Writing Argumentative Text: A Developmental Study of the Acquisition of Supporting Structures

Pierre Coirier
Caroline Golder
University of Poitiers, France

The development of argumentative writing is studied here by examining the structural organization of argumentative texts. It is assumed that the ability to construct supporting relationships, that is, a conclusion statement supported by argument statements, is acquired gradually with age. The following stages of acquisition are postulated: (1) a pre-argumentation stage, where at first no explicit position is stated, and then an explicit position is stated but is not supported by an argument; (2) a minimal argumentation stage, where a position is explicitly taken and supported by one argument; and (3) an elaborated argumentation stage, where at least two unrelated supporting arguments are used, and then two related arguments are used.

Two corpora were gathered under similar conditions: collective debate in the classroom, followed by individual essays written on the chosen topic. The first corpus was produced by 147 children aged 7 to 14, and a group of 34 college students. The second corpus included the protocols of 92 children aged 11 to 16 the essays were graded for the presence or absence of each structural level, and then classified at the highest structural level exhibited.

The resulting classification largely confirmed the hypothesized order for the stages of argumentative development. The minimal argumentative structure (standpoint + one supporting argument) was mastered by nearly 90% of the 7 and 8 year-olds. The most elaborate structural level in our model (two related arguments) was attained later: less than one out of four 7-8 year olds versus three out of four beyond age 14. Techniques involving more complex argumentative relations such as refutations and counterarguments, or restriction of one argument by another, are mastered even later and seem to be strongly linked to the nature of the issues under debate.

Three main conclusions can be drawn from these results: precocious argumentative skills exist in children before age 11 or 12, argumentative discourse complexity continues to increase up to age 14 and beyond, and the characteristics of the referential domain of argumentation have an impact on this structural elaboration process.

Convincing others that we are right, modifying their representations or point of view, or influencing their judgments, in short, argumentation, is a basic, everyday language activity found in almost all dialogues. Moreover, many studies have shown that argumentative behavior

is exhibited very early in development (Eisenberg & Garvey, 1981; François, 1980, 1983; Genishi & Di Paolo, 1982).

A number of studies in psychology have dealt with some of the specific operations required for argumentation: handling connectives, presupposition processing, use of propositional attitude verbs, etc. (see in particular Bassano & Champaud, 1989). But little research has focused specifically on *the textual organization of argumentation in written monolog production*. The problem posed by this type of activity is not limited to the local execution of a single argumentative operation, such as stating or supporting a position, specifying or restricting an argument, etc. Argumentative writing requires the simultaneous execution, management, coordination, and planning of all of these operations — and this is a crucial difference. It also imposes a dual constraint on the writers, who must conceptually organize their reasoning on the one hand, and express their reasoning in words on the other. Viewed as the ability to write an elaborated, argumentative text — the meaning we shall grant to the term here — argumentative competency, according to Pieraut-Le Bonniec and Vallette (1987), is acquired quite late in development. In their experiment, children asked to solve a detective puzzle on the basis of a few clues did not produce truly argumentative text until age 15 or 16 (prior to that, the narrative mode prevails). But the task proposed by these authors was more of a logical reasoning or explanation task than an argumentative one. The problem at hand was to solve the puzzle and explain the solution, not to defend one's position on a controversial issue. In our minds, argumentative discourse must be of the latter type. Argumentation does not entail stating 'why such and such is the case', but rather 'why I feel it is preferable that such and such is the case' (on this matter, see Ebel's 1981 distinction between explicative and polemic discourse). Additional pessimistic results were obtained by Benoit and Fayol (1989), who used a sorting task to show that argumentative texts are not easily identified as such, even by adults. However, the texts proposed by these authors resembled narrative reports of an argumentation more than argumentations *per se*. Moreover, the data obtained did in fact indicate a strong tendency to confuse argumentative text and narrative text.

Schneuwly (1988) on the other hand studied genuinely argumentative texts written by 10 to 14 year-old children. Analysis of the texts produced showed late acquisition of the ability to consider a potential position opposing one's own. The 10-year-olds simply juxtaposed arguments in favor of their own point of view (*I think that... and that...*). By age 14, however, a more elaborate level of argumentation appeared, with opposing positions included (*X said... but it's not true... As for me, I think...* followed by a factual argument).

