CHAPTER EIGHTEEN

Researching Reading

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This chapter gives an overview of key issues and research areas in second language reading research, and describes research techniques frequently used in this field. It also describes a sample study that uses verbal protocol analysis as a data collection technique, in order to illustrate some of the methodological issues involved in collecting and analysing observational reading data.

Key issues

In contrast to writing, where the writer produces a text that can be examined and analysed, reading is essentially an internal activity, the relatively intangible product of which is a representation of the text that has been read in the mind of the reader. Probably for this reason, much reading research has traditionally been psycholinguistic in nature, focusing on gaining insight into the reader's internal cognitive processes. However, in recent decades reading research has broadened its focus by becoming more socially, culturally and multi-culturally oriented (Kamil et al. 2000). As a reflection of this, the more socioculturally oriented term 'literacy' is currently increasingly used alongside 'reading'. It needs, however, to be pointed out that many conceptualizations of literacy exist, many of which, at the very least, include both reading and writing and often also a variety of aspects of oral, aural and digital communication.

Within the field of applied linguistics, second language (L2) reading research has leaned heavily on first language (L1) reading research by echoing – and even amplifying – its cognitive focus. And like L1 reading

research, L2 reading research is shifting its focus – albeit to a lesser extent – to incorporate other perspectives, particularly sociocultural ones. Reflecting this, the term 'multilingual literacy research' is sometimes used instead of 'second language reading research' (e.g. Fitzgerald 2003), and there is a growing trend that broader conceptualizations of literacy are being incorporated into second language reading research. Also similar to L1 reading research, the bulk of L2 reading research focuses on English – in this case as a second language, which has led to charges of Anglocentrism (e.g. Bernhardt 2003).

Although first language and second language reading research share commonalities, there are issues specific to second language reading, largely relating to the fact that L2 readers have access to more than one language and culture. An issue that has received considerable attention is the relationship between first and second language reading, sometimes referred to as '*transfer*'. Transfer refers to the extent to which knowledge and skills that readers possess in one language transfer to reading in another language. Numerous studies have investigated transfer from L1 to L2 (e.g. Bernhardt & Kamil 1995; Carrell 1991; Gottardo & Mueller 2009; Jared et al. 2011; Lee & Schallert 1997; Nikolov & Csapo 2010; Sparks et al. 2012; Taillefer 1996; van Gelderen et al. 2004, 2007; Yamashita 2002). An approach that has commonly been used to examine this issue is the component-skills approach, in which reading is viewed as being a set of sub-skills such as decoding, vocabulary knowledge, syntactic processing and metacognition (Jeon & Yamashita, 2014). This approach enables the identification of key predictors of L2 reading.

Some component-skills studies have focused on the interdependence between L1 and L2 reading (see interdependence hypothesis, Cummins 1979a, b). There is considerable evidence for the existence of strong relationships between various components of L1 and L2 reading, pointing towards some kind of common underlying proficiency. Other studies have focused on factors that impede the transfer of knowledge and skills between L1 and L2. It has been claimed that in L2 reading, below a certain threshold of language proficiency, readers are unable to fully transfer the strategic skills, such as guessing meaning from context or making inferences, which they possess in L1 reading. This hypothesis is sometimes referred to as the *threshold hypothesis* and is related to the more general threshold hypotheses formulated by Cummins (1979a) in relation to the educational development of bilingual children. This hypothesis also has its roots in the work of Alderson (1984) in which he raised the question of whether L2 reading problems were predominantly language problems or reading problems. Some studies investigating the notion of a threshold in L2 reading have emphasized the role of lack of L2 *language knowledge* in inhibiting transfer of reading ability from L1 to L2, while others have emphasized the role of lack of L2 *linguistic processing skills*, such as speed of word recognition and sentence parsing.

