

## METALINGUISTIC AWARENESS AND EARLY READING: A LONGITUDINAL STUDY\*

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This study originates from two 'ecologically valid' educational experiences. First, there is Van Damme's activity as a teacher-researcher in the RUG Laboratory of Education's experimental primary school. Since 1980 she has been responsible for the reading and writing program of the children of the 1st and 2nd grade (aged 6 - 8). Second, there is the preschool reading acquisition experience in which a father (M. Spoelders) and his son joined efforts to make the 'miracle of literacy acquisition' happen (Spoelders & Van Damme, 1982). Both experiences convinced the writers of this paper that the phenomenon of developmental metalinguistics should be in the focus of their future educational and scientific endeavours. Pedagogic intuition suggested, indeed, that the reading proficiency of their pupils seemed to be related to their level of metalinguistic ability. To infer this from one's own limited experience is one thing; to try to show scientifically that one has got a point here is, of course, something quite different. Therefore, Van Damme's reading classes and Spoelders' case study were carefully analysed on their hypotheses generating qualities. As a result of this a more metric longitudinal psycho-educational investigation was designed. Its main aim was: the clarification of the role of metalinguistic awareness in early reading acquisition. In this paper a first overall view on the outcomes of this study is presented. In section 1 basic information on the sample operationalization of the factors involved in the process of beginning reading acquisition is given. In section 2 some major results are

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\*Paper originally presented at the 2nd Congress of the International Society of Applied Psycholinguistics (ISAPL), Kassel July 1987. Part of the research reported in this article was funded with University of Gent grant OZF/RUG 0014688 to Marc Spoelders. Reprints may be requested from Lut Van Damme, Laboratory of Education RUG, 1 Henri Dunantlaan, B-9000 Gent, Belgium.

reported. By way of conclusion, in a final section, a tentative model of the relations among the variables of the investigation is presented.

### **1. Sample and variables**

From May 1984 to June 1986 a cohort of 251 children from the Ghent School area were followed from their final months in Kindergarten through the 1st and 2nd grades of primary school. The mean age at the start of the study was 5;7. Due to various reasons (absence during the Kindergarten testing periods, for example) 'sample kill' was about 25%. Except for 15 Ss all other were native Dutch speakers. They were screened on eight different occasions. Table 1 gives an outline of the procedure, thereby focussing on the different sets of variables. The first ten listed there are independent pupil-related variables: metalinguistic awareness (pre-reading), reading readiness, intelligence, arithmetic readiness, attitude toward reading (before), socio-economic status, birth order, age and sex/gender. The next two are independent school variables: teacher/class and reading method. The dependent variables in the study consists of reading proficiency (technics and comprehension) and attitude toward reading (after). (Table 1)

### **Instruments**

The operationalization of the key - variable metalinguistic awareness was the result of the construction of a psychometrically acceptable research instrument: the metalinguistic awareness test (see Van Damme & Spoelders 1985; Spoelders & Van Damme 1986 and in press). Its general structure and contents is given in Table 2. The test is administered individually and takes about 30 minutes (Table 2).

Reading readiness was measured by means of a standardized test of reading conditions (Moenaert, s.d.) that for the greater part could be administered collectively. The test focusses on visual discrimination, spatio-visual ordering, visual analysis and auditory analysis. Ss should identify, for example, a single

SCHOOL LEVEL	KINDERGARTEN 3	ELEMENTARY 1st GRADE				ELEMENTARY 2nd GRADE		
	MAY / JUN '84	JAN	MAR	APR	JUN '85	SEP '85	JAN	JUN '86
N PUPILS	251	247	248	250	248	48	189	187
VARIABLES								
1 Metalinguistic awareness (Ma1)	x							
2 Reading Readiness (Rr)	x							
3 Intelligence (Iq)	x							
4 Arithmetic readiness (Ar)	x							
5 School readiness (Sr)	x							
6 Attitude to reading (At1)	x							
7 Socio-economic status (Ses)								
8 Birth order (Bo)								
9 Age (A)								
10 Sex /Gender (G)								
11 Teacher N=18 (T)								
12 Method 8 handbooks (M)								
13 Reading prof. technics (Rp)		x	x		x			x
Speed (RpS)								
Accuracy (RpA)								
14 Reading prof. compreh. (RpC)							x	x
15 Metalinguistic awareness (Ma2)						x		
16 Attitude to reading (At2)				x				

Table 1: Outline of the study.