The results obtained by Brassard (1990) also appear particularly relevant to the notion of argumentative competency. The writing samples these authors studied were obtained using an experimental device which was clearly argumentative — write a text *to convince smokers to stop smoking* — and it was indeed the argumentative organization of the texts that was analyzed, i.e. the involvement of the writer and addressee, the presence of counterarguments, the percentage of conclusion statements and argument statements, the connection vs. the juxtaposition of arguments, etc. The authors found that argumentative writing skills develop substantially with age (in this case, between the ages of 8 and 13), that teachers can produce considerable improvement by appropriate action, and above all, that argumentative skills are clearly present by age 8 or 9. These observations are consistent with our own analyses of argumentative writing and speech (Coirier, 1991a; Espéret, Coirier, Coquin, & Passerault, 1987; Golder, 1990, 1992a; Passerault & Gaonac'h, 1989). By age 7 or 8, many of the children's productions exhibit very characteristic argumentative features such as speaker accountability, judgments expressed in modal form, counterarguments, and so forth.

In the present study, we shall examine the *initial acquisition and subsequent elaboration of supporting structures for argumentation*. It is assumed (Coirier, 1991b; Coirier, Coquin-Viennot, Golder, & Passerault, 1990) that the type of argumentative text can be characterized by its aim, i.e. by the overall discourse act it is intended to accomplish. This act is accomplished through the construction of a 'schematization' — in Grize's sense of the term — to modify the representation of an addressee on a given subject matter. Such a 'construction' necessarily

involves specific operations like determining the referent objects, or defining the space of interlocutory or referential negotiation (Golder, 1990, 1992a). But above all, it must be 'supported'. According to Apotheloz and Mieville (1989), '*To support*, a discursive function applied to a given segment of discourse (a functionally homogeneous group of one or more statements), is to substantiate, render credible, reinforce, etc. the assertive content of another segment of the same discourse. It is therefore a generic function, whose reinforcing effect can obviously result from a wide variety of specific operations, ranging from those based on strict rules (such as the ones used in proofs), to others based on more flexible rules (like the ones used to win over an audience)' (our translation).

This definition is operational insofar as no normative judgments need to be made about whether an argument is a 'good' one, or even a 'receivable' one. Support is said to be provided by the sheer fact that one segment is presented and/or recognized as backing up another segment in the text. Based on this alone, the structural organization of an argumentative text can be analyzed simply by looking at relationships such as the juxtaposition, connection, and chaining of the basic structures. Analysis of this type has already demonstrated some particularly complex argumentative structures (Coquin-Viennot & Coirier, 1992). In this general analysis framework, the following pair of statements, *It's a good idea to give 8-year-olds an allowance; I wish my parents would give me one every week*, is considered not only to express an explicit position, marked by the axiological form *It's a good idea*, but also to include a stipulating specification, *every week*. But there are no supporting arguments, nothing to really back the position (except for its reformulation, if, like Grize (1985), we consider reformulation to be one particular kind of support, which will not be the case in the present paper). In contrast, the following pair of statements does indeed contain a supporting argument, even if it may not be a particularly receivable one: *Allowances should be given by age 10; I use mine to buy myself whatever I want*. In our minds, support exists every time a specific choice is made and backed by an argument of any kind, whether based on a more general value, personal or collective values, or possibly already proven facts. As a general rule, our definition of support thus implies that there is not only affirmation or reaffirmation of an initially stated position (*Allowances should be given to all children — it's good for them to have money*), but also a change in axiological register (*Allowances should be given by age 8; it will teach kids how to handle money*).

The development of supporting structures with age can be viewed from different angles. From a qualitative angle, one question that can be raised is: What are the different types of support being utilized? Are personal, self-centered value systems used for support, or on the contrary, do speakers base their argumentation on collective norms or topoi (Golder, in press; Miller, 1987). Another approach would be to ask what types of operations are used to argue: refutation by counterargumentation, negation, concession, etc. (Apotheloz, Brandt, & Quiroz, in press). Our aim here is to characterize the acquisition and development of argument support structures, viewed as the transition from a pre-argumentative structural level (no supporting arguments), to a minimal structural level (the supporter-supported pair), and finally, to a more elaborate structural level involving the use of several related arguments. Our procedure is analogous to the one used by Botvin and Sutton-Smith (1977) who analyzed the organization of narrative productions in terms of the presence of a minimal pair (opening and closing of the narrative), the concatenation of several pairs, and the nesting of pairs. This increasing structural elaboration was found to develop progressively in the texts of children age 4 to 8 (Espéret, 1984). We shall take a similar approach to the analysis of the argumentative texts produced here, by postulating the following increasingly complex structural levels (illustrative examples are given on page 173 in the protocol analysis section):

Pre-argumentation level: (1) No position is stated; (2) An unsupported position is stated.

