

## **Less skilled readers, well built texts?**

### **Effects of text- and reader- characteristics on text comprehension and text appreciation of vmbo-pupils (prevocational education)**

This dissertation reports on experimental research into the effects of text- and reader-characteristics on text comprehension and text appreciation of less-skilled readers for their study texts at school. These less-skilled readers attend the Dutch Prevocational Education (also known as 'vmbo'). The vmbo mainly provides practical education: pupils are educated in the profession of cook, waitress, nurse, electrician, or gardener. Media and research often assume that pupils of the vmbo have a negative reading attitude. Also, they are not thought to be motivated to do homework for school or read in their free time. As a consequence, it is assumed that a lot of vmbo-pupils are not able to read well, and that they are unable to read study texts for school accurately (Hacquebord, et al., 2004). For this reason, it is important to investigate which characteristics influence the reading capability of the less skilled readers of the vmbo.

In chapter 2, 3, 4, and 5 of this dissertation four main studies are presented. In the first chapter we will give an introduction and present the main research questions. The dissertation ends with a discussion in which we point out the main results, give possible explanations for these results, make suggestions for future research, and give practical advice for writers of study text on the vmbo-level. For each study, this summary will give a short overview of the research questions, the methods we used, and the results we found.

#### **Study 1**

##### **Inventory reading behavior**

In the first study we investigated to what extent the common assumption that vmbo-pupils have a negative reading motivation and reading attitude is true. We used a questionnaire and a logbook to record how vmbo-pupils appreciate reading in their free time, what they like and don't like about books, how often they read, and what their opinion is about the texts they have to read at school (see also Otter, 1995; Tellegen en Lampe, 2005).

The results show that 32% of the vmbo-pupils read a book in their free time. They spend most of their free time making home work, watching TV, listening to music, making phone calls and playing computer games. Moreover, the results show that half of the vmbo-pupils are bored by the texts they have to read for school. Finally, we conclude that the reading behavior of vmbo-pupils shows strong heterogeneity. There is a large group that does not appreciate reading books or study-text, but there are also many pupils who read often and who do like reading a lot.

#### **Study 2**

##### **Effects of reading attitude**

In the second study we examined to what extent the reading attitude of vmbo-pupils affects their comprehension skills. The questions we investigated were: Do pupils who do not like reading and who do not read often perform worse than pupils with a positive reading attitude? And does this relation also exist the other way around? Are pupils with good comprehension scores better motivated to read in their free time? In most studies the relation between reading attitude and reading skills is interpreted as a causal relation (see Boland, 1989; Otter, 1995). In this study we investigate to what extent this relation really exists. By using a correlational experiment we examined whether we can interpret this relation as causal: do reading attitudes affect reading skills or are reading attitudes caused by reading skills? To answer these questions we asked vmbo-pupils to fill in a questionnaire about their reading attitude and reading frequencies. We also asked questions about the reading stimulation from parents and friends. After answering the survey, pupils had to read two study texts and answered comprehension questions about these texts. Five weeks later, the same procedure was repeated. The only difference was that pupils read different study texts. We performed a

statistical analysis to compare and to correlate the scores from the first measurement with the scores of the second measurement.

The results show no causal effect between reading attitude and text comprehension scores. Pupils do not become better readers if they like reading, and a good comprehension of study texts does not lead to a better reading attitude. However, we did find weak correlations between reading attitude and text comprehension during the same measurement: pupils who like reading, score higher on the comprehension questions than pupils who do not like reading, measured at the same moment. This is comparable with other studies (see Kuhlemeier, 1996).