Despite assumptions that are sometimes made concerning the existence of an L2 reading threshold, the empirical evidence is by no means conclusive. For example, a meta-analysis by Jeon and Yamashita (2014) of research that examines the correlations between L2 reading comprehension and a variety of component skills found that language specific variables such as grammar and vocabulary correlated more strongly with L2 reading comprehension than did more general variables such as metacognition. This would indicate that L2 language proficiency may play a greater role in L2 reading than does general reading ability, although the role of general factors cannot be ignored, as these also correlate significantly with L2 reading comprehension. Moreover, this meta-analysis found little evidence for a transfer threshold as L2 language proficiency did not significantly affect the relationship between L1 and L2 reading comprehension.

A complicating factor in drawing overall conclusions from the research about the existence of a threshold is that studies differ in the methods they have used to investigate this issue and in the characteristics of participants. Factors such as proficiency level, age and characteristics of the readers' first language are likely to strongly influence the degree of transfer from L1 to L2.

Indeed, a second issue in L2 reading research is how the processing of words, sentences and texts in the second language is influenced by characteristics of the reader's first language, such as orthography, phonology and morphology. For instance, a number of studies have found that word identification processes in the second language are influenced by the characteristics of L1 writing systems, such as whether they are alphabetic or non-alphabetic (Nassaji 2014). Results of studies support the notion that word identification in an alphabetic L2, such as English, is easier for readers with an alphabetic L1 than for readers with a non-alphabetic L1, such as Chinese or Arabic (see Wang & Koda 2007). Investigating Chinese and Korean learners of Japanese, Horiba (2012) found that the development of second language word knowledge and its relationship to text comprehension was influenced by L1-related factors such as syntax. As Korean and Japanese are syntactically more similar than Chinese and Japanese, Korean learners appeared to find it easier to use syntactic knowledge to process Japanese sentences. At text level, the extent to which L1 and L2 share similar text structure properties (i.e. rhetorical distance) has been shown to influence textual processing, with greater similarities facilitating the processing of key ideas and semantic relations (Koda 2005).

A third issue that has emerged concerns the effects of bilingualism on reading and on the acquisition of literacy in the classroom. Psycholinguistic research has investigated how knowing two languages affects the electrical activity in the brain during reading (e.g. Perfetti et al. 2007). Other research has focused on the development of bilingual children's reading ability (e.g. Bialystok et al. 2005, 2007; Da Fontoura & Siegel 1995). One of the questions relating to this development is whether knowing two languages

has a positive or a negative influence on the development of reading ability in either of the bilingual's languages.

Studies that compare monolingual and bilingual readers in terms of language knowledge and/or reading proficiency have typically found that monolinguals perform better than bilinguals (e.g. Silverman et al. 2013). For example, Silverman et al. (2013) found that monolinguals scored higher on both vocabulary and reading comprehension than bilinguals. However, some results from studies such as this may reflect that participants are not balanced bilinguals and/or are from disadvantaged minority contexts. There is also the issue of how bilingualism is defined: participants that one study may refer to as second language learners, another study may refer to as bilinguals. A case in point is the Silverman study, which makes a conscious choice to use the terms 'language learner' and 'bilingual' interchangeably.

Research that compares monolinguals and bilinguals in terms of metacognitive ability, rather than knowledge or processing speed, has tended to produce outcomes that are more favourable for bilingual readers. Studies have found that young bilinguals are more metalinguistically aware than monolingual children in areas that underpin reading development, although the evidence for this advantage has not been conclusive. In light of the mixed outcomes of studies, it has been suggested that it may be biliteracy, that is, the ability to read (and write) in two languages rather than bilingualism per se that is crucial in determining the course of the development of reading ability (Schwartz, Leikin & Share 2005). Schwarz et al. found that biliterate bilingual children outperformed both monoliterate bilingual children and monolingual children in terms of reading fluency and phonological awareness, but that there was little difference in terms of linguistic measures.