Minimal argumentation level: (3) A position is stated and supported by one argument.

Elaborated argumentation level: (4) A position is stated and supported by at least two *unrelated* arguments; (5) A position is stated and supported by at least two *related* arguments.

By definition, these five structural levels are nested (each level encompassing all preceding levels). Thus, analyzing their order of occurrence was not our primary focus. Our objective was rather to determine whether these levels indeed correspond to distinct, consecutive developmental stages of argumentation, and if so, at what age each emerges. In particular, we are interested in the age at which the minimal structure is in place, and the age when the most elaborate forms become predominant.

Method

Corpus

Two different corpora were analyzed. The first, corpus A, was collected by Espéret et al. (1987) from 147 children aged 7 to 14, and a group of 34 college students. The second, corpus B, was collected by the present authors using a similar procedure (Golder & Coirier, 1991) from 92 children aged 11 to 16.[1]

Corpus A. After a collective debate in class, each child was asked to write down his or her point of view on the chosen topic. The instructions given orally were: *'We've just seen that not everyone agrees. Now you're going to write down your own ideas, and give the best possible explanation of why your answer is the right one. (An example is given) You, XXX, just said you disagreed with YYY. What could you write down to make him agree with you, to convince him?'*
Each child wrote an essay about two different topics, in two separate sessions. One of the topics had a 'formal' discourse referent (a problem of the scientific type), while the other had a 'natural' discourse referent (a question of opinion). The topics proposed were adapted to the children's age (see Table 1).

Table 1
Characteristics of corpus A

Age	N	Formal	Natural
	Subjects		**Topics**
7-8	55	conservation of weight	getting an allowance before age 10
9-10	48	conservation of volume	getting an allowance before age 12
11-12	23	conservation of inertia	the right to smoke at age 15
13-14	21	conservation of inertia	the right to smoke at age 17
Adult	13 formal	conservation of inertia	
	21 natural		use of notes and textbooks during exams

In all, 328 protocols were collected, two per child up to age 14 (one formal, one natural) and one per adult (either formal or natural).

Corpus B. The experimental setup was the same as in A: collective debate followed by

individual writing. But this time, the same topic, pollution, was used for everyone. A total of 92 protocols were examined, all with this 'natural' discourse referent. Twenty-seven of the essays were written by 11-12 year olds, 27 by 13-14 year olds, and 38 by 15-16 year olds.

Remarks. (1) The number of protocols per age group was relatively high. In addition, the two corpora were obtained using the same experimental procedure, but different subjects and a different essay topic. This setup was designed to facilitate validation of our results. (2) Although the argumentation situation was not a common one in either case (writing an essay after a debate), the experimental setup (actual debate, then instructions to defend one's opinion in order to convince someone else) did in fact trigger the production of truly argumentative texts (containing marks of speaker involvement, for instance), as already shown in the initial analyses of these corpora by Espéret et al. (1987) and Golder and Coirier (1991). (3) The age range chosen for corpus A turned out to be a good one for revealing developmental effects; in particular, a clear shift occurred between the ages of 11-12 and 13-14, as found in other studies (Golder, 1990). The age brackets studied in corpus B took these critical cutoff points into account.

Protocol Analysis

Two principles guided our protocol analysis:

1) The exhaustive description of the supporting structures in a given protocol turned out to be extremely lengthy and often tricky due to the difficulty of defining the appropriate description criteria (Coquin-Viennot & Coirier, 1992). A more limited goal was set here: to characterize the minimal argumentative competency of each subject on the scale of increasing complexity presented above. Doing this amounts to answering the following question for a given protocol: Does this protocol explicitly exhibit the complexity level under consideration? *At the very least*, is a position taken, is there *at least* one argument, etc.? This type of analysis is a conservative one, and no doubt underestimates the children's actual competency level.

