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THE SKILL OF IDENTIFYING ARGUMENTATION

Frans H. van Eemeren, Rob Grootendorst and Bert Meuffels

1. *A Cognitive Caesura?*

This article is a report on empirical research in which two main questions were posed: (1) Can 14-year-old school children in secondary schools recognize argumentation without having received systematic instruction? (2) To what extent is the identification of argumentation an independent skill?¹ The practical relevance of the first question is self-evident. The epistemological relevance of the second question is that it seeks to provide an answer to the question of whether or not the identification of argumentation is based on the traditionally known cognitive intellectual skills "Verbal Comprehension," "Inductive Reasoning," et cetera. Otherwise, it must be a separate skill.

Until recently, little was known about the factors which influence the identification of argumentation. The same can be said about the degree to which language users are able to recognize argumentation as such. For this reason, empirical research was undertaken by us in order to establish to what extent certain factors in the presentation of argumentation facilitate or hamper recognition (van Eemeren, Grootendorst, Meuffels 1984, 1985). This research concentrated on the least complicated case: simple argumentation in which one of the two statements which together form the argumentation is left unex-

pressed. For the time being, additional problems arising in discourses with a more complex structure (multiple, coordinate, subordinate, indirect argumentation, etc.) are not taken into consideration. First, it is important to establish exactly which factors play a part in the recognition of simple argumentation.

In order to measure the capacity for recognizing argumentation, we constructed a pencil and paper test with text items some of which contained argumentation and some not. The respondents must indicate which fragments contain argumentation. It may be presumed that the fewer the mistakes made, the easier the process of identification has been.

The pencil and paper test consisted of 150 text fragments, partly argumentative and partly not. The argumentative texts varied in 4 features: (1) marked/unmarked viewpoint, (2) forward/backward referring presentation, (3) charged/not charged topic, and (4) presence/absence of argumentative indicator. When presented to 113 first-year students of Dutch at the Universities of Amsterdam and Leyden, results showed that only the last independent variable, the presence/absence of an argumentative indicator, influenced the identification. Although the first three variables had no significant effect on the identification of argumentation, this by no means proves that they have no actual influence. In this particular case there was a striking *ceiling effect*: an average of 94 argumentations out of 100 were correctly recognized by the students. A pencil and paper test, however, only provides clear indications of the influence of certain variables if the respondents really make mistakes.

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¹The research which is reported on here is part of project LET 11/102.023.A of the VF programme 'Discourse Analysis' of the University of Amsterdam. It should be noted that in Dutch there is no confusion at all concerning the meaning of the word "argumentation": it is a perfectly normal everyday word for statements offered in support of a claim.

In order to avoid the occurrence of ceiling effects, an adapted form was presented to a number of 15-year-old grammar school students (third form). These younger school children probably make more mistakes in identifying simple argumentation. But there was, once again, a ceiling effect. Therefore, the test was replicated among a group of 14-year-old students of a lower educational level within a comprehensive school (second form).² Among a large proportion of the latter respondents, an unmistakable *bottom effect* occurred. The majority of them were unable to grasp concepts such as "standpoint" and "argumentation," even after a thorough (20 minute) explanation had been given. At the same time there was, once more, evidence of a ceiling effect, albeit among a small minority.

It is striking that a great many students within a lower stream in comprehensive school do not possess any basic understanding of the concept of argumentation whereas others within the same stream do. The concept of argumentation is probably an issue which is simply either understood or not. This phenomenon calls for an explanation. Such an explanation could be found in the fact that at the age of 14 to 15 a real break-through in cognitive intellectual development takes place. It is our hypothesis that this break-through manifests itself in a clear *caesura* in the understanding of the concept of argumentation. Before this cognitive change has occurred people don't grasp this concept, and after it they do.

Is this hypothesis justified? In other words: is there any evidence of cognitive intellectual development producing more ceiling effects among 15-year old students

within a lower stream in comprehensive school (third form) than among 14-year olds (second form)? Presuming that this development takes place in their understanding of the concept of argumentation, how is this related to other cognitive developments which are then taking place? Intellectual skills such as "Verbal Comprehension," "Inductive Reasoning" and "General Ability to Reason" are known to undergo considerable changes among 13- to 15-year-olds. Is the skill for identifying argumentation, which we are examining, dependent on these other skills, or is it a separate and independent skill which is unrelated to the others?