Reflecting the shift away from a psycholinguistic conceptualization of second language reading towards a sociocultural conceptualization, an issue that has come to the foreground in recent years is the relationship between literacy, literacy practices and identity. Literacy is increasingly viewed as being socially constructed, and as being understood in terms of practices not only engaged in by individuals but also embedded within the context of practices within the home, the school, the community and society as a whole (Norton 2010). These practices are instrumental in shaping learner identity. Research has demonstrated that if learners have a sense of ownership of meaning-making and are in a position of empowerment, they are able to engage in literacy practices that are meaningful and fruitful for their literacy development. Likewise, if learners do not have a sense of ownership or are disempowered, the literacy practices they engage in may not be very beneficial to the development of their literacy, and they may suffer (further) educational disadvantage. Research in this area has largely been carried out in second language contexts with learners from migrant or indigenous minority groups or foreign language learners in disadvantaged contexts (e.g. Medina 2010; Moore & McDonald 2013; Norton 2010; Owodally 2011).

Research areas

Figure 18.1 divides the field of second language reading research into seven areas: lexical, fluency, discoursal, strategic, affective, intermodal and sociocultural. For each area, one sample study is listed. The sample studies have been selected on the basis of recency and also for representativeness of the kind of research topics common in a particular area. The studies chosen also reflect some of the diversity in research methods in L2 reading research, ranging from qualitative research (e.g. case studies) to quantitative research (e.g. survey and experimental studies). It should be noted that many of the studies described below reflect the aforementioned cognitive orientation of much L2 reading research. It should also be noted that within most of the areas, studies can be found that have an instructional focus, as they examine the effectiveness of a particular form of reading instruction or evaluating the effectiveness of a program incorporating a particular form of instruction. Testing and assessment of reading has not been included as an area, as it is seen as falling within the field of language testing.

Research area	Examples	Sample study
Lexical	e.g. vocabulary; grammar	1. A quantitative study on the relationship between percentage of words known in a text and reading comprehension. (Schmitt, Jiang & Grabe 2011).
Fluency	e.g. reading speed; lexical access; syntactic parsing	2. A review of research on fluency in reading (Grabe 2010).
Discoursal	e.g. text structure; rhetorical features; background knowledge	3. A quantitative study on effects of text structure on L2 text recall (Chu, Swaffar & Charney 2002).
Strategic	e.g. knowledge of and use of reading strategies	4. A verbal protocol study of using L1 in L2 reading (Upton & Lee-Thompson 2001).
Affective	e.g. motivation; attitudes	5. A survey study on the effects of extensive reading on FL reading attitudes (Yamashita 2013).
Intermodal	e.g. relationship between reading & writing, listening or speaking	6. A verbal protocol study on hypermedia reading strategies (Akyel & Ercetin 2009).
Sociocultural	e.g. home literacy environment; educational context	7. A case study on literacy practices of two Puerto Rican families in the US (Compton-Lilly 2007).

FIGURE 18.1 *Research areas in L2 reading research*

Lexical

Research in this area focuses on various aspects of the relationship between vocabulary and reading comprehension. Some research has found that vocabulary knowledge is the language knowledge component that is most strongly related to reading comprehension (Koda 2005). Studies have focused on the role of reading in vocabulary development (e.g. Pulido 2007); on the effects of reading on incidental vocabulary acquisition (e.g. Brown, Waring & Donkaewbua 2008; Kweon & Kim 2008); and on the relationship between the words known in a text and reading comprehension (e.g. Schmitt, Jiang & Grabe 2011). A study by Schmitt, Jian and Grabe (2011) found no evidence that there is a threshold of knowledge of words in a text beyond which comprehension increases dramatically. Also, the study confirmed previous findings that readers need to know a very high percentage of words in a text as a pre-condition to being able comprehend the text.