2) The criteria used to define the structural levels were also conservative:
   Presence of an explicitly stated position (P). This level was assigned to texts which included a statement manifesting an identifiable argumentative orientation on the topic in question, in particular, through the presence of prescriptive forms (*we must*) or axiological forms (it's a good idea to...). Example (Aline, age 7): *You shouldn't give an allowance before age 10* (followed by some non-supporting statements in which personal events were described or told).
   Presence of one argument supporting the position taken (PA), regardless of the nature of the argument or its relationship to the conclusion. Usually, the supporting relationship was expressed by a connective, or even a para-linguistic mark (an arrow, a colon, etc.). If not, the semantic relationship between the two statements was clear enough for the judges to agree unanimously. Example (Jerome, age 12): *I think people should not be allowed to smoke before the age of 15 because it ruins their lungs.*
   Presence of two distinct arguments (P2A). The position was supported by two (thematically) unrelated arguments. Example (Christophe, age 8): *An allowance can be given at any age. It can help us learn to count and can be useful in buying gifts.*
   Presence of two related arguments (P2AC), usually linked by a connective (and, besides, in addition, even if, etc.). Example (Aline, age 12): *I think that before you're 15 you shouldn't smoke because it ruins your health, especially between age 10 and 15. And teenagers who have asthma have difficulty breathing.*

Each of the protocols was coded by two separate judges. In general, disagreement between judges was infrequent (less than 25%). Differences were settled by discussion.

The percentage of children in each group who attained a particular structural level was analyzed. Remember that, by construction, the levels are nested: a child classified at the 2-unrelated-arguments level necessarily belongs to the group classified at the lower, 1-argument level. No distinction was initially made between the two types of protocols collected in corpus A (formal vs. natural discourse), since the structural differences between the two turned out to be minimal.

Results

Let us repeat the essential questions we are attempting to answer:

Do the increasingly complex structural levels of argumentation defined here a priori correspond to the changes with age found in our subjects' texts? Do these patterns accurately represent distinct developmental stages, and if so, what are these stages?

Is the expected progress made gradually and regularly, or are there abrupt shifts? In the acquisition of supporting structures for argumentation, do we find the same abrupt shift as the one noted by Espéret et al. (1987) and Golder (1992a, 1992b) in 11- to 14-year-old children's usage of speaker accountability and discursive negotiation marks?

General development of supporting structures with age

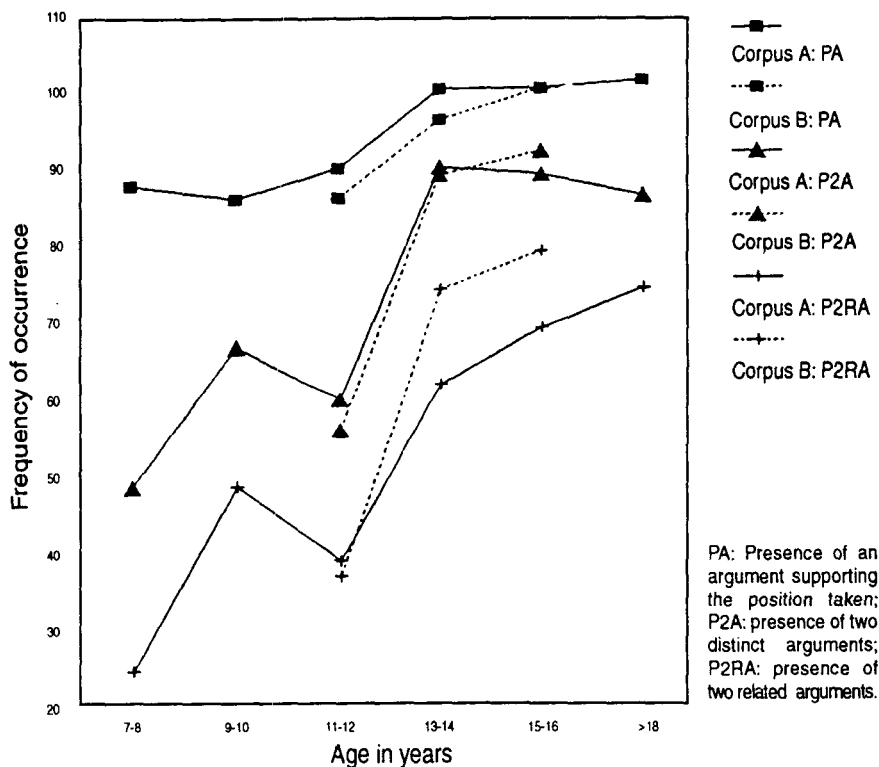The main results obtained for each corpus are shown in Figure 1.[2]

Figure 1. Frequency of each supporting structural level, by age

Comparing the two corpora, the first remark that can be made is a methodological one. For age groups 11-12, 13-14, and 15-16, the difference between the percentages obtained for corpora A and B never went above 8%; and this percentage was only 4 or 5% in the other cases. Again, given the non-negligible difference between the corpora (different schools, collection period, topic discussed, data coding by different judges), this result largely validates the data analysis method. It also guarantees the reliability of the data for future interpretation.