2. Method and Procedure

In order to answer the question whether or not identifying argumentation is an independent skill, 40 second form pupils and 82 third form pupils in a lower stream in 3 comprehensive schools near Amsterdam were given four tests. One test, for measuring the skill of identifying argumentation, we adapted from a test developed in a related study. For the other three tests we made use of the Groninger Intelligence Test, GIT: (1) Word List Test, (2) Matrix Test, (3) Navigation Test. The Word List Test is indicative of "Verbal Ability," the Matrix Test of "Verbal Ability to Reason," and the Navigation Test of "General Ability to Reason." The reliability of these three tests has proved to be relatively high; moreover, the factorial structure is known which is manifested in low mutual correlations (Snijders & Verhage 1961). There is a slight overlap between these three tests with respect to what they profess to measure.³

²The Dutch educational system is rather different from the Anglo-Saxon systems. Whereas the USA has only high schools for ("eleven plus") secondary education, Dutch schools are differentiated in "gymnasium/atheneum" (grammar school), "HAVO" (higher streams in comprehensive schools), and "MAVO" (lower streams in comprehensive schools).

³In terms of Guilford's Structure of Intellect Model, the Word List Test, Matrix Test and Navigation Test measure respectively the factors CMU, CMR and CMS. In view of the nature of these factors and their importance in every predictive study (cf. Hoeks 1985: 5-33) it is only natural to include these three skills in the test.

In our study test fulfill a t serve as the l expected devel tifying argum Whether pupi gress in the established r regarding th Research has erable develop the 13-15 age 1969; Guilfor the three part means of anal the argument: the question c tifying argum with an indep

2.1. Instruction

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In our study, the three parts of the GIT test fulfill a twofold function. First, they serve as the base-line against which the expected development in the skill of identifying argumentation can be compared. Whether pupils make little or great progress in the relevant skill can only be established reliably if their progress regarding the other skills is known. Research has shown that there is considerable development of these three skills in the 13-15 age group (Piaget & Inhelder 1969; Guilford 1967: 417-438). Second, the three parts of the GIT test should, by means of analysis of the correlations with the argumentation test, provide insight to the question of whether the skill of identifying argumentation may be attributed with an independent status.

2.1. Instruction and testing

The group of respondents were instructed in the classroom by being read standard instructions. By means of a number of examples, it was explained to them what they were expected to do. Following this, they were given the opportunity of asking questions. Particular attention was paid to the concept of "argumentation." Again by means of examples it was explained that argumentation consists of one or more statements put forward to support a particular viewpoint. It was stressed that their personal opinions regarding the various viewpoints and argumentations were irrelevant.

The four tests were given in two separate sessions, with an interval of at least one week. In the first session the Argumentation Test and the Word List Test were carried out, and in the second, the Matrix Test and the Navigation Test.

The process of testing varied from extremely bad to good. In one class, contrary to the instruction given, pupils worked together in groups of two or three. The data of this class were not included in the analysis. After all, the aim of this

research is to get insight in (relations between) skills; this means that we are interested in *individual achievements*. In the other three classes the testing posed no difficulties whatsoever.

2.2. Description of tests

The skill of identifying argumentation

The test used in this investigation was adapted from one developed and used by Van Eemeren, Grootendorst & Meuffels (1984, 1985). The original test consisted of 150 items varying on four experimentally manipulated features. For the present study, the 40 texts with the highest item-test correlation were selected. Half of these contained argumentation. The reliability of the original pencil and paper test was .96, and that of the shortened version .92.

The 40 text fragments thus selected each consist of one simple argumentation or a text of equal length and complexity. Each text is reproduced in the form of one compound sentence, divided by commas. Grammatically speaking, there is in each case a main clause and a subordinate clause. For example:

In my opinion the presence of trees along the road is important, they reduce the tedium.

The respondents had to indicate in each text whether argumentation was present or not, and to underline the argument if present. Each of these two tasks was scored separately for each respondent: establishing the presence of argumentation must be distinguished from determining the argument. Recognizing argumentation covers both aspects, although the first does not necessarily imply the second.

Word List Test

The GIT World List Test contains 20 items in varying degrees of complexity.

Each item consists of a keyword and a list of five other words from which the respondents had to select the one that is most closely related in meaning. Two examples:

fast —water quick round eel haste
frugal —polyphonic hindered sober fragile clear

Virtually every series of tests on intellectual skills contains a vocabulary test; factor studies have shown that this is the most consistent and least ambiguous indicator of what is generally known as *Verbal Comprehension*.⁴

Matrix Test

The Matrix Test also consists of 20 items which increase in complexity. Each item consists of five options from which one word is selected which completes the analogue. An example of an item:

paper —wood 1. cow
cardboard —straw 2. horse
leather —... 3. boot
4. shoe
5. skin

Just as with vocabulary tests, analogy tests have always been an aspect of intelligence tests (Spearman 1927; Thurstone 1938; Guilford 1967). Analogy tests indicate the factor *Inductive Reasoning*.

