), serves as a promising path to development of the individual expository argument skills that figure prominently in academic contexts.

The present work includes an additional layer in this collaboration by asking two peers who share the same position on a social issue to collaborate in argumentive discourse with a series of opposing pairs who hold an opposing position. I focus on the discourse between the agreeing pairs as they engage in the joint task of formulating their contributions to electronic discourse with a series of opposing pairs. In a preliminary study that provides a foundation for the present work and employed very similar methods, we compared a condition involving collaborating pairs with a condition in which individuals worked alone in formulating and implementing the same kind of electronic arguments with an opposing peer. When subsequently assessed individually at the end of a several-month period, those in the collaborating condition showed greater increase in argumentation skill (as indexed by frequency of use of direct counterargument, the same measure employed in the present work). I therefore seek in the present study to investigate what occurs in the collaborative discourse of same-side pairs that is beneficial to their individual skill development.

The hypothesis that guided the present study is that this benefit is metacognitive in nature. Meta-level regulation lies at the end of a meta-level developmental trajectory beginning with a young child's awareness of mental functions (Kuhn, 2000; Wellman, 1992). In the argumentive context, the focus is on metastrategic knowing – specifically knowing about how to effectively engage in an argument. This metastrategic competence includes knowledge of the goals of argumentation, including attention to the opponent's position and claims, and knowledge of different discourse strategies. Awareness is a first step toward meta-level competence. A high level of such competence is reflected in metastrategic evaluation, which enables the speaker to monitor the effectiveness of strategy use. Awareness and evaluation are both necessary along a path of meta-level development toward true meta-level regulation.

Meta-level regulation in the argumentive context involves the speaker's ability to control strategy use during argumentive discourse. Speakers at this level are able to choose and sequence different strategies effectively, based on their knowledge of the utility of the strategies, while understanding how the strategies lead to the dual goals of argumentation, identified by Walton (1989) as obtaining commitments from the opposing partner to support one's own arguments and critiquing the opposing partner's arguments to weaken their force. In addition, regulation allows for continuous adjustments in response to the other speaker's discourse strategies. This metastrategic effort reflects knowledge and control over a sequence of strategies involving counterargument and rebuttal (counterargument of a counterargument).

Three techniques were employed in the present work to support students' awareness of and reflection on their argumentive discourse. These were thought to be key in enhancing both their understanding of the goals of argumentation and their skill in implementing these goals. First, students worked in pairs. Previous

research demonstrates the benefit of collaborative planning and implementation in the development of young adolescents' argument skills (Kuhn & Udell, 2003; Shaenfield & Moore, 2009; Sampson & Clark, 2009).

A primary benefit of collaborative planning is making knowledge explicit. Learning is shown to be enhanced when learners articulate the reasoning behind problem-solving behaviors (Chi & Van Lehn, 1991). In the context of planning argument discourse strategies, collaboration provides the opportunity for articulation of meta-level regulatory strategies. It was hypothesized that two students with the same goal and having to deliberate regarding each argumentive move would not only generate more effective contributions to the discourse but would also make the collaborative pair more aware and reflective regarding this discourse.

Second, following the work of Felton (2004), an explicit reflective activity was added. Some of the students' own dialog transcripts were made available as the basis for this activity. Third, students conducted their dialogs via instant-messaging (IM) software. In addition to capitalizing on teens' familiarity with the medium, this technique has the benefit of providing an immediately available and permanent record of the discourse, as a basis for reflection. In striking contrast, in real-time verbal discourse, the contents of each contribution to the dialog immediately disappear as soon as they are spoken.

A number of previous studies (Anderson, Nguyen-Jahiel, McNurlen, Archodidou, Kim, Reznitskaya, et al., 2001; Chinn, 2006; DeFuccio, Kuhn, Udell, & Callender, 2009; Felton, 2004; Felton & Kuhn, 2001; Kuhn et al., 2008; Kuhn, Shaw, & Felton, 1997; Kuhn & Udell, 2003; Nussbaum, 2003, Nussbaum & Kardash, 2005; Nussbaum & Sinatra, 2003; Reznitskaya, Anderson, McNurlen, Nguyen-Jahiel, Archodidou, & Kim, 2001; Schwarz, Newman, & Biezuner, 2000; Udell, 2007) have reported gains in argumentation skill as a result of engagement and practice.

