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Cognitive and metacognitive aspects of the L2 reading process

Research and teaching perspectives[1]

Dieser Beitrag thematisiert das zweitsprachliche Lesen expositorischer Texte als kognitiven und metakognitiven Prozess. Im Hinblick auf die Lehrperspektive werden ausgewählte Untersuchungen zu den Unterschieden zwischen erst- und zweitsprachlichen Lesern und zwischen mehr und weniger erfolgreichen zweitsprachlichen Lesern zusammengestellt. Zunächst wird dabei ein kurzer Überblick über die kognitiven Prozesse gegeben, die an der Konstruktion eines mentalen Modells und einer propositionalen Textbasis beteiligt sind. Danach werden aktuelle Studien vorgestellt, die entweder das Strategiebewusstsein und den wahrgenommenen L2-Lesestrategieeinsatz fokussieren oder die Steuerung und Kontrolle des L2-Leseprozesses thematisieren. Aus den beschriebenen kognitiven und metakognitiven Prozessen werden jeweils Empfehlungen für den zweitsprachlichen Leseunterricht abgeleitet.

1. Introduction

The second language (L2) reading teacher can benefit from understanding the complex cognitive and metacognitive processes involved in reading expository texts and from exploring the particular challenges that arise for L2 readers as opposed to first language (L1) readers. This knowledge is helpful for diagnosing reading difficulties and for planning cognitive and metacognitive reading strategy instruction. From a teaching perspective, this paper therefore gives a brief overview of the differences between L1 and L2 reading, and links them to concrete teaching suggestions aimed at the various processing levels. Section 2 begins by presenting cognitive perspectives for teaching L2 reading; it is partly based on Schramm (forthcoming). Section 3 turns to a discussion of metacognitive aspects.

2. Cognitive teaching perspectives

2.1 Reading as a cognitive process

Central to cognitive definitions of reading is the concept of meaning construction, which characterizes reading not as a passive way to transfer information, but as an active process to construct individual knowledge. Figure 1 from Schnotz (1994: 214) highlights three important aspects of this active process:

- Readers construct mental models.
- For the construction of their mental models, they use their (linguistic and topic-specific) pre-knowledge.
- For the construction of their mental models, they use a propositional textbase, which they construct in an on-going processing of the visual information of the text surface

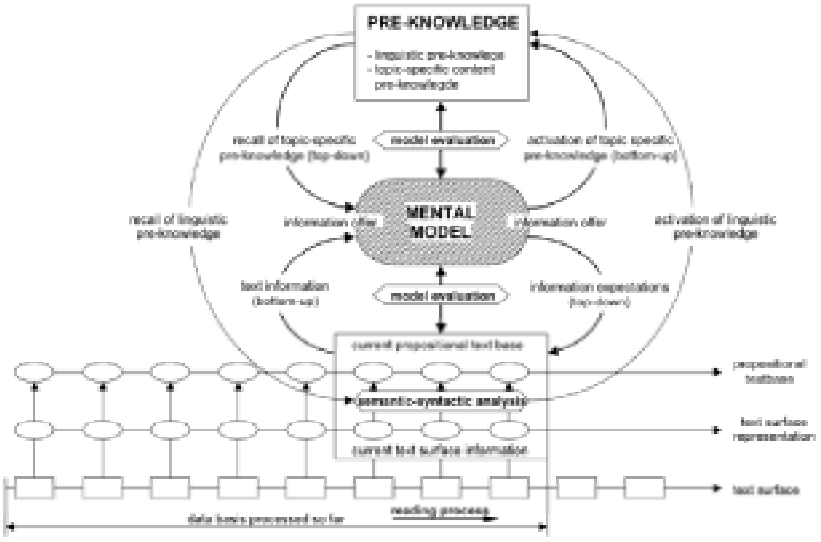


***Figure 1**: Text comprehension as the dynamic construction of a mental model (translated, with permission, from Schnotz 1994: 214)*

2.2. Processes involved in the construction of a mental model

Topic-specific pre-knowledge plays an important role in the construction of a mental model (e.g. Brantmeier, 2005; Nassaji, 2002). The recall of pre-knowledge elements (see figure 1) such as, for example, personal experiences, academic facts, or visualizations, and their integration into the mental model are usually referred to by the term *elaboration*. Like elaborations, *intended inferences* also involve the recall of topic-specific pre-knowledge: readers infer implicit text information on the word, sentence, or discourse level, for example, specific tools used for an action such as eating soup (with a spoon) or eating Chinese noodles (with chop-sticks).