From the developmental standpoint, two characteristic shifts can be seen (confirmed by statistical analysis of both corpora; see below). The second shift, between age 12-13 and 13-14, has already been observed many times in this type of study. But the first one, falling between ages 7-8 and 9-10, was relatively unexpected.

One remark is called for at this point. The first shift did not occur for the simplest level, minimal argumentation, whereas the second occurred for all three levels, including both sublevels of elaborated argumentation (unrelated arguments and related arguments). Now, the related-argument level requires a minimal linguistic skill: the ability to use connectives and to express coordination and subordination. It is thus legitimate to assume, provided a more direct analysis is conducted, that it is not linguistic competency alone which is the determining factor of the developmental patterns observed here. We shall come back to this point in the discussion.

Again, concerning the overall development pattern, note that the progression seems to stop at approximately age 13 or 14. Yet substantial developmental progress in discursive negotiation and argumentative cooperativeness have been found in argumentative dialogues of children after age 14 (Golder, 1992b). It appears (Golder, 1992a) that the two main constituents of argumentative discourse, support and negotiation, are governed by different factors, depending on what skills are acquired at the same time by the child. This difference seems to be confirmed by the present results.

Breakdown by structural level. Out of the total of 420 protocols, all except two (found for age 7-8) contained the statement of a position (level P). This pre-argumentation level thus appeared early. The children understood that they were required, at the very least, to express their opinion in the text. Similarly, the minimal argumentation structure (PA) was found in nearly 90% of the 7 and 8 year olds' protocols. This also means, however, that a non-negligible number of children did not explicitly support the position they took: this was the case in 11 out of 108 protocols at age 7-8, 13 out of 96 at age 9-10, and 9 out of 73 at age 11-12, versus only one for the older subjects. Between the ages of 11-12 and 13-14, the difference was not inconsequential (10%) and was statistically significant ($\chi^2_{(1, N = 132)} = 4.86$, $p < .03$). Making an overall comparison between ages 7 to 12 and 13 to adult, we obtained $\chi^2_{(1, N = 420)} = 16.74$, $p < .0001$. Of course, our criteria for analysis may have masked non-explicit forms of support, although that would be a weak interpretation given the reliability of the results.

Finally, for the more elaborate argumentation levels, P2A and P2AC, the patterns were particularly dramatic (two clear shifts). Only 50% of the 7-8 years olds' protocols included two arguments to support the position taken, and these two arguments were only related half of the time, i.e. in 25% of the total for that age. In contrast, starting at age 13 or 14, more than 80% of the protocols reached the P2A level, and 65% to 75% attained the P2AC level. Statistically speaking, these differences are highly significant. For P2A, the values obtained between ages 7-8 and 9-10 were $\chi^2_{(1, N = 206)} = 6.47$, $p < .02$, and between ages 11-12 and 13-14, they were $\chi^2_{(1, N = 142)} = 18.9$, $p < .0001$. No significant difference was found, however, between ages 9-10 and 11-12 ($\chi^2_{(1, N = 169)} = 1.48$, $p > .22$).

Similar results were found for level P2AC. Between ages 7-8 and 9-10, the values were $\chi^2_{(1, N = 206)} = 12.23$, $p < .0006$. Between ages 11-12 and 13-14, they were $\chi^2_{(1, N = 142)} = 13.9$, $p < .0002$. However, no significant difference was observed between ages 9-10 and 11-12 ($\chi^2_{(1, N = 169)} = 1.89$, $p > .16$) or between ages 13-14 and 15-adult ($\chi^2_{(1, N = 141)} = .83$, $p > .36$).

Supporting structure complexity appears to be highly dependent on age, and constitutes

the major quantitative variation. But, here again, note that 25% of the 7-8 year-old children were capable of producing an elaborate argumentative discourse. This result testifies to the inequality of development at this age. Another example of unequal development was found for the adults (college students), this time in the other direction, for three of the levels studied: PA = 100%, P2A = 85%, P2AC = 73%.