Previous research (DeFuccio et al., 2009; Felton, 2004; Felton & Kuhn, 2001; Kuhn et al., 2008; Kuhn & Udell, 2003) has shown that young adolescent arguers tend to limit themselves largely to discourse strategies addressed to articulation of their own positions. Over time, a shift is seen toward greater attention to the opponent's claims and, eventually, efforts to address and weaken them. As this occurs, a shift in the awareness of the goals of argumentation may also be developing. Growth of the meta-strategic aspect of argumentation, alongside skill development, may be critical for progress. Previous studies of argument skill development have not explicitly addressed the relationship between this meta-level development and skill development itself. To further understand the relationship between developing meta-level regulation and developing dialogic argumentation skills, the intra-dyad discussion between same-side partners was recorded on audiotape for subsequent analysis.

Method

The research employs a two-group repeated measures design using an untreated control group to compare the effects of the intervention on argument discourse skill. The entire study took place in repeating phases over seven months.

Participants

Participants were the entire eighth-grade student body of 49 students not assigned to individualized education programs (IEP), drawn from three classrooms, in an urban public middle school. The school primarily serves African American and Latino families from a lower-income community; 80% of students are eligible for free lunch and 14% are eligible for reduced-price lunch. The city school system classifies the student body of the school as academically disadvantaged, with student achievement is several years below grade level. The city education website lists the student body ethnicity ratios as 54% Black or African-American, 40% Hispanic or Latino, 4% White, 1% Asian or Pacific-Islander and 1% Native American. One class of 26 students (17 females and nine males), participated in the intervention, while the remaining 23 (10 females and 13 males), drawn from two classrooms, served as a control group.

Procedure

Pretest Assessment

The purpose of this phase was to assess all 48 students' individual initial skill levels in dialogic argument, for comparison at final assessment. Students' opinions regarding capital punishment (CP) were assessed individually by questionnaire. This assessment allowed students to be classified as holding a pro or con position on CP. Each student was then paired with a classmate holding an opposing (pro or con) view on CP. Each pair conducted a dialog on the CP topic mediated by iChat (instant messenger chat software) installed on laptop computers. The specific instruction was to attempt to convince the other opponent that his or her opinion was the better one. Pairs of pro and con students were positioned to face opposite sides of the classroom to reduce

the possibility of verbal or eye contact.   The software saved a transcript of the dialog for analysis. Sessions were approximately 25 minutes in length.

Initial Intervention

The initial phase of the intervention took place over the course of 11 successive 45-minute class periods, twice per week. On the days when the experimental group was participating in the intervention, the control group attended their regular social studies class. The experimental group's first topic was whether children should be required to attend a town school or whether it's permissible for parents to teach them at home if they wish.

1. Individual position and assessment (session 1). Students' positions regarding the first topic were assessed individually by questionnaire, allowing students to be classified by position on the topic.

2. Dyadic electronic arguments with opposing-view pairs (sessions 2-7). Students were paired with a classmate holding the same view (home okay or school mandatory). An attempt to form the greatest number of same-gender dyads was made but not possible to implement completely due to the uneven gender make-up of the intervention group. However, the majority of pairs were same-gender. The two members of a pair remained paired throughout the topic. The paired students collaborated in engaging in a series of e-dialogs with other dyads holding the opposing view. In one case, to accommodate an uneven number of students, a trio was formed. Dyads were instructed and reminded to collaborate with one another in constructing their input and, once in agreement, to take turns typing it on the laptop. An audio tape recorder continuously recorded the intra-dyad discussion. Sessions averaged 25 minutes in length.

Dyads engaged a different opposing dyad at each session. During the dialog period, several adults circulated to address any technical difficulties and to remind partners to collaborate. Dyads were also provided with a series of "reflection sheets" to promote their representing and reflecting on their own and the opposing pair's arguments. The "Other Argument" sheet asked the students to determine what the other side's main argument was, their dyad's "comeback" (counterargument) to that argument, and how the dyad could improve this comeback. The "Own Argument" sheet asked the students to identify one of their main arguments, the other side's counterargument to that argument, the dyad's comeback (rebuttal) to the counterargument, and to suggest how that comeback could be improved.