⁴It should be stressed that vocabulary tests such as the GIT Word List Test do not measure knowledge of vocabulary *tout court*. A vocabulary test is a correlational indicator of Verbal Comprehension: words function as labels for structures of knowledge. The understanding of (the meaning of) a word implies the understanding of many other words and their related ideas and it is precisely this larger set of knowledge which is crucial to Verbal Comprehension. The most important function of a vocabulary test is not so much to estimate a person's knowledge of vocabulary but to estimate a person's ability to acquire new words, ideas and knowledge (cf. Stenberg & Powell 1983: 88 "Vocabulary tests are such good predictors of one's overall intelligence because they reflect one's ability to acquire new information"). Similar considerations apply to the other two tests. These should be regarded as indicators of underlying problem solving procedures and not be taken at face value.

Navigation Test

The Navigation Test involves calculating the time required by a ship to sail from one port to another. A nautical chart is provided: a square divided into four equal sections by two perpendicular bisectors. Eight ports are situated on the corners and in the middle of the four sides of the square. The travel time from one port to the next is two hours.

The 20 items gradually increase in complexity. At first, it suffices to calculate the distance (and travel time) after which the effects of the current must be taken into account (crosscurrent: to every 2 hours 1 hour must be added; tail current: subtract 1 hour from every 2 hours; side current: no effect). Complexity is increased further by the effects of current and wind and finally by "double strong" current and wind. The arithmetic involved in the Navigation Test has been kept simple so that the items call primarily on an understanding of conceptual problems (such as insight into the fact that a counter-current and wind of equal strength cancel each other out and need not be calculated into the total time). Factor studies show that assignments such as the Navigation Test indicate the factor *General Reasoning*.

3. Results

Prior to establishing whether third-form pupils in a lower stream in comprehensive school are substantially more able to identify argumentation than second-form pupils, it must first be established whether the third formers are actually older than the second formers. After all, if no differences were found between the two, this could be attributed to the fact that there is hardly any age difference between them. Of course, it could be that the age differences between the two groups which you would expect are not so clear because of pupils who have

remained a year students (N = 8 age (s.d. = .86) students (N = 4 age (s.d. = .59). Hence is indeed $p < 0.01$). If no the skill of ic between the sec this could at an the variable "ag

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RELIABILITY (C)

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Argumentation
Argumentation
Word List Test
Matrix Test
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remained a year behind. The third-form students ($N = 82$) averaged 14.8 years of age ($s.d. = .86$), while the second-form students ($N = 40$) averaged 13.6 years of age ($s.d. = .59$). The expected age difference is indeed present ($t = 7.89$; $df = 120$; $p < 0.01$). If no differences were found in the skill of identifying argumentation between the second and third form pupils, this could at any rate not be attributed to the variable "age."

Reliabilities for the five measures computed from the four tests are given in Table 1. All appear adequate for the present purposes, although the reliability of the Word List Test is rather low.

To check for ceiling and bottom effects, we tabulated the number of students scoring in each of ten percentage ranges (see Table 2). As far as the identification of argumentation is concerned, some 33% of the second-form pupils don't even reach the chance level ($<.50$); in form 3 this hardly reaches 5% (see left hand side of Table 2). In form 2 ceiling effects are found among 30% ($>.80$). This applies to more than half of the pupils in form 3. These differential bottom and ceiling effects are also evident in the test concerning underlining of argumentation (see right hand side of Table 2). The comparison of second-form and third-form students for all five measures is summarized in Table 3.

Of the tested skills, the argumentation tests discriminate the strongest between form 2 and form 3. In form 2 the average percentage of correctly identified argumentations totals 65%; in form 3 it is 80%!

TABLE 1
RELIABILITY (CRONBACH'S ALPHA) PER TEST

Test	Alpha
Argumentation (identification)	.90
Argumentation (underlining)	.92
Word List Test	.54
Matrix Test	.63
Navigation Test	.82

TABLE 2

FREQUENCY DISTRIBUTION OF PERCENTAGES OF CORRECTLY IDENTIFIED ARGUMENTATIVE TEXTS AND CORRECTLY UNDERLINED ARGUMENTS

% Correctly Identified	Argumentation		Underlining Argument	
	Form 2	Form 3	Form 2	Form 3
0-10	0.0	0.0	0.0	0.0
11-20	0.0	0.0	2.5	0.0
21-30	2.5	1.2	7.5	3.7
31-40	15.0	1.2	15.0	2.4
41-50	15.0	2.4	22.5	8.5
51-60	7.5	9.8	10.0	14.6
61-70	12.5	14.6	20.0	10.9
71-80	17.5	18.3	7.5	22.0
81-90	25.0	18.4	5.0	15.8
91-100	5.0	34.2	10.0	22.0

This is a surprising result, particularly if compared with the progress in "Verbal Comprehension" and "General Reasoning" (the progress in "Inductive Reasoning" is not even statistically significant at the 5% level). When considered in combination with the results in Table 2, it looks very much as if in this age group the identification of argumentation is a black or white issue.