Nested relationships. The embedding of the structural levels and the ages was consistent with our a priori model (as shown in Figure 1). (1) For all ages, the structural levels were embedded in the predicted order: statement of a position, statement of a supported position, use of two unrelated arguments, use of two related arguments. (2) The frequency of occurrence of each individual structural level increased with age, except for one slight inversion (nonsignificant) between age 9-10 and 11-12. Finally, the differences were quantitatively large. The proposed model thus appears to accurately describe the development of argumentative text structures or 'reasoned organizations' as Apotheloz and Mieville (1989) called them.

Refutation, specification, and restriction

We have just seen that the appearance of various connections linking the arguments used to support a position is one of the characteristic developmental stages in the mastery of argumentative text. One additional structural level was considered separately: the case where arguments are related by 'modulation', i.e., where one argument restricts or specifies the scope of the other (in which case, connectives like *except if, in cases where,* etc. are found), or where one argument refutes a counterargument (via concession connectives: *although, even if,* etc.). The difficulty young children experience in handling counterargumentation was already established by Brassard (1987). However, restriction and specification relations *per se* have hardly been studied. Do these types of relations define a more complex supporting structural level within the preceding level, and thus one which would be acquired later? Or do they pertain instead to another type of analysis, one involving the nature of the argumentative relations? In the latter case, do they depend on the conceptual organization of the underlying referent?

For each age, Table 2 gives the percentage of protocols containing at least one refutation or restriction-specification relation.

Table 2
Percentage of protocols with arguments connected by a refutation or a restriction-specification relation

Age	Corpus A	Corpus B
7-8	9%	
9-10	29%	
11-12	20%	15%
13-14	21%	70%
15-16		61%
Adult	35%	

These results bring out some differences between the two corpora. Corpus B shows an important change between the ages of 11-12 and 13-14, with particularly high scores beyond age 12: 60% to 70% of these protocols exhibited complex argumentative relations of refutation or restriction-specification. The corresponding scores were much lower for corpus A.

This discrepancy between the two corpora indicates that, strictly speaking, the structural level under consideration does not constitute an additional level of argumentative complexity.

Indeed, as stated above, for age groups 11-12, 13-14, and 15-16 and adult, the values obtained for each of the other structural levels differed little across corpora. It is reasonable, therefore, to contend that this similarity in the quantitative data of the first three levels of structural complexity should also exist at a later level, in which case the restriction-specification rates for corpus A and corpus B would be similar. This was not the case. This leaves only the difference in the argumentation topics and the fact that all corpus B subjects argued about pollution, regardless of their age. In this case, is the observed effect more or less a direct consequence of the children's familiarity with the topic due to their regular exposure to debates and discussions on this issue in their natural environment (television, political campaigns, newspapers or special publications, etc.)? Such a familiarity effect could not occur for the other topics (getting an allowance, the right to smoke, the use of notes and textbooks during exams), which are not everyday subjects of debate and are not strongly polarized.[3] The clearly higher frequency of occurrence of refutation and restriction-specification relations in the corpus B protocols may therefore be a direct manifestation, not of a new argumentative level in the children, but of a high degree of potential activation of the argumentative domain, in this case marked by polemic oppositions, and of the children's familiarity with the various possible argumentative viewpoints.