Such recall processes are only possible when readers have activated their relevant pre-knowledge structures on the basis of their constructed mental model (see figure 1). Several early studies (e.g. Hudson, 1988; Roller and Matambo, 1992) found that L2 readers often miss opportunities for the activation of pre-knowledge because of their limited language skills. Finkbeiner's (2005) recent study draws attention to the fact that the availability of such pre-knowledge depends on the reader's interests. According to her analysis, reading interests influence deep-level processing in an indirect way; they provide the activated pre-knowledge that allows for the strategy of personal elaboration with its enormous impact on deep-level comprehension (cf. also Finkbeiner's article in this edition).

Two further processes are involved in the construction of a mental model. The information expectations (see figure 1) concerning incoming text-information are helpful in the construction of a propositional textbase (see section 2.3); they are often referred to as anticipations, hypotheses, or predictions. Secondly, figure 1 shows that readers integrate text information from the propositional textbase into the mental model.

Several comparison studies of L1 and L2 reading strategies indicate that L2 readers focus more on language processing and less on the construction of a mental model than L1 readers (Davis and Bistodeau, 1993; Stevenson, Schoonen and de Glopper, 2003; Young and Oxford, 1997). Another difference between L1 and L2 readers is that L2 readers often do not possess as much target-culture-specific pre-knowledge and therefore cannot elaborate, infer, and anticipate as many knowledge elements (e.g. Steffensen and Joag-Dev, 1992).

Comparisons between more and less successful L2 readers have often relied on think-aloud data. For example, Chamot and El-Dinary (1999) investigated young readers' strategy use in immersion classrooms and found that high-rated students employ a higher percentage of background-knowledge strategies such as inferences, predictions, and elaborations than low-rated students who used a higher percentage of phonetic decoding. Block (1986) studied L1 and L2 readers with low reading abilities at the tertiary level and distinguished two modes of response: a more affective, personal approach to the text that was characteristic of less successful readers (*reflexive mode*) and a more matter-of-fact, objective approach that was characteristic of more successful readers (*extensive mode*). Similarly, Schramm (2001) distinguished *integrative elaborations* that serve the reading goal and *associative elaborations* that successful academic L2 readers make, but dismiss into mental distance because these knowledge elements do not serve their reading goals. These findings indicate that it is not the use of pre-knowledge in general, but the particular functions and orchestrated ways of using pre-knowledge that are characteristic of successful L2 reading.

These are some related suggestions widely made for L2 reading instruction to consider with your particular students in mind:

- Let students choose their reading texts on an individual basis according to their pre-knowledge and in-



Jacques Villon, La lecture sur l'herbe.

terests; they should read several texts on one (or similar) topic(s) so that they can use their activated and previously acquired topic-specific pre-knowledge.
- Students should establish an authentic reading goal and do pre-reading exercises that help them activate and/or build pre-knowledge (e.g. semantic maps, pictures, slides, presentations, movies, discussions, field trips, etc.).
- Students should preview the text (esp. titles, subtitles, illustrations, figures, and/or tables) and form hypotheses about its content (on the basis of identified clues); during reading, they confirm or revise their hypotheses and form new hypotheses (on the basis of identified clues).

As previously mentioned, the successful construction of a propositional textbase plays a major role in and interacts with the construction of a mental model. The next section will therefore briefly look at the different interactive processing levels involved in the construction of a propositional textbase.

2.3 Processes involved in the construction of a propositional textbase

The pre-lexical and lexical level: The readers' eyes jump in so-called saccades from one fixation point to the next in order to bring new information into the foveal area of the retina. The resulting iconic representations of alphabetic scripts are analyzed into graphemes by pattern recognition mechanisms. For such an analysis, an L2 reader needs grapheme knowledge of the distinctive features of letters and of the combination of letters into graphemes as well as orthographic knowledge about the probability of letter combinations. At this level, a new writing system, a new writing direction, lesser orthographic knowledge of the L2, and possibly orthographic interference from the L1 present processing challenges to the L2 reader as compared to the L1 reader (see Akamatsu, 2003; Berkemeier, 1997; Nassaji, 2003).

Furthermore, L2 word recognition – be it on the basis of the activated phonological code or on the basis of the visual code – is problematic compared to L1 reading if the word is either not represented in the learner's mental lexicon or if its access is slower or less automated than that of an L1 reader. Qian's (2002) study underlines the importance not only of vocabulary breadth, but also of vocabulary depth (measured by word meanings and collocations) for reading comprehension. Interestingly, Fukkink, Hulstijn and Simis (2005) did not find that acceleration of lexical access by instruction in L2 word recognition skills transferred to reading speed or higher-order text comprehension, suggesting that such instruction may not be beneficial. Fukkink and de Glopper's (1998) meta-analysis of instructional studies on deriving word meaning from context shows this approach to be more effective than others to lexical problems.