3. Preparation for final, class-level e-argument (sessions 8 & 9). Session 8 marked the beginning of a culminating activity with respect to the topic. Students worked within their same-side teams, preparing for what was to be a final "showdown" debate at session 11. Within each of the same-side teams, each of the dyads that had worked collaboratively to this point were divided, one assigned to an "Other Argument" (OTH) team and the other to an "Own Argument" (OWN) team. Each preparation team had an adult coach who facilitated the group process. The materials available to each team were as follows: The "Own Argument" teams had copies of the "own argument" reflection sheets that had been produced by each team. The "Other Argument" teams had copies of the "other argument" reflection sheets that had been produced by each team. Coaches had transcripts of all dialogs on hand for reference if requested by the students.

The OWN team was told that their goal in preparing for the showdown was to be familiar with the possible counterarguments the opposition could assert and prepare rebuttals to use in the showdown. The team created a set of "own argument – counter – rebuttal" sequences that were recorded onto the OWN argument sheet. To do this, first they selected the three most convincing arguments for their position. The reflection sheets were provided as references to complete the OWN argument sheet counter and rebuttal sections. The OTH team was told that their task was to be familiar with effective counterarguments to use when faced with other arguments advanced by the opponents in favor of their position. The team created a set of "other argument – counter" sequences that were recorded onto the OTH argument sheet. During this preparation session, these team members identified the three most damaging arguments raised by the opposition and, using the provided or newly generated materials, decided on their counterarguments.

4. The Showdown (session 10). Students on each side were divided into two teams of 6-7 members – Team A and B based on the recommendations of the coaches during the preparation phase, so as to create two teams of overall comparable skill. The division was done such that each team contained members who in the preparation phase specialized in generating the best "own arguments" for their position, as well as members who had specialized in countering the "other arguments" of the opponents.

During the first half of the showdown, Pro Team A debated with Con Team A. At half time, a team change took place and B Teams from each side continued the showdown. The showdown consisted of a single electronic dialog between the two sides lasting approximately 30 minutes. All members of the team collaborated and came to an agreement on the text to be sent to the opposition.

5. Judging and feedback (session 11). The electronic dialog produced in the showdown was represented in an argument map prepared by the researchers. All the arguments, as well as the corresponding counterarguments and rebuttals, were represented and connected by lines to show their interrelation. Different colors were used to label contributions as effective, ineffective, or neutral argumentive moves. A point system

was also applied, which made it possible to declare a winning side. The argument map as well as the graph representing the outcome was presented to the students for their examination the week following the showdown.

Subsequent Intervention Phases

The intervention was repeated during the second and again during the third trimester of the school year, with new topics. The second topic addressed whether disruptive students should be expelled from school or allowed to remain. The third topic, linked to the social studies curriculum, addressed whether the United States should offer military intervention to a small country requesting it. Due to time limitations created by school scheduling conflicts, the second and third interventions included only five dialogic sessions instead of six.

Posttest Assessment

The pretest assessment involving individual dialogs on CP was repeated for all students. In the intervention group, one student participating in the initial assessment left the class after the first topic and was not included in the posttest assessment. Another student who joined the intervention classroom during the second topic was also not included in the posttest assessment.

Results

Overall effect of the intervention

Dialogs were coded based on the argument discourse coding scheme developed and used in previous research (Felton, 2004). The main indication of improvement was the increase in counter-critique strategy moves – a counterargument that directly weakens the force of the opponent's preceding argument. The proportion of Counter-C usage for the intervention group increased from 20.67% (SD = 29.67%) at initial assessment to 40.91% (SD = 19.28%) at final assessment, while the control group increased nominally from 18.84% (SD = 28.45%) at pretest to 19.93% (SD = 32.44%) at posttest. A significant group X time interaction was found, $F(1, 46) = 4.89$, p=.032, partial $\eta2 = 0.096$.