SUBTEST	CONTENTS	MATERIAL	Nr ITEMS
I	1 Recognizing	Reading & Writing Pictures	10
	2 Understanding		20
II	Concepts of features of printed language knowledge of technical terminology	Test Booklet	20
III	Concepts of features of spoken language		
	Phoneme awareness		
	1 Phoneme differentiation	2 frogs (puppets)	6
	2 Rhymes	Puppet	6
	Word awareness		
	3 Word boundaries	Cubes	6
	4 Long/short words		6
	Form awareness		
5 Morphemes	Puppets	6	
6 Grammatical Acceptability of sentences	Puppets	6	

Table 2: Structure of the metalinguistic awareness test.

grapheme or a configuration of graphemes among a series of alternatives. They are asked to look for the constituent graphemes in a configuration of graphemes among a set of alternatives. The auditory analysis subtest consists of items in which Ss should point at a set of pictures in the same order as pronounced by the administrator and of items in which a phoneme is pronounced by the administrator and the child is asked to tell where - given a series of pictures - this sound can be heard.

An IQ was calculated by means of the UKKI - test (Baarda, 1978). This test too can be administered collectively for the greater part. It consists of a verbal and a non-verbal part. In the former the child should explain the meaning of some words. In the latter, it is asked to copy some geometric figures and draw a man.

Arithmetic readiness was operationalized by means of Aernoudt's (1983) test for the measurement of prenumeric abilities.

This instrument consists of four main parts. The items in the first part ask for the recognition of the unit (for example: given four identical pictures of bouquets the child is asked to draw a circle round one). In the second part Ss have to count (for example: they have to strike out the pictures of six hats out of a series of ten). The next part deals with insight in simple and complex relational terms such as 'long', and 'most' (for example Ss have to strike out the picture of the pot that contains incre water, given a series of five). The last part of Aernoudt's test has to do with simple calculations (for example, the children should add blocs until there are six altogether).

A variety of data, obtained from the Schools Counselling Service, were used as an index of school readiness. Constituent parts were: the figure of Rey, the copying of configurations of lines, the differentiation of figures placed in different positions and a test of listening comprehension.

Meyer's (s.d.) reading attitude scale, a Likert- type instrument of 22 statements such as 'It's nice to be given a book as a present', was used to measure attitude toward reading.

Reading proficiency (technics) was measured by means of Caesar (1975), a test for grapheme knowledge, Brus (1970) - in one minute as many of one hundred words should be read aloud - and the Enschede Reading Cards (Van Calcar et al., 1969) - text reading -. Factor analyses performed on the scores obtained on these tests identified two factors which were labeled 'speed' and 'accuracy'. The factor scores (RpS and RpA respectively) and scores on the One Minute Test (Brus) were used as operationalizations for technical reading proficiency. For the detection of reading comprehension two standardized tests (Moenaert, 1985a and 1985b) were used. They consist of a variety of items which reflect the kind of tasks children encounter in their reading books. For example, they should read an incomplete sentence silently and complete it by choosing the appropriate word out of four alternatives. Or, they are asked to follow up a written instruction (for example: 'Strike out the black cow and draw a circle round the cow without patches'). In

another series of items the Ss have to fill in an appropriate word (for example: 'It is cold in winter and it is ... in summer'). The last part of this test tries to find out whether children are able to answer questions which pertain to a text that has been read silently.