### Study 3

#### Effects of integrating structure characteristics

In the fourth chapter, we report an empirical study of the effects of integrating structure characteristics in the text comprehension and appreciation of vmbo-pupils. Many researchers have focused on the effect of structure characteristics on text comprehension (see for an overview Bos-Aanen, Sanders, & Lentz, 2001; Kamalski, 2007; Sanders & Noordman 2000; Sanders & Spooren, 2007). Although these studies do not focus on less-skilled readers or study texts, this theoretical background allows us to formulate two contrasting hypotheses concerning the effects of structure characteristics on the text comprehension of less-skilled readers: (some) pupils of the vmbo. First, we formulated the hypothesis of *maximum coherence*. This hypothesis predicts that vmbo-pupils will understand a study text better when the text relations are clarified with connectives or other structure signals and when the sentences are integrated (a so called integrated text), than when a text consists of implicit coherence relations and only main clauses that start on a new line (a so-called fragmented text). The following examples illustrate the difference between an integrated text and a fragmented text.

(example of a fragmented text)

...  
*There had to be a German empire.  
Hitler wanted to be the leader of that.  
He had to conquer other countries.  
Hitler had built a large army...*

(example of an integrated text)

...  
*There had to be a German empire **and**  
Hitler wanted to be the leader of it.  
**However**, he needed to conquer other  
countries first. **That's why** Hitler had  
built a large army...*

The assumption is that in an integrated text, readers are helped by the structure signals to interpret the coherence relations. As a result, they will understand and comprehend the integrated text better than a fragmented text in which they get no help from structure signals (Degand & Sanders, 2002; Kamalski, 2007; McKeown, Beck, Sinatra, & Loxterman, 1992; McNamara, Kintsch, Songer, & Kintsch, 1996; Meyer, Brandt, & Bluth, 1980; Mulder, 2008; Ohlhausen & Roller, 1988; Sanders, 2001; Sanders, 2005).

On the other hand, we have the hypothesis of *minimal cognitive load theory*. This hypothesis assumes that especially less-skilled readers will understand a fragmented study text better than an integrated text. Structure signals are mainly abstract words such as *however*, *because*, *so*, and *although*, and are therefore hard to understand for less-skilled readers. Also, less skilled readers are generally not able to interpret too much text information at the same time. Their working memory is not as capable as the working memory of good readers. Therefore, less-skilled readers will understand a text best if this text has only short main-clauses and no subordinate clauses (like in a fragmented text). In that case the readers only have to comprehend short clauses, and as a consequence their working memory will be minimally loaded (McDaniels, Hines, & Guynn, 2002; Montgomery 2003; Van Meriënboer & Sweller, 2005). The hypothesis of *minimal cognitive load* also predicts that less-skilled readers will understand a fragmented study text better because the absence of structure signals will force them to comprehend the texts in an active way.

In the fourth chapter, we first describe a corpus-analysis. With this analysis we recorded which structure signals appear in study books that are used for history lessons on all levels of the vmbo. The results of this corpus-analysis show that fragmented texts appear mostly in the study books for the lowest level of the vmbo. The texts in books for the higher levels consist of more integrated texts.

Next, we investigated the following research question: do pupils of the vmbo understand and appreciate integrated or fragmented study text the best? We used eight experimental texts which we based on the real study texts from the vmbo-study books. We constructed two versions of each text: one fragmented and one integrated version. The content of the text was kept constant in both versions as much as possible. A large group (582) of pupils of the vmbo had to read three text versions of different texts. After reading they were instructed to answer appreciation questions on a *Likert-scale*. When they had finished the appreciation questions, they had to answer three different types of comprehension questions. The results show that vmbo-pupils score higher on comprehension questions after reading an integrated text than after reading a fragmented text. The results do not show an influence of text manipulation on text appreciation. Thus, we confirmed the hypotheses of *maximum coherence* in this experiment.

Because we used non-conventional tasks to measure text comprehension, we will describe these tasks shortly in the section below.