Intra-dyad Discourse Analysis

Analysis of the intra-dyad discussions is based on the 163 intra-dyad discussion transcripts of the discussion between members of a dyad as they participated in the sessions of the intervention. A coding scheme was developed to distinguish meta-level discursive moves about strategies (planning, evaluating, or predicting) from simply discussing the content of the arguments (see Table 1).

Table 1: Intra-dyad discourse coding scheme

Code	Examples
METACOGNITIVE STRATEGIES	
PLANNING [PL]	-We could mention how effective the expulsion will be towards the kids in the school. Maybe we explain that better?
	-I meant we can use the friends reason.
	-What should we say to that?
PREDICTING [PR]: Predicting effect or consequence of strategy that hasn't happened	-They are still writing. What do you think they are going to talk about?
	-They will say that he could learn English in school or they could get him a Spanish teacher.
	-Don't know how they will come back from that
EVALUATING [EV]: Analysis of performance and strategy effectiveness	-We stuck a hole in their argument
	-We gave them a good comeback
	-They proving our point! Look what they keep writing!
	-What's our main argument?
METACOGNITIVE KNOWLEDGE [MC]	-I don't even know why I'm arguing with this side. I got so many ideas in my head

	-Can we just talk to everybody instead of typing? - You know what, we can use this! We can use this! This is our comeback! Our Counter-Counter argument.
NON-METACOGNITIVE	
NULL [N]	-Oh man
OFF TASK [OT]	-I'm MAD hungry. How much time til lunch?
TECH [TC]	-They just responded -I don't think our network is connected
READING FROM SCREEN [RS]	-They said, "Aris needs to make friends"
TYPE-ALOUD [TA]	-We… think… the… boy… should… be… home… schooled
DICTATION [DT]	-…receiving a fatal warning, F-A-T-A-L.
DIVISION OF LABOR [DL]	-Let me type now
ARGUMENT DISCUSSON [AD]	-He could hire a tutor
Discussion of content (not discourse)	

Relation between Meta-Level Intra-Dyad Discourse and Strategic Gain

To examine the relationship between meta-level discourse and strategic performance from initial to final individual assessment, students were categorized into two additional groups for each topic. The strategic improvement categorization is based on whether they increased or didn't increase with respect to a key indicator of strategic improvement, the proportion of Counter-C utterances from initial to final assessments.

For Topic 1, six students (three dyads) were dropped from the analysis of the first topic due to not participating in the intervention. Simply put, the partners didn't interact with one another during the entire first topic of the intervention. In consultation with the classroom teacher, these six participants were arranged in better pairs for the second and third topics. Of the 19 participants, 14 were classified as showing improvement from initial to final assessments. Of the 14 that improved, eight were also classified in the high-meta intra-dyad category, i.e., they were equal to or above the median for total number of meta-level utterances, and six were classified in the low-meta category. Of the five that didn't improve, two were above or equal to the median and three were below. While suggestive, these proportions were not significantly different (a = .628, Fisher's Exact Test).

For Topic 2, of the 25 participants, 19 improved from initial to final assessments and six didn't. Of the 19 that improved, 13 were above or equal to the median for proportion of meta-level utterances and six were below. Of the six that didn't improve, all were below. These proportions were significantly different (a = .005, Fisher's Exact Test).

For topic 3, of the 25 participants, 19 improved from initial to final assessments and six didn't. Of the 19 that improved, 13 were above or equal to the median for proportion of meta-level utterances and six were below. Of the six that didn't improve, all were below. These proportions were significantly different (a = .005, Fisher's Exact Test).

Relation between Total Utterances and Strategic Improvement

A similar analysis was conducted to determine if total intra-dyad talk related to strategic improvement. Two groups were formed per topic – the *high-talk* group, at or above the median, and the *low-talk* group below the median. The relationship between total talk frequency and strategic improvement, even while suggestive for topics 2 and 3, was not significant for any of the topics. Thus, it appears to be meta-level talk specifically, rather than talk in general, that is predictive of strategic gain.