In order to meet L2 reading challenges at the pre-lexical and lexical level, teaching recommendations have included suggestions such as these:
- Students practice the use of phonological and orthographic processing strategies.
- While reading texts that do not contain more than 1-3 unknown words per 100 words, students work at increasing their sight vocabulary[2] and their reading speed (e.g. by timed and paced readings).
- Students practice the use of strategies to deal with unknown words (e.g. inferring from the context, analyzing into morphological components, ignoring, and effectively using a dictionary).

The semantic-syntactical and intersentential level: Sentence-parsing on the basis of a comparably limited learner grammar is another challenge for the L2 reader. Furthermore, Koda (1993, 1994) found that L2 readers tended to use syntactic strategies that are based on the morpho-syntactical characteristics of their L1. For example, a reader with the L1 English will usually transfer the strategy of paying attention to word order even when reading in an L2 with a rather flexible word order like Korean, which native readers process without paying attention to word order (also see Karcher, 1994; Koda, 2005). Beyond the clause and sentence level, readers need to establish local coherence on the basis of connectors and co-reference (e.g. Chung, 2000; Ozono and Ito, 2003). These are examples of teaching recommendations at the semantic-syntactical level:
- Students receive explicit receptive grammar instruction (e.g. how to go about analyzing sentence structure in a specific L2).
- Students highlight relevant morpho-syntactical clues for syntactic processing.
- Students analyze topic-comment structures, co-reference, or conceptual coherence such as causality, sequence, illustration, comparison, problem solution (e.g. using different colors or symbols for aspects like cause, effect, etc.).

The paragraph and text level: It is often more difficult for L2 than L1 readers to reduce and organize text information in order to establish global coherence; they consequently have more trouble answering comprehension questions at this deeper processing level than factual questions at the surface level of the text (e.g. Oded and Walters, 2001). L2 reading research has also established that L2 texts based on L1 rhetorical conventions lead to better comprehension and recall (e.g. Chu, Swaffar and Charney, 2002), suggesting that L2 readers need to build their knowledge about culture-specific

text forms in order to be able to make top-down use of it in their L2 reading. Therefore, teaching recommendations such as the following have been widely followed in L2 reading instruction:

- Students gain insights into text organization by sorting scrambled paragraphs and discussing the respective linguistic clues (e.g. announcements, transitional sentences) as well as by comparing L2 texts to corresponding L1 text forms.
- During reading, students pay special attention to advance organizers, previews, summaries, notes in the margin, and graphics; they identify topic and paragraph sentences, and they write notes or paragraph headlines in the margin.
- After reading, students produce visualizations of the text organization or excerpts.

This section has looked at cognitive processes and teaching perspectives, but metacognitive processes are equally important for successful L2 reading. Therefore section 3 reviews some of the more recent findings on metacognition in L2 reading.

3. Metacognitive teaching perspectives

3.1 Reading as a metacognitive process

The term metacognition refers to declarative knowledge about cognition as well as to procedural knowledge that regulates and controls cognition. Both aspects are of great interest from a teaching perspective: Are L2 readers aware of their strategies and does new strategy knowledge help them become better L2 readers? We will address these questions in section 3.2, then ask the following question in section 3.3: How do L2 readers regulate and control their L2 reading process and can instruction help them to be more efficient at these executive processes?

3.2 Stategy awareness and reported strategy use

Studies on the declarative aspect of metacognition in L2 reading have typically used questionnaires or interviews and found that perceived strategy use correlates positively with L2 reading comprehension. In a study involving 685 Dutch EFL readers in grades 6 (about 12 years of age), grade 8 (about 14 years) and grade 10 (about 16 years), Schoonen, Hulstijn, and Bossers (1998) documented that metacognitive knowledge – even though it had not been taught – played a significant role in L2 reading comprehension of students in grades 8 and 10; they suggested that students in grade 6 with lesser metacognitive knowledge might profit from instruction in this type of knowledge. Sheorey and Mokhtari (2001) reported significant differences between high- and low-reading ability L2 students in the United States concerning their cognitive and metacognitive as well as their overall perceived strategy use frequency. Similarly, Dreyer and Nel (2003) found that South-African at-risk students, compared to their more successful peers, lacked knowledge of metacognitive strategies, especially for monitoring and evaluating comprehension. Finkbeiner's (2005) analysis shows awareness of strategies for self-regulated learning to play an important role for deep-level processing as well. Taken together, these studies strongly suggest that strategy knowledge and strategy awareness play a crucial role in L2 reading.