#### *Measuring text comprehension*

We tried to measure the text comprehension on an optimal and deep level. Therefore, we constructed tasks that should measure text comprehension on the situation model level (see Kintsch, 1998; McNamara, et al, 1996). In order to have an optimal understanding of a text, readers construct a coherent mental representation of the text. If they construct this representation on the level of the situation model, they are able to retrieve the text information for a long time after reading the text. In that case, we speak of deep and optimal text comprehension and learning from texts. To construct a mental representation on the level of the situation model, readers integrate the new text information within their world knowledge and the information from their long term memory about the same or relevant contents and context, and also the knowledge about time-ordering and causality. For example, readers read the following sentence:

*Hitler conquered Poland in 1939. As a result a world war started in 1940.*

To construct a coherent mental representation on the level of the situation model, readers has to integrate this sentence with their knowledge about time: 1939 happened before 1940. They also have to interpret a causal relation that is explicated by the signal *as a result*. Readers do not only have to know the meaning of this signal, they also have to know that this signal means that the second sentence is a consequence of the first sentence. They also have to integrate the information in the text with their general world knowledge and background knowledge to understand this sentence well. For example, they have to know what a war means but also that Hitler was dictator of Germany in that time. Readers must also know that leaders of other countries did not agree with the ideas of Hitler and his attack on Poland. So, in order to understand the text, the readers have to combine this knowledge with the information from the text.

We constructed time ordering-tasks to measure text comprehension on the level of the situation model. In the time-ordering task pupils had to fill in given sentences from the text in the good position on a timeline. To give the correct answer, they had to use their knowledge about linear time-ordering (consecution) from their general world knowledge. An example is given below.

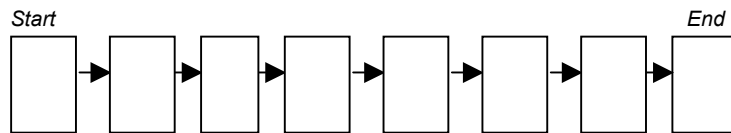
#### **Example time-ordering task**

(Concerning a text about the assessing of a Russian writer during the communism).

Put the sentences below in the right boxes. Use only the numbers of the sentences. Each sentence fits in one box.

Sentences

1. Interviewing eye - witness
2. Dying in hospital
3. Threatening
4. Writing about communism
5. Pricked by a umbrella
6. Communism has the power
7. Find assassins
8. Escaped to London



We also constructed scheme tasks to measure comprehension on the level of the situation model. In these scheme tasks pupils had to order given sentences from the text in empty boxes in a scheme. The connections between the empty boxes are clarified by connectives that are comparable with the relations described in the texts. To answer these tasks correctly, pupils have to use knowledge about causality from their general world knowledge. An example of a scheme-task is given below.

**Example of a causal scheme task**

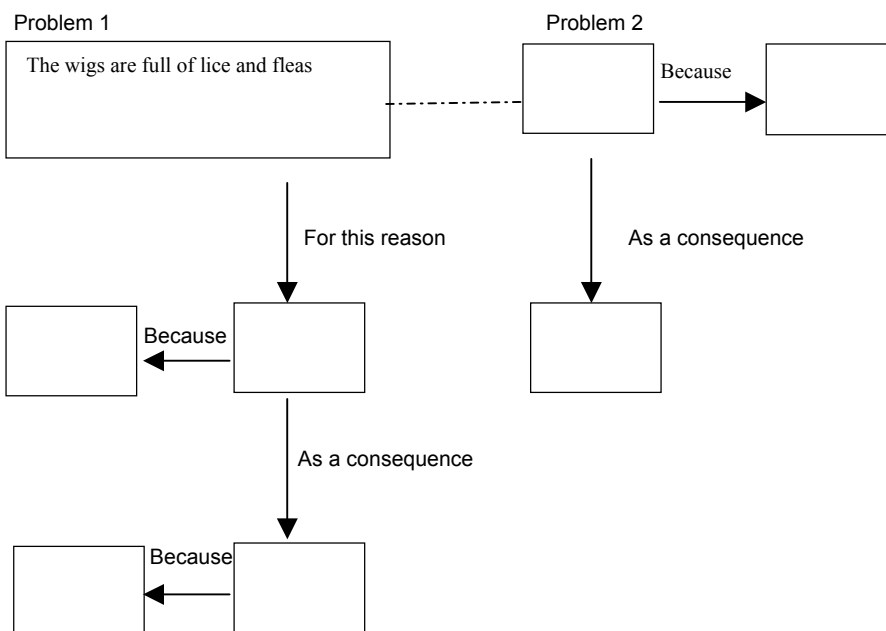
(Concerning a text about hygiene in the court of Lodewijk XIV).