Fluency

Fluency can be defined as 'the ability to read rapidly with ease and accuracy' (Grabe 2009, p. 291). Research in this area focuses on processing skills, such as reading speed, and speed of component measures, such as lexical access and syntactic parsing. Research in this area was pioneered by researchers such as Schmidt (1992) and Segalowitz (2000; Segalowitz & Segalotwitz, 1993). Literature reviews by Grabe (2010) and Nassaji (2014) indicate that studies by and large support the importance of fluency for second language reading. However, it should be noted that it is still unclear whether training to increase fluency can lead to improvements in text comprehension (see Fukkink, Hulstijn & Simis 2005).

Discoursal

Research in this area focuses on discoursal aspects of reading, such as text structure and background knowledge. Some studies look at the effects of such aspects on comprehension. For example, Chu, Swaffer and Charney (2002) found that when English texts were structured according to Chinese rhetorical conventions, L1 Chinese learners of L2 English had better recall than when texts were not structured in this way. Other studies look at online discourse processing, such as readers use of text structure information while actually reading texts (e.g. Chen & Donin 1997). Instructional studies look at the effects of discourse-oriented training on reading comprehension (e.g. Jiang 2012).

Strategic

Research in this area focuses on readers' knowledge and use of reading strategies. Reading strategies are activities and behaviours that readers engage in to assist them in comprehending a text, such as predicting text content or guessing meaning from context. Strategies are thought to be related to metacognition, which is readers' ability to reflect on and control their reading processes. Some studies have examined the effects of reading strategy instruction on reading comprehension. For example, Kern (1989) found that strategy training led to strong gains in reading comprehension. Other studies have focused on the role that metacognitive knowledge plays in reading comprehension. For example, Schoonen, Hulstijn and Bossers (1998) administered a questionnaire to Dutch high school readers on their knowledge of reading goals, text structure and reading strategies. They found that for children in higher grades, metacognitive knowledge played a greater role in both L1 (Dutch) and L2 (English) reading comprehension than at lower grades. Still other studies focus on the actual strategies that readers use, through online measurement of what readers do when they read in L1 and/or L2. For example, Upton and Lee-Thompson (2001) examined use of L1 when reading L2 texts for L1 Chinese and Japanese readers of L2 English. They found that L2 readers used L1 for a variety of strategic purposes, including predicting content and structure and monitoring their own reading behaviour.

Affective

Research in this area focuses on affective aspects of reading, such as motivation and attitudes. Until fairly recently, little L2 reading research had been carried out in this area (Mori 2002), and consequently the overall direction of the research is still taking shape. Topics that have recently been the subject of study are: the components of L2 reading motivation (Mori 2002); the relationship between motivation and reading comprehension (Kondo-Brown 2006); students' motivations for reading extensively (Takase 2007); the relationship between L1 and L2 reading attitudes (Yamashita 2004, 2007); and effects of extensive reading on reading attitudes (Yamashita 2013). For example, in a study of Japanese university students reading in English, Yamashita (2013) found that extensive reading had a positive effect on different aspects of FL reading attitudes. It should also be pointed out that extensive reading itself is a growing area of L2 reading research. See a recent meta-analysis by Nakanishi (2014).

Intermodal

Research in this area focuses on reading in relation to other traditional modalities (i.e. writing, listening and speaking), as well as in relation to digital modalities (e.g. hypertext, visual images). For traditional modalities, research has largely focused on reading-writing connections in academic writing and within this, on both reading to help writing and writing to help reading. Two publications that offer a good introduction to both theory and research on reading-writing relations are Hirvela and Belcher (2001) and Hirvela (2004).

For digital modalities, a few studies have been carried out about online reading for ESL readers (e.g. Esther & Noelia 2009; Tseng 2007). There is also a small but growing body of research on reading with hypertexts (e.g. Abdi 2013; Akyel & Ercetin 2009; Kasper 2003). For example, Akyel and Ercetin (2009) found that certain reading strategies common to print reading such as guessing meaning from context were not used in hypermedia reading and that strategies specific to utilizing annotations and navigating through the text were used. As yet, little work appears to have been done on visual literacy in a second language. However, a qualitative study by Petrie (2003) found that ESL teachers viewed graphics and images as being quite separate from texts rather than viewing them as visual language.