## 2. Results

In this paper only some general findings will be presented by means of some synthesizing tables. The questions raised here belong to two domains. a) Are there any differences between girls and boys, between younger and older pupils, between children of different socio-economic background regarding the different variables? Has reading method and school-class an effect on reading proficiency? b) What is the predictive value of the main independent variables on reading proficiency? And, more specifically, where does metalinguistic awareness fit in the picture?

VAR.	BOYS		GIRLS		t
	M	SD	M	SD	
1 Ma1	45,7821	13,155	47,7070	13,885	-1.30
2 Rr	18,8673	4,867	19,8800	4,773	-1.62
3 Iq	97,5128	12,085	100,1069	12,588	-1.65
4 Ar	36,1639	5,607	37,8421	5,818	-2.34*
5 Sr	51,5310	10,566	52,7200	9,812	-0.90
6 Ar1	10,6903	3,655	10,8000	3,583	-0.23
16 At2	10,9292	3,607	11,0160	3,727	-0.18
13 PpS	-0,1739	0,936	0,1638	0,987	-2.68**
13 RpA	0,0389	0,991	-0,0366	0,877	0.62
14 RpC1	22,3486	2,823	22,6161	2,807	-0.71
14 RpC2	6,5507	2,011	7,2301	1,946	-2.56*
13 BRUS	5,3303	1,785	5,9469	1,757	-2.59**

\*p < .05

\*\*p < .01

Table 3: (t - test) Differences between girls and boys.

VAR.	OLDER		YOUNGER		t
	M	SD	M	SD	
1 Mal	59,1152	12,210	43,3649	13,294	4.74***
2 Rr	21,1045	4,222	19,5000	3,707	2.22*
3 Iq	99,5692	11,516	101,9074	11,463	-1.10
4 Ar	39,2239	4,482	36,3091	4,876	3.44***
5 Sr	54,5672	8,755	52,0000	9,421	1.56
6 Atl	11,4154	3,737	9,200	3,788	3.22**
16 At2	11,1515	3,828	9,7143	3,706	2.10*
13 RpS	0,0215	0,995	-0.1511	0,946	0.92
13 RpA	0,1905	0,595	0,1118	0,661	0.65
14 RpC1	22,8571	2,729	22,0217	2,671	1.59
14 RpC2	7,1746	1,728	6,8936	2,108	0.77
13 BRUS	5,6032	1,810	5,5435	1,946	0.16

\*p < .05

\*\*p < .01

\*\*\*p < .001

Younger = born in last three months of 1978  
 Older = born in first three months of 1978

Table 4: (t - test) Differences regarding age.

From Table 3 it can be derived that there is a tendency for girls to score higher on metalinguistic awareness, reading readiness, intelligence, arithmetic readiness, school readiness and attitude toward reading. However, the difference between girls and boys is only significant for arithmetic readiness. On the other hand, girls do read significantly better than boys, technically as well as on the level of comprehension.

Younger starters seem to be disadvantaged regarding metalinguistic awareness, reading readiness, arithmetic readiness and attitude toward reading. Their attitude remains less positive in the first grade. Although older Ss read better at every testing moment, these differences were not found to be significant (Table 4).

VAR.	SOURCE	M	DF	F	TUKEY
1 Mal	between groups	1435,9126	2	8,643***	H & M > L
	within groups	166,1412	235		
2 Rr	between groups	242,0945	2	11,255***	H & M > L
	within groups	21,5099	235		
3 Iq	between groups	2245,6270	2	17,011***	H & M > L
	within groups	132,0082	235		
4 Ar	between groups	325,0371	2	11,030***	H & M > L
	within groups	29,4684	235		
5 Sr	between groups	1423,8496	2	15,434***	H & M > L
	within groups	92,2524	235		
6 At1	between groups	12,4640	2	0,956	
	within groups	13,0380	235		
16 At2	between groups	8,4264	2	0,626	
	within groups	13,4595	235		
13 Rps	between groups	14,0967	2	16,839***	H > M & L
	within groups	0,8372	230		
13 Rpa	between groups	14,4697	2	19,225***	H & M > L
	within groups	0,7527	230		
14 Rpl1	between groups	119,0003	2	17,281***	H & M > L
	within groups	6,8861	218		
14 Rpl2	between groups	47,6682	2	12,769***	H & M > L
	within groups	3,6861	214		
13 BRUS	between groups	24,5217	2	8,255***	H > M & L
	within groups	2,9707	214		
***p < .001	****p < .0001	H = higher	M = middle	L = lower	
		Socio-economic class			

Table 5: Differences regarding Se\$ (Anova).