When Sheory and Mokhtari (2001) compared L2 readers to L1 readers of English, they found that the difference in perceived strategy use between high- and low-ability L2 readers was comparable to the corresponding difference between high- and low-ability readers of English as L1. Mokhtari and Reichard (2004) even documented similar patterns of strategy awareness and reported usage among U.S. American L1 and Moroccan L2 readers of English college-level material who had comparable reading abilities, but had been schooled in two cultures that differed greatly. These two studies suggest that L2 readers' strategy awareness and reported strategy use are more closely related to a general reading proficiency than to learner language variables and socio-cultural factors.

Recommendations widely made in the fields of language learning strategy research and reading strategy research have included the following:

- In order to increase L2 reading strategy awareness, encourage self-observation and self-reports such as think-alouds, retrospective oral or written reports; also use inventories of reading strategies to assess perceived strategy use.
- Initiate reading strategy knowledge exchange between students, for example through (real or virtual) strategy bulletin boards, learner group discussions, and cooperative reading.
- Encourage students to interview more experienced L2 readers or to make use of counseling sessions with professional L2 reading advisors in order to learn about new L2 reading strategies.

3.3 Regulation and control of L2 reading

Regulation and control of L2 reading are often referred to by the term metacognitive strategies. According to Kluwe and Schiebler (1984), regulation – or organizing – includes the regulation of capacity, intensity, object, and speed. Control – or comprehension monitoring – is characterized not only by the often mentioned metacognitive strategies of evaluation and planning; the identification (of what the learner is doing, or has just done) and analysis (of the reader how he or she is doing it) play just an important role even though they are

rarely mentioned in the research literature on L2 reading.

Investigations of the regulation and control of L2 reading typically rely on think-aloud data. Block (1992) analyzed different phases of comprehension monitoring of L1 and L2 readers. She distinguished an evaluation phase (recognize problem, identify source), an action phase (plan, act), and a checking phase (check solution, revise solution). Schramm (2001), who studied more complex cases of non-understanding than Block, documented that L2 readers tended to employ a recursive rather than a linear mental pattern. Her participants often engaged in several rounds of evaluating non-comprehension, searching for and finding a potentially helpful element and trying to use that element to transform non-understanding into understanding before they actually succeeded.[3] Schramm also found that less successful readers relied more strongly on so-called pre-knowledge-driven repair strategies (i.e. they tended to elaborate pre-knowledge elements in order to solve their comprehension problems) whereas more successful readers' repair strategies were typically text-driven (i.e. these readers sought potentially helpful elements for revising or expanding their mental models in the text rather than in their pre-knowledge). Stevenson, Schoonen and de Glopper's (2003) think-aloud study on readers of L1 Dutch and L2 English supported earlier findings that L2 readers are able to make full use of their metacognitive strategies in L2 reading.

These are some of the empirically based teaching recommendations to increase efficient regulation and control of L2 reading:

- It is advantageous to not teach strategies separately, but to integrate L2 reading strategy instruction into content-oriented L2 reading in order to make the strategies' functionality apparent to students.
- Encourage and support your students to evaluate, individually change or elaborate, and consciously transfer new L2 reading strategies.
- Make use of cooperative and/or self-controlled models of reading strategy instruction such as The Reciprocal Teaching Approach, Transactional Strategy Instruction, and the Cognitive Academic Language Learning Approach (for a review, see Allen 2003).



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4. Conclusion

This brief overview of L2 reading as a cognitive and metacognitive process has focused on differences between L1 and L2 readers as well as between more and less successful L2 readers. It has outlined teaching perspectives for the various interactive processing levels. First of all, suggestions were made for the activation and use of pre-knowledge; these can be considered as characteristic for L2 reading instruction research in the eighties and early nineties. Furthermore, we focused on teaching suggestions that build on cross-linguistic insights into L2 reading. Such studies have explored the influence of strategies, which readers have developed in order to process their L1 with its particular linguistic characteristics, on the reading process in an L2 with different characteristics that might require other processing strategies. Finally, we turned to recommendations that are based on our increasing understanding of the role that metacognition plays in L2 reading. These two fields of cross-linguistic and metacognitive inquiry have been in the center of attention of L2 reading research in the past decade.

Footnotes

[1] I would like to thank Birgit Beile-Meister for native speaker editing of an earlier version of this paper.

[2] The term sight vocabulary refers to words which an individual reader immediately recognizes as a whole without having to rely on a phonological and orthographic processing of its parts.

[3] The mental pattern employed by L2 readers in Schramm's (2001) study is the pattern of cognitive-operative reasoning, which Ehlich and Rehbein (1986: 122) deduct from the interactional pattern of 'giving reasons'. Kameyama

(2004) also found this pattern to be employed in social comprehension-securing action; this suggests a close connection between interactional repair in conversation and mental repair in reading.

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