Sociocultural

Research in this area focuses on sociocultural aspects of reading, such as home, classroom and community literacy practices. This research, which is largely qualitative, has often been carried out from a social justice or educational policy perspective. It has sought to identify practices in the social, educational or home environment that may compromise children or adults in minority settings in acquiring literacy but has also sought to identify practices that these individuals engage in and resources they possess that are empowering and that can lead to positive gains in their literacy. For example, Compton-Lilly (2007) uses the notion of 'capital', taken from the sociologist, Bordieu, to examine the economic, social and cultural aspects of reading in the families of two elementary school children of Puerto-Rican background in the United States. She found that although the families did not possess much economic reading capital (e.g. computers, books), they were relatively rich in social capital (e.g. networks of relationships with family members, community and teachers) and that educators need to identify and utilize the unique funds of knowledge that children from various cultural backgrounds bring to classrooms.

There has been a call for more L2 reading research to incorporate a sociocultural perspective. Luke (2003) puts forward a multilingual literacy research agenda to examine issues such as how people use texts, discourses and literacies in homes, communities and schools and how the literacy

resources that people have are recognized and incorporated into school-based literacy instruction. Fitzgerald (2003) makes a plea for a sociocognitive approach to L2 reading research in which social-cultural perspectives are combined with cognitive perspectives. As time goes by, it is likely that an increasing number of studies will examine both cognitive and sociocultural aspects of reading.

Research techniques

This section gives a brief description of some of the most commonly used techniques in reading research, which is organized around the distinction between process and product-oriented techniques. Process-oriented techniques provide information about the reading process, that is, about what readers do when they read. In contrast, product-oriented techniques provide information on the product of reading, that is, on comprehension or its components. The description of techniques does not include interviews, surveys, diaries and logbooks, which are used in reading research as well as in many other fields of applied linguistics research, as these are already discussed in other chapters of this book (see e.g. Vandergrift; Wagner).

Process-oriented techniques

Process-oriented techniques are used to infer readers' internal cognitive processes. Techniques may infer processes from observation (e.g. verbal protocols); from measurement of the time taken to respond to stimuli (e.g. speed measures); or from measurement of physiological responses, such as eye movements (i.e. eye-tracking) or the electrical activity of the brain (i.e. event-related potentials (ERPs)). Reading research has a strong tradition of using process measures in controlled, experimental settings, but there have also been abundant small-scale qualitative studies carried out, particularly using observational process measures. Below, three process-oriented techniques are described: verbal protocols, eye-tracking and speed measures.

Verbal protocols

Verbal protocols, also known as think-aloud protocols, are an observational technique that involve readers verbalizing thoughts about the text they are reading. Protocols may be directed towards gaining insight into a specific aspect of reading, such as deriving meaning from context, or they may be used to gain an overall picture of the strategies readers use in building a global representation of a text.

Verbal protocols can be collected either concurrently (i.e. while reading the text) or retrospectively (i.e. after reading the text). In concurrent

collection, the thoughts that are verbalized are supposed to reflect the current content of short-term memory (Ericsson & Simon 1993). Although widely used, concurrent protocols have also been widely criticized for being disruptive to natural reading processes and for providing only a fragmentary representation of what actually goes on in a reader's mind when reading. While retrospective protocols are less potentially disruptive to reading processes, questions arise concerning the validity of the information obtained. Readers may not have accurate recall, and they are also more likely to provide explanations or interpretations rather than reporting what they actually did. Some researchers have sought a compromise by placing marks at various points in a text, with readers verbalizing their thoughts every time they reach a mark. For a study on the issue of disruptiveness in verbal protocols, the reader is referred to a study by Leow and Morgan-Short (2004).