Read this text carefully and fill in the scheme below without using the text. Only use the numbers of the sentences.

Each sentence fits in one box.

Sentences

1. It stinks in the palace
2. People do not wash themselves
3. People sleep with their wigs on
4. there are no toilets in the castle
5. The people shit in the rooms
6. In the opinion of the king, washing is unhealthy
7. The lice and fleas jump into the blankets



We also constructed sorting tasks like McNamara, et al (1996) and Kamalski (2007) did before. In this sorting tasks pupils had to sort given sentences from the text into groups. For example, if there are three reasons described for a certain problem, pupils had to sort these three reasons together under the title *reason*. In our experiment the titles were already given. An example of this sorting task is given below.

**Example sorting task**

(Concerning a text about the Cold War).

Below you see a table with terms from the text on the left side in the rows. In the columns you see titles. Each of the words belongs to a certain title: America, Russian, America and Russian, or the word does not fit.

For each word, put a mark in the right box,. Use only one mark for each word.

Words	Titles	AMERICA	RUSSIAN	AMERICA AND RUSSIAN	DOES NOT FIT
East Europe					
Communism					
West-Europe					
Strong					
Conquered a lot of land					

Rich				
Eastern block				
third world war				
Atom bomb				
Stick to the rules				
Help with weapons and money				
scared of a third world war				
They control Europe				

Apart of this three situation model tasks, we used multiple choice questions to measure text comprehension.

If we look at the results more closely, we see a difference in score for the three situation model tasks. The results show that pupils in the lowest education level of the vmbo (vmbo-basic) answer all the comprehension tasks better after reading an integrated text as after reading a fragmented text. The score of pupils from the highest educational level of the vmbo (vmbo-theoretic) although, is the same on the scheme task for both text manipulations. We can conclude that scheme-tasks do show differences in the effects of structure characteristics between low-level pupils and high-level pupils. We can explain these results by the difference between good and less-skilled readers. In general, pupils at vmbo-theoretic level can read better than pupils at vmbo-basic level. Good readers benefit less from structure signals and integration than less-skilled readers when answering questions about the causality in the text. So, good readers are more capable to interpret the causal relations on their own than less-skilled readers, and for that reason they do not need signals. Another explanation is as follows. In the scheme-tasks the connectives and fill-in sentences are given which highly resemble the connectives in the text. Vmbo-pupils in the theoretical level are more able to recognize these exact connectives and sentences. For this reason, scheme tasks do not measure text comprehension, but only text remembrance and recognition by vmbo-pupils of higher educational levels.

#### Study 4

##### Effects of identification increasing style-characteristics

Not only the text structure, but also the style of the text can have an effect on text comprehension and appreciation. Style characteristics can make a text more or less interesting and because of that readers will make more effort to understand a text that interests them than texts that do not. In the fifth chapter of this thesis we examined the effect of certain style characteristics on the text comprehension and the text appreciations of vmbo-pupils. We focused on characteristics that increase the possibilities for readers to identify with the text. Characteristics that increase identification are: the presence of a (fictive) person, the description of emotions these persons have, a personal point of view (eye-witness), and use of the present tense. Research in the field of linguistics and literature has already investigated how style characteristics influence opinions about the text (Andringa, 1996; Bal, 1990; Hustinx & Smits, 2006; Sanders & Redeker, 1996; Schram, 1985; Segal et al., 1997; Van Peer & Pander Maat, 1996). Nevertheless, this research does not focus on less-skilled readers but only focuses on good experienced readers, and moreover, we used study texts instead of long and complex prose. However, we can formulate two contrasting hypotheses based on the theoretical views that lie behind the research in the field of literature and linguistics. First there is the hypothesis of *increasing identification*. This hypothesis predicts that a study text will be better understood by vmbo-pupils if the text includes characteristics that increase identification possibilities. Pupils will feel involved with the events in texts with more possibilities for identification and as a consequence they will judge the text as interesting and

highly appreciate these texts (Hidi & Baird, 1986; Hidi & Krapp; 1992; Krapp, 1999; Renninger, Hidi, & Krapp, 1992; Sadoski, 2001). Because of that, they will use extra effort to comprehend texts that include identification characteristics. An example of a text with identification characteristics is given in Fragment 3.