From Table 4, it is clear that the change in the skill of identifying argumentation cannot be explained in terms of other dimensions of cognitive development. While the intercorrelations of all the measures are positive and moderate (as should be expected for a set of developmental variables), they are not so high as to suggest that any one is a function of the others. Together Verbal Comprehension, Inductive Reasoning and General Reasoning account for only 19% of the variance in the skill of identifying argumentation. Moreover, the correlation between age and the skill of identifying argumentation (.37) remains relatively strong (partial $r = .30$), when the other variables are controlled statistically.

4. Conclusion

Even after a 20 minute explanation of the concepts of "argumentation," "argument" and "viewpoint," a relatively large

TABLE 3
% CORRECT PER TEST, PER FORM: DIFFERENCES (t-RATIOS) BETWEEN FORM 2 AND 3 AND EFFECT SIZE ('OMEGA SQUARED': CF. HAYS, 1973: 413-422)

Test	% Correct	s.d.	t	df	p	Ω^2
Arg/(Ident)						
form 2	65.3	21.0				
form 3	80.4	16.4				
			4.34	120	.000	.13
Arg/(Under)						
form 2	56.5	21.1				
form 3	72.8	19.3				
			4.26	120	.000	.12
Word List						
form 2	43.7	12.3				
form 3	48.9	12.5				
			2.15	120	.029	.03
Matrix						
form 2	57.0	14.4				
form 3	61.0	12.1				
			1.59	120	.112	.01
Navigation						
form 2	69.4	21.3				
form 3	78.4	17.8				
			2.45	120	.015	.04

ARG/(IDENT) = Argumentation (identification)
ARG/(UNDER) = Argumentation (underlining)

proportion of second form pupils in a lower stream of comprehensive school were unable to identify simple argumentation. A large majority of third formers, however, were able to identify arguments. Insight into the concept of "argumentation" appears to be a "matter of yes or no": Argumentation is either understood as such or it is not. Compared with the progress in "Verbal Comprehension" and "General Reasoning," the progress in "Identifying Argumentation" is the greatest.

The skill which must be deployed in

identifying argumentation is a relatively independent skill. It is already extremely doubtful that a transfer of knowledge and insight between closely related skills is to be expected (cf. Meuffels 1982: 79-101; 152-156), but such a transfer is simply ruled out with mutually independent skills. This means that one may not expect that people who have not received systematic education and instruction in argumentation analysis will automatically, within the regular curriculum, gain insight into the concept of simple argumentation, let alone more complex forms

TABLE 4
CORRELATIONS (PMC) BETWEEN THE EXAMINED SKILLS

	Argumentation (id)	Argumentation (und)	Word list	Matrix	Navigation
Argumentation (identification)	...				
Argumentation (underlining)	.87	...			
Word list	.31	.25	...		
Matrix	.33	.34	.18	...	
Navigation	.20	.21	.10	.19	...

of argumentation may cast some doubt that systematic instruction in argumentation among 14-year-olds is perhaps, if one is not careful, a waste of time on it).

Although we have not had a regular curriculum in argumentation in our schools as well as in the results of our research, we should be careful not to overstate the curriculum established at a time when it was really susceptible to change.⁵

⁵Of course, this is not to say that younger children could not be taught to identify argumentation, but that is a different kind of education, as pointed out here, as part of a general education.

of argumentation. Moreover, the results may cast some doubt on the effectiveness that systematic education and instruction in argumentation analysis will have among 14-year-old pupils in a lower stream of comprehensive school (unless, perhaps, if one is prepared to spend a lot of time on it).

Although we are convinced that argumentation analysis should be part of the regular curriculum in comprehensive schools as well as grammar schools, the results of our research suggest that one should be careful and not start this part of the curriculum until it has been firmly established at exactly what age people are really susceptible to it, so that it can be effective.⁵

⁵Of course, this does not mean that we think that younger children don't use argumentation and that it would be impossible to discuss their arguments with them, but that is quite another matter than the reflective kind of argumentation analysis we have in mind here, as part of the curriculum of secondary education.

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