Formal discourse and natural discourse

Each corpus-A subject had to write two essays, one on a 'scientific' question (formal discourse or FD) and one on a question of opinion (natural discourse or ND). Espéret et al.'s 1987 analyses of this same corpus showed that the type-of-discourse variable had a decisive effect on enunciative involvement — marks of speaker accountability, axiological forms, and modal expressions of certainty were much more frequent in the natural discourse texts. What about the supporting structures? Arguments used to support an answer to a scientific type of problem are drawn from a speaker-independent, homogeneous referential domain. For example, a geometry proof does not, in principle, rely on arguments other than ones extracted from the geometry domain; nor will two arguments be used whenever one suffices; and if ever two arguments *are* used, chances are they will be related. In this case, the argumentative
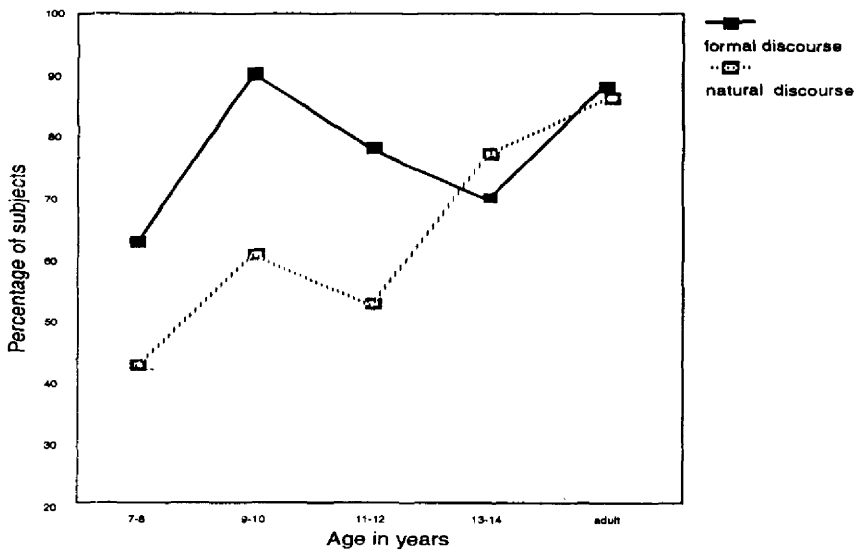

Figure 2. Percentage of subjects who connected their arguments in formal discourse (FD) and natural discourse (ND)

domain is unique and integrated. In contrast, an opinion can be supported by arguments from different, potentially unrelated domains, and it is often true under these circumstances that 'two arguments are better than one' (see Coquin-Viennot & Coirier, 1992). Accordingly, the structural level 'statement of a position + 2 supporting arguments' was reanalyzed here for corpus A by distinguishing the two types of protocols (FD and ND). The results are presented in Figure 2.

As can be seen in Figure 2, the two types of discourse differ considerably until age 11 or 12: whenever the speaker's position was supported by two arguments, there were more connections between them in the formal discourse texts than in the natural discourse ones. Starting at age 13 or 14, however, the FD and ND protocols did not differ in this respect. Can it be said, at this stage, that the argumentative modes are modelled after the 'scientific' mode, as already suggested by Espéret et al. (1987) in regards to this same corpus? The available data do not allow us to answer this question.

General discussion

Our *a priori* model of the increasing structural complexity levels of argumentative text was found to be effective at describing the developmental patterns observed in the texts collected here. All argumentative texts included *at least* the statement of a position (2 exceptions out of 110 protocols by 7 and 8 year olds). In addition, the speaker's stand was supported by an argument (minimal argumentative structure) by a large majority of the 7 and 8 year olds. The argumentative structures then became more complex, first by the addition of another supporting argument (in nearly 90% of the 13-14 year olds' protocols), and then by the connection of the two arguments in 70% of the cases from age 15-16 and on. Related arguments occurred earlier in formal discourse than in natural discourse.

The model proposed here is a basic, essentially descriptive one. It is not based on a theory of 'good argumentation' — two arguments are not necessarily better than one, for example. However, it does allow us to establish the fact that most 7 and 8 year olds are capable of argumentation, and that many of them are even able to argue in a complex fashion. This is a more optimistic conclusion than other studies suggest. How would this argumentative competency develop if the school system were to place as much emphasis on this type of text as it conventionally does on narratives?

Although not strictly necessary, the relating of supporting arguments appears to be the most sensitive indicator of the development of text structures: present in only 25% of the essays written by 7 and 8 years olds, this process did not really become prevalent until age 13 or 14. These findings are quantitatively similar to Brassard's 1990 results on argument interconnection, a fact which is worth noting, given the difference between the two studies in the data collection and analysis procedures used.

From the developmental standpoint, two important shifts must be emphasized: between age 7-8 and age 9-10, and between age 11-12 and age 13-14. What happens during these periods of development which might explain these shifts? Neither the first nor the second can be explained solely by the development of linguistic competency. Granted, certain complex linguistic operations are not yet perfectly mastered, even at age 14. But, as we have seen, the two shifts occurred for two structural levels which require different syntactic skills, one more complex (P2AC) than the other (P2A) as far as inter-sentence relationships are concerned. These two developmental stages correspond to two critical points in the French school curriculum: the first is when children learn to read and write, and the second, when they begin regular composition exercises. Language mastery viewed as the ability to handle a given isolated linguistic operation does not provide an entirely satisfactory explanation. But linguistic competency does becomes a critical explicative dimension in the production of complex argumentative texts if we account for the two aspects mentioned above, i.e. access to the written language and learning to compose text.