Eye-tracking

Eye-tracking is a technique in which the reader wears a device that enables the measurement of eye movements made while reading. When reading, eyes make short, rapid, back or forth movements known as saccades and short stops, known as fixations. Fixation time is taken to provide an indication of the time taken to process the point in the text to which the reader is attending the most (Rayner 1998). However, an important methodological issue is that there is not necessarily a one-to-one relationship between processing time and fixation time. For example, readers sometimes make multiple fixations on the same word; words may also be processed when they are not directly fixated, such as words above or below the fixated word; and processing may also occur during saccades (Irwin 1996). For a detailed consideration of methodological issues involved in eye-tracking research, see Rayner (1998). The bulk of eye-tracking research has examined first language reading, and to date, only a handful of studies have examined second language reading (see Frenck-Mestre 2005). The use of eye-tracking in second language reading research is a field that is wide open for exploration in the coming years.

Speed measures

The speed with which processing is carried out is generally considered to be a reflection of readers' fluency. Common speed measures are the time taken to read the whole text (text level); speed of syntactic processing (sentence level); speed of word recognition (word level); and speed of letter recognition (letter level). In many cases, measures include sentences or words that are in some way anomalous (e.g. nonsense sentences), and the speed of processing these elements may be compared to the speed of processing elements that do not contain anomalies. Reaction times for such measures are generally measured using computers.

A methodological issue is whether the measures used are context-specific or non-context specific (Stevenson 2005). Context-specific measurements are made within a textual context. For example, speed of syntactic processing may be measured by registering the speed at which readers read each sentence of a text. In contrast, non-context specific measurements are made in an isolated context. For example, fluency of sentence-level processing may be measured by registering the speed reading of sentences presented as isolated items that together do not form a text. Non-context specific methods, which select items from a general sample of words that are not taken from a specific text, are able to provide a measure of general processing skills, whereas measures that use items taken from a specific text can only make more limited claims concerning processing as it relates to specific texts. However, on the other side of the coin, using non-context specific measures leaves the researcher open to the criticism that little can be said about real online textual processing.

Product-oriented techniques

Product-oriented techniques measure comprehension of reading or of a component of reading. Below, these techniques are divided into comprehension measures, which seek to gain insight into the quality of the readers' mental representation of a text, and knowledge component measures, which seek to gain insight into the level of knowledge that a reader possesses concerning a component that is relevant to reading, such as vocabulary or grammatical knowledge.

Comprehension measures

Broadly speaking, comprehension measures can be sub-categorized into measures that require short responses and measures that require extended responses, referred to by Bachman and Palmer (2010) as extended production responses.

The classic short response measure is the multiple-choice comprehension test, which though much maligned, remains popular due to the ease with which it can be administered and scored. A major criticism that has been levelled against this testing format is that it measures test-taking skills more than it measures reading ability, as readers who have developed good guessing strategies may score well regardless of whether they have a good understanding of the text.

Another common short response measure is the cloze test, in which the reader is required to restore words in the text that have been deleted. The underlying rationale is that the semantic and syntactic constraints to which the reader must be sensitive in order to provide correct responses are also constraints that guide textual processing (Koda 2005). Alderson (2000)

points out that there is a difference between a 'cloze test' and 'gap-filling' test, although the terms are often used interchangeably. According to Alderson, cloze tests are tests in which every *n*-th word is deleted randomly, whereas in gap-filling tests the test constructor decides to delete certain words on the basis of criteria appropriate to the testing objective, thus giving the test constructor more control over what is measured. Both kinds of tests have been criticized for being more sensitive to linguistic constraints than to underlying meaning and for only being capable of measuring local rather than global comprehension. Many other kinds of short response formats exist, including short answer questions, yes/no questions, choosing from a heading bank for identified paragraphs and flow chart/diagram completion.