Fragment 3. An identification text

*It is very warm in the palace and Diederick is having a refreshing nap. He is crown prince of Norway and still only 12 years old, but he is now already present at the celebration of Lodewijk 14th. In the 17th century Lodewijk 14th was the French king. In the court of Lodewijk 14th nobody knew anything about hygiene and that gave large problems. The first problem Diederick noticed already. Suddenly he awakes shocked. "Holy shit, there are small beasts crawling around all over the place!" Rapidly he calls a clerk. The clerk says booming: "yes, we have a problem with lice and fleas because we hardly ever wash ourselves. We do not wash ourselves, because in the opinion of our king washing is unhealthy!"*

On the other hand, we can formulate a hypothesis of *increasing distance*, based on empirical research. This hypothesis predicts that identification characteristics will have a negative effect on the text comprehension of vmbo-pupils, because characteristics that increase the possibility for identification can distract the readers from the important information in the text. This assumption is based on the is also called the *seductive details effect* (Garner, Gillingham, & White, 1989; Hidi & Baird, 1988): By including identification increasing characteristics in study texts, the text tries to be more interesting. As a consequence, pupils will spend too much energy and attention on this identification increasing characteristic, and do not comprehend the main ideas very well. The hypothesis of increasing distance predicts that vmbo-pupils will understand study texts better when these texts do not have any identification characteristics. Study texts should be formulated in a distant and professional manner: no emotions are described, no person has the focalization and only the past tense is used. With respect to the hypothesis of increasing distance, it is expected that vmbo-pupils will understand a formal text such as fragment 4 better than an identification text, such as fragment 3.

Fragment 4. A formal text

*In the 17th century the king of France frequently gave parties. That's when he invited princes and kings from friendly countries. In the court nobody knew anything of hygiene and that gave large problems. First, lice and fleas crawled around all over the place, because people hardly ever washed themselves. They did not wash themselves since in the opinion of the king washing is unhealthy.*

In order to examine which of the two hypotheses describes reality the best, we first analyzed a corpus of study texts from study books used in history class at vmbo-schools. The results of this corpus-analysis show that identification increasing characteristics do not occur often in study texts written for the vmbo. Most of the texts are formulated with distance and professionally. Secondly, we constructed a reading experiment with eight texts, all based on real study texts selected from study books used at vmbo-schools. For each text we constructed two versions, a formal version and an identification version. Only the appearance of identification increasing characteristics differed for each text version; the text structure and content remained constant. The procedure and method we used are similar to those used in the third study (see above). The results show that vmbo-pupils score higher on comprehension questions after reading a formal text than after reading a text with identification increasing characteristics. The results also show that vmbo-pupils appreciate a text with identification increasing characteristics more. In their opinion, the identification texts are more exciting and more fun to read. Thus, for comprehension we validated the hypothesis of increasing distance and for text appreciation we confirmed the hypothesis of increasing identification. Identification characteristics do make a study text more appreciated, but a high appreciation does not lead to better comprehension.

In a second reading experiment we tried to find out why pupils do not comprehend study texts better when these texts are interesting and contain characteristics that may increase reader identification. We predicted an interaction effect between integrating structure characteristics (see study 4) and identification increasing characteristics. Identification increasing characteristics can lead to a less obvious text structure due to the presence of a central character, and, more over, the text contains more information (such as conversations, emotions and descriptions). Therefore, the main ideas are less clear and the distance between the main ideas can be bigger than when there is no central character (see also *the seductive details effect* from Garner, et al., 1989). Based on this assumption we predict that pupils comprehend identification increasing texts better when structure signals help them to make the right interpretations of the coherence relations (see also Spooren, Hoeken, & Mulder, 1998). To test this prediction, we constructed four versions of eight research texts, all based on real texts from the vmbo-study books. The text versions had an integrated or fragmentized text structure in combination with identification or distance increasing characteristics. Six hundred vmbo-pupils answered comprehension questions on the level of the situational model (see study 4) after reading three texts versions of different texts. The results do not point towards an interaction between style and structure characteristics. Pupils comprehend a study text with an integrated structure better than a study text with a fragmentized structure, independent of the presence of identification increasing characteristics. Furthermore, pupils comprehend a study text with distance increasing characteristics better than a study text with identification increasing characteristics, independent of the clarification of the text structure.