In the same line of thinking, the well-known interindividual differences in the acquisition of these skills can be used to shed light on the variations observed within age groups in our protocols. An illustration of this is the 7-8 year olds, who formed three nearly distinct groups: those who did not support their position (10%), those who produced the minimal argumentative structure, but nothing more (approximately 40%), and those who connected their arguments, and thus achieve the adult level (25%).

Argumentative text writing involves more than just knowing how to write and compose. Three other factors seem to be important:

The supporting process can be partially viewed as a reasoning process. Combining arguments together, refuting, and generalizing require more general ('logical') cognitive processes. Mastery of the latter develops substantially during the period under consideration here. Espéret et al. (1987) already noted that the shift between ages 11 and 14 occurs at the point in the school curriculum where children are taught formal proofs, in geometry in particular. This is also the period during which French children are introduced to the experimental sciences. One of our results falls directly in line with this explanatory perspective: the formal referent situations (debate about a scientific type of problem) were the ones in which the most complex supporting structure (two related arguments) was used first.

Producing elaborated argumentative discourse also means considering other points of view and opposing arguments. The skills needed to do this are acquired late (Golder, 1992b; Schneuwly, 1988). Among these skills is the child's ability to 'decenter', both in the formal operations domain and in the sociocognitive domain (e.g. representation of the other person's point of view). The two developmental shifts observed here may be linked in this respect to two important modifications in the socio-familial environment of the child: entry into the school system, for the first shift, and passing from elementary school to secondary school, for the second shift. It is conceivable that this socio-familial change affects the children's representation of the interactive contexts where argumentation can occur, as well as their representations of the supporting structures likely to be effective. One does not 'debate' matters with one's mother in the same way as one does with a brother, a peer, or a teacher (Clark & Delia, 1976).

Finally, by analogy with the work done by Espéret (1984) on the narrative schema, it can be contended here that as they grow older, children construct a prototypical representation of the textual constituents required for an argumentative type of discourse. As observed by Golder and Coirier (1991), the presence of such a prototypical representation has an impact (slight but significant) on the way children aged 13 to 16 use marks of discursive negotiation, which are characteristic of argumentative text. And this representation is based on the supporting process: texts were only judged to be argumentative if they contained the minimal argumentative structure, i.e. a position + one supporting argument. Moreover, it appeared in this study that the representation of argumentative text is still very sketchy at age 10 or 11, while being fully set by age 13 or 14. This is another point of convergence with the present data.

There is still much to be learned in the study of argumentative text. The ability to argue can be said to emerge early, provided argumentative behavior is assessed in terms of isolated operations. However, the ability to produce an elaborate argumentative text is acquired much later. But — and in this respect we agree with one of Brassard's conclusions — this skill could be substantially improved by the implementation of teaching practices focusing on the required argumentative operations. This means not only determining what these requirements involve at the textual expression level, but also gaining a better understanding of the underlying cognitive processes, while taking other necessary skills into account.

Notes

[1] Methodological details about data gathering techniques are given in the studies cited; only the basic principles will be reviewed here.

² The pre-argumentation stage (a stand is taken but not supported) is not shown in this figure, since it was only observed in 2 (7-8 year old) children.

³ Our protocols were collected well before the beginning of the national debates in France about setting legal limits on the right to smoke.

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Pierre Coirier . Laboratoire de Psychologie du Langage, ERS CNRS 21, Université de Poitiers, 95 avenue du Recteur Pineau, F-86022 Poitiers-Cedex, France.

Current theme of research:

Cognitive processing of text types; Functional and structural aspects of argumentative text.

Most relevant publications in the field of Educational Psychology:

Coirier, P. (1991b). Production of argumentative discourse: the textual function of statements considered important by the speaker. In G. Denhiere & J.-P. Rossi (Eds.), *Text and Text Processing,* (pp. 363-374). Amsterdam: North-Holland.

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Caroline Golder. Laboratoire de Psychologie du Langage, ERS CNRS 21, Université de Poitiers, 95 avenue du Recteur Pineau, F-86022 Poitiers Cedex, France

Current theme of research:

Production and comprehension of argumentative texts in children.

Most relevant publications in the field of Educational Psychology:

Golder, C. (1992). Production of elaborated argumentative discourse: the role of cooperativeness. *European Journal of Psychology of Education, 7,* 51-59.

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