Extended response measures, such as recall and summarization, are said to tap more directly into the reader's comprehension of the text, without the intervention of test questions. In free recall, the reader is asked to recall everything they can about the text. In cued recall, questions are used to guide the reader to recall particular aspects of the text. In summarization, the reader is asked to summarize the main ideas, either with or without the possibility of consulting the text. The scoring of extended response measures is more time-consuming and less 'objective' than the scoring of short response measures, as the resulting recall or summarization protocols require intensive coding.

Knowledge component measures

Knowledge component measures are used to disentangle the knowledge components that contribute to reading ability. These measures typically focus on lower order linguistic aspects, such as vocabulary, grammar and spelling. However, they may also measure higher order conceptual aspects, such as topic knowledge, or metacognitive aspects, such as knowledge of reading strategies. Studies that use the component skills approach explained earlier in the chapter may incorporate a battery of knowledge measures as well as speed of processing measures and measures of global reading comprehension. Correlational statistical techniques, such as regression analysis, are frequently used to determine the strength of the relationship between the specific variables and reading comprehension measures.

A sample study

This section highlights methodological features of a verbal protocol study carried out by myself to compare first and second language reading strategies (see Stevenson, Schoonen & de Glopper 2007). I have chosen a verbal protocol study, as details of the use of this technique are notoriously scantily reported (Afflerbach 2000). Through this discussion, I hope to shed light on some of the methodological issues surrounding this widely used

yet controversial technique. A brief description of the study will be given, followed by a discussion of methodological issues under the headings: texts; elicitation of verbalizations; modelling and instruction; and coding.

Description of the study

The study examined the extent to which readers' strategy use transfers from L1 to L2 by comparing the reading strategies of twenty-two Dutch junior high school students in L1 (Dutch) and a foreign language (English). I collected concurrent verbal protocols by recording each student thinking aloud while they read two texts in Dutch and two in English. In order to obtain more detailed information about strategy use than previous studies had been able to do, I classified the students' reading strategies in terms of three separate dimensions. The three dimensions in the coding scheme were: Orientation of Processing (i.e. whether strategies are directed towards content or language); Type of Processing (i.e. whether strategies involve regulating the reading process, processing the meaning of the text or rereading the text); and linguistic Domain of Processing (i.e. whether strategies are directed towards texts elements at below-clause level, clause level or above-clause level). The results showed that the readers focused more on the language in the text in FL and that they did this by, in particular, regulating their reading process and using language strategies at clause level and above (i.e. by translating and paraphrasing chunks of text they did not understand). Thus, in contradiction to claims made by the threshold hypothesis, the readers appeared to be able to make good use of reading strategies in FL reading. Moreover, the readers did not appear to be inhibited in FL in their use of strategies that focused on global text content.

Texts

If more than one text is to be read in a think-aloud study, for many research purposes it is desirable to match the characteristics of the texts. In my study, I matched the four texts (two Dutch, two English) in terms of text type: they were all argumentative texts. Topics were chosen that were similar but not overlapping (e.g. 'Children should wear school uniforms' (Dutch) and 'Boys and girls should be in separate classes some of the time' (English)). I also matched the texts in terms of the number of arguments and sub-arguments. For example, the Dutch and English texts mentioned above both contained one main argument, one counter argument and one refutation presented in six paragraphs. I also checked that there were no large discrepancies in the level of difficulty of the two texts by examining the mean sentence length, mean word length and the type token ratio. Lastly, I gave the texts to several teachers and educationalists to ascertain whether they felt that the topics and levels of the texts were suitable for the target students.