In the two experiments mentioned above, we used a cluster of identification increasing characteristics. However, by using a cluster we do not exactly know to which special characteristic we can attribute the effect we found. Therefore, we constructed a third experiment. In this experiment we examined to what extent the characteristics *point of view* and *narrative time* (use of past or present tense) attribute to the effects we found for identification increasing characteristics. We constructed four research texts, based on real texts from vmbo-study books. For each text we constructed four versions: eye witness point of view (we and I) or auctorial narrator point of view (them and they) in combination with present or past tense. 1077 vmbo-pupils read two texts in different versions. After reading these texts, they had to complete appreciation questions, multiple choice questions, and a sorting task, a scheme task or a timeline task (see study 4). The results show no effect of point of view and narrative time on text comprehension. The specific characteristic point of view and narrative time do not give an explanation for the negative effect on comprehension of identification increasing characteristics. However, we do find an effect on appreciation: pupils are most appreciative of texts that are set up in the past tense with an eye-witness point of view.



These three experiments show a negative effect of the identification increasing characteristics on text comprehension. A possible explanation for this negative effect is that pupils are not used to reading study texts (and answering questions about the texts after reading) with narrative components (like the present tense, descriptions of emotions and the presence of a central character). Therefore, the pupils may have had wrong expectations (a so-called top-down-effect). On the other hand, pupils had to read three texts. So, if there is a top-down effect this should show up as an order-effect, which we do not find. Another explanation for the negative effect is that identification increasing characteristics make study-texts unnatural. Especially history texts are situated in the past, and suddenly these texts are formulated in the present tense with a eye-witness point of view, which is, of course, unnatural. Furthermore, the inclusion of identification increasing characteristics makes the syntax of the text more complex, because the characteristics include more interesting, (for study texts unusual) information, and maybe because of that pupils do not know what is important to remember. As a result of this confusion, they did not remember anything at all.

### **Advice for the education practice**

With the results of this dissertation we can formulate some advice for educational practice, and, more specifically, for the way vmbo-study texts should be formulated. First, the results show that the group of vmbo-pupils is highly heterogenic. There are a lot of pupils who do not like reading and do not read often, but there are also many pupils who do read a lot. Moreover, the results show large differences in text comprehension performance. This heterogeneity means that it is almost impossible to formulate advice that can apply to all vmbo-pupils. However, from our results we can conclude that certain text characteristics can attribute to better text comprehension. The most effective study texts for vmbo-pupils studying at the lowest level should contain main clauses and subordinated clauses. The coherence relations should be clarified by connectives, and the clauses should be one integrated whole. Furthermore, study-texts for the vmbo should not contain identification increasing characteristics such as central characters, present tense, or descriptions of emotions. Since the results show that vmbo-pupils do appreciate identification increasing characteristics, these characteristics should be added to study texts which pupils do not have to study in order to learn or memorize textual information, but rather use as “background reading”. In other words, these characteristics should only serve as a motivating function. Also, the results show that pupils are most appreciative of study texts when they have been written in the past tense in combination with an eye-witness point of view. Therefore, when writing study texts with no learning function, the past tense in combination with eye-witness point of view should be preferred. Finally, the results of the correlational experiment between the reading attitude and the text comprehension of vmbo-pupils do not show a causal relation between reading attitude and text comprehension. Being a keen reader does not lead to better comprehension. Hence, it does not seem necessary to stimulate the reading attitude, and reading frequency does not need to be used as a way to change the less skilled readers of the vmbo into good readers.