Discussion

The present results confirm that argumentation skill can be developed among young adolescents over the course of a goal-based, collaborative activity offering dense opportunities for engagement in discourse. Consistent with earlier findings (Kuhn et al., 1997, 2008; Kuhn & Udell, 2003), the intervention was effective in enhancing students' dialogic argument skills in addressing a new topic that had not been included in the intervention. Students in the intervention group exhibited an increased proportion of usage of skilled argument strategies (Counter-C) and a decreased frequency of usage of less advanced (Exposition) strategies, compared to the control group.

These findings are inconsistent with claims that argument skills are entirely domain specific (Stein & Miller, 1993). Participants in the present study only engaged each other on the capital punishment (CP) topic twice – once before the intervention as a pretest and once at the end as a posttest. The pretest did provide students with some experience with the topic, but no more than it did students in the control group. Improvements within a domain could be due to acquisition of specific content-bound arguments within the domain, but transfer to a different domain requires a more complex account.

It warrants emphasis that this progress was observed in a group of significantly academically disadvantaged students. Prior to the intervention, these young adolescents had little occasion to practice sustained argumentive discourse in their daily lives. Observation of their classroom experience showed that they experienced only infrequent opportunities to express their views and then only in response to a teacher's question, rather than in debate with one another. Yet these students readily engaged the activity and the majority showed clear advance in skill.

The contribution of the present study lies in the insight it offers regarding the mechanisms that make the method effective. The intervention created conditions in which focused peer discourse was required and supported. The results indicate that its value lay not in talk per se, the quantity of which did not predict improvement. Instead, it has been proposed here, a major value of such discourse is its support of meta-level representation and regulation of discourse processes. The findings support this hypothesis. Students producing a high proportion of meta-level utterances during peer discourse tended to make the greatest progress in individual argument skill. This relationship was statistically significant for the latter two of the three phases of the intervention period. During the first topic, we can speculate, students were settling into an activity that was very new to them and gains were less consistent overall.

The present results, it should be emphasized, don't simply show that students displaying a high proportion of meta-level utterances did better on the argument skill posttest. Rather, frequent expression of meta-level utterances with a collaborating partner is associated with advance in individual argument skill. This advance, note further, could be observed across the range of initial skill levels. Initially less competent and initially more competent individuals both improved when they engaged in frequent meta-level talk.

Why might engaging in meta-level regulatory discourse lead to skill advance?   Meta-level understanding of the goals of argumentation and of strategies to achieve these goals develops over time with engagement and practice. Such meta-level discussions aren't simply reflecting the individual's current understanding of task and strategies. The discussion is part of the process, along with engaging the opposition, of constructing the understanding.

The most useful and likely accurate way to conceptualize the relationship between meta-level understanding and strategic engagement with a cognitive task is most likely as one of mutual bootstrapping (Kuhn & Pearsall, 1998). Implementation and practice of strategies leads to greater understanding and valuing of them, in bottom-up fashion, while top-down monitoring and management of strategies plays an increasing role. This is not a new idea, but the present study contributes to our understanding of how this process may work by examining and identifying differences between cases in which it works well and less well over an extended period of time. The Counter-C strategy was used in combination with less advanced strategies over the course of the intervention. Both the effective use of advanced strategies and ineffective use of less-advanced strategies may "feed-up" to the meta-level and strengthen awareness of the utility of each strategy. Meta-level understanding also "feeds down" to the strategic level. Increasing awareness of the coordination of task objectives and effective strategies to reach task objectives guides strategy implementation.

As microgenetic research has repeatedly shown, enhanced meta-level awareness of strategies, and particularly more advanced strategies, doesn't mean that less-advanced strategies cease to be used (Siegler, 2006). More likely, however, meta-level understanding was under construction throughout the intervention through repeated engagement rather than emerging in a single observable moment of change.

In summary, the present results support the conclusion that the opportunity for explicit meta-level discourse contributes to meta-level understanding, which has been shown here to relate to the development of strategic skills. We are far from a complete understanding of the mechanisms involved and more observation of them in action is needed. In particular, the need to understand how top-down and bottom-up processes reciprocally support one another will arguably require more attention to individuals' understanding of their practices, rather than simply performance of them.

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