Elicitation of verbalizations

An important issue in verbal protocol studies is the manner in which verbalizations are elicited. I conducted an informal pilot study to determine the best way of doing this. I gave the two Dutch texts to be used in the study to a few students of the same age and grade as the students who would participate in the study. For one of the texts, students did not receive any prompting and were free to verbalize spontaneously. For the other text, dots were placed in the text after every five sentences, and students were instructed to think aloud when they reached each dot. It became apparent that prompting influenced the kinds of verbalizations made. Prompted verbalizations frequently consisted of a summary of what had just been read, whereas when readers verbalized spontaneously, they tended to voice the actual strategies they were using to help them understand the text. Therefore, I opted for spontaneous verbalization, but as a compromise I decided that if readers fell silent for more than five sentences they would be prompted verbally by asking 'what are you thinking about?' However, after the data was collected, it turned out that I had to exclude these prompted verbalizations from the data, as, just as with the dots, they nearly always resulted in the readers summarizing part of the text.

Modelling and instruction

It is necessary to provide modelling and instruction in thinking aloud. A pressing issue is weighing up the amount of instruction against any time constraints. In my study, there were considerable time constraints, given that the students could only absent themselves from normal classes for one 40-minute lesson at a time and that they needed to complete two reading tasks in this period. I decided to give each participant 15 minutes of instruction and practice immediately prior to reading the first text. I first modelled the technique myself, using a Dutch text similar to the texts in the study and then asked the participant to use the same text to practise thinking aloud. The same verbalizations were modelled for all participants, and the model provided examples of different kinds of reading strategies. The participants were instructed to read the texts aloud and to voice their thoughts consistently. They were told that they were free to voice their thoughts in Dutch or English. They were also told that the text did not have to be read in a linear fashion: they could reread or omit any part of the text.

Coding

Developing a workable coding scheme is a central issue in the analysis phase of any protocol study. Traditionally, the first step in doing this has

been to make a word-for-word transcription of the protocol recordings. However, I was lucky to be able to skip this very time-consuming step by using a computer program called Observer 3.0 to code the protocols (Noldus Information Technology 1998). To develop my coding scheme – and thereafter code the data – I listened to the protocol recordings, stopped them at each point where a strategy ended, and typed codes into a format that I had set up in the computer program.

It is important to be able to demonstrate that the coding scheme that is developed is reliable, that is, that it can be used by different people in a consistent way. Thus, it is necessary to have all or part of the data coded by more than one coder and to use a statistical measure, such as Cohen's kappa, to calculate the inter-rater reliability. In my study, a research assistant and I independently encoded a quarter of the data. For a formula for determining how much of the data in a particular study needs to be coded by more than one coder, see Siegel and Castellan (1988).

Obtaining an acceptable level of reliability can be surprisingly difficult. I learnt from experience the importance of having a coding scheme that is not overly complicated. A balance needs to be struck between, on the one hand, obtaining sufficiently detailed information, and on the other, not making the categories in the coding scheme so finely grained that somebody else cannot distinguish between them. I also learnt that it was important for the coders to have an extended period of working and training together. The research assistant and I practised on protocols that would not be included in the reliability sample, adjusting categories in the coding scheme and discussing issues that arose as we went along. Discussing the coding scheme and practising coding turned out to be an invaluable step in developing a coding scheme that could be used reliably.

Resources for further reading

Grabe, W & Stoller, FL 2011, *Teaching and Researching Reading*, 2nd edn, Pearson Routledge, London.

In addition to an overview of L2 reading theory, this book provides an overview of cognitively oriented L2 reading research and a framework for researching reading in the classroom.

Koda, K 2005, *Insights into Second Language Reading; A Cross Linguistic Approach*, Cambridge University Press, Cambridge.

This book deals with the theoretical foundations of L2 reading and provides a detailed overview of components of reading, including relevant research.

Pressley, M & Afflerbach, P 1995, *Verbal Protocols of Reading*, Lawrence Erlbaum, Hillsdale, NJ.

This book provides a thorough overview of verbal protocol techniques, including the results of protocol studies and major methodological concerns.

Hulstijn, J, Schoonen, R & van Gelderen, A 2007, 'Unravelling the componential structure of second language skills', *TESOL Quarterly*, vol. 41, no. 1, pp. 186–192.

This article discusses some methodological features of three quantitative L2 research projects in which the component skills approach is used.

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