Children from lower economic families score significantly lower on all variables compared with children from higher socioeconomic families, except for attitude toward reading. Even after two years of formal teaching there remained a significant difference between children from different SES on reading proficiency. The influence of social inequality does not seem to level off after two years of reading instruction.

No significant birth order effects could be observed. Regarding the effects of reading method and school-class on reading proficiency there was ample statistical evidence to assume that method has an effect on reading proficiency ( $p < .0001$ , Anova). Although all methods used in the 18 classes that were followed through the first two grades seem to belong to the same type, advocating a 'structural' approach to reading, the combined effect of teacher/method could be illustrated.

It was also found that belonging to one or another class/group had significant effects on reading proficiency (speed and comprehension). Moreover, 'good' reading classes at the beginning become better as a whole towards the end of the second grade. 'Low' starting classes never reach the level of the 'good' classes. The same is true on the level of the individual pupil: good starters become better, low or bad starters never attain the level in reading proficiency of their good peers.

### 3. A tentative model

The model presented in Figure 1 maps the pattern of relations that exist between the variables. Metalinguistic awareness, together with intelligence and the readiness variables load high on one factor. Within this cluster intelligence seems to have a clear predictive value on the other four. Further analysis shall have to reveal whether it is plausible to think of this factor as a kind of metacognitive ability. Attitude toward reading loads high on another factor. Both attitude and metalinguistic awareness influence positively the fluency aspect of reading proficiency. Proficiency in reading comprehension is predicted by technical

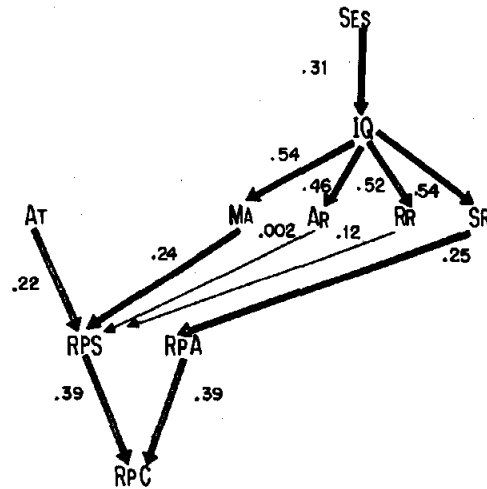


Figure 1: A tentative model (path analysis) (thick arrows mark significant relations)

reading proficiency. What the model does not show, but can be inferred from the second administration of the metalinguistic awareness test is that the ability to reflect on language forms clearly profits from learning to read. Even for the lower groups of Ss t- tests revealed highly significant differences between the mean scores on the two administrations.

#### By way of conclusion

This study showed that there are large differences in metalinguistic ability among children at the time formal reading instruction in elementary school starts. At the end of the second school year pupils' reading proficiency can partially be predicted by their level of metalinguistic awareness at the onset. Probably it is an essential element for reading acquisition. However, it cannot be looked upon as a prerequisite - learning to

read stimulates the metalinguistic awareness definitely - but should rather be regarded as a facilitating factor. Beyond the discussion of metalinguistic awareness viewed as either cause, consequence of facilitator, this study makes clear that it is an important language skill associated with learning to read. An educational consequence would then be that educators would become aware of the importance of this ability and try to creatively focus children's attention on language form. More than before they can make the correct appreciation of this value work in their practice: reading stories aloud, rhyme, play word games, invent secret secret languages.

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