FRAMEWORK FOR DIAGNOSTIC ASSESSMENT OF READING

Edited by
Benő Csapó • Valéria Csépe

Framework for Diagnostic Assessment of Reading

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Reading is thinking and writing is speech

Mihály Babits

Contents

Introduction

The motto chosen for the volume presenting the frameworks for the diagnostic assessment of reading is a quote from the Hungarian poet Mihály Babits: "Reading is thinking and writing is speech." If we think about the truth of this statement, it will not take long to recognise the self-evident dependence of the course of learning to read and write on these two areas of cognition, and the complexity of the development of the skills of written text comprehension and reading-based knowledge acquisition. It is hardly necessary to argue that the proper development of reading and text comprehension skills cannot be assessed without a thorough understanding of these relationships and of their evolution. While teachers' experiences of reading literacy can help us to obtain a rough estimation of the development of reading skills, there will always remain subjective factors bearing on the accuracy of the estimate.

In our modern world, the methods used by schoolteachers in reading instruction, the teaching of text comprehension and the fostering of knowledge extraction skills should be based on empirical evidence gathered through reliable measurement tools and analysed using well-established methods. Some of the problems related to reading literacy can be resolved by a skilled teacher since only a small proportion of the children underperforming in these areas have special educational needs. Subjective estimations are, however, an inadequate basis for educational activities addressing the roots of the problem since students' level of development and, therefore, the outcomes of an intervention strategy cannot be accurately assessed in the absence of the right measurement tools.

Over the past decade, research efforts have intensified and produced results that – if integrated and transferred into practice – may bring about a major improvement in the efficiency of public education. The programme providing the framework for the present volume occupies the intersection of three major research trends. First, various international surveys have given a great impetus to the development of educational assessment and testing. Second, recent research results in education science and psychology have led to an increasingly refined understanding of the concept of knowledge, which allows more precise definitions of what should be measured at different stages of development. Third, the

availability of info-communication technologies allows measurements to be performed in the way and with the frequency required by public education.

The key to progress in an education system is the availability of efficient feedback mechanisms at the various levels of that system. Such mechanisms can be created through measurements providing objective data on various aspects of performance at each level of the system. These measurements allow us to ascertain whether the education programme is successful in meeting its targets, or whether a given intervention strategy has achieved the desired results. Three main levels of feedback mechanisms have emerged. Large-scale international surveys have become regular events since the turn of the millennium. Hungary participates in international surveys (PISA, TIMSS, PIRLS) that provide data, allowing the performance of the Hungarian education system to be evaluated in the context of other countries' results. The data and the results of their analyses can be used to draw conclusions with regard to ways of introducing system-wide changes improving education efficiency. The results of the recurring cycles of the surveys also provide feedback on the effects of any interventions. The international assessment programmes are designed and implemented with the contribution of the top research and development centres in the world. The various solutions of measurement methodology developed at these centres have also contributed to the development of national assessment systems.

Several countries, including Hungary, have introduced a system of annual assessment covering all students in selected grades of schooling. These surveys provide detailed feedback to individual schools on the performance of their own students and, based on an analysis of the results, schools may improve internal processes and the efficiency of their activities. The results are also made public, which may act as an incentive to seek ways of improvement and development. The experiences of countries where a system of this sort has been in place for a relatively long time show, however, that placing pressure on schools has the effect of improved efficiency only within certain limits. If the stakes associated with the evaluation are too high for either the teachers or the schools, various distortions may result. Further improvement in efficiency can only be achieved by propagating methods and tools directly assisting the work of teachers. These include measurement tools that enable teachers

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to obtain a precise assessment of students' level of development in areas of key importance with respect to their further progress.

Traditional paper and pencil tests were, however, very costly and labour-intensive and were therefore unsuitable for performing sufficiently frequent assessments. The second important recent development is thus the explosive advancement of information and communication technologies, which offer novel solutions in every area of life, including educational measurement. Thanks to these technologies, tasks that used to be beyond solution have now become simple to implement in education also. One of these is educational assessment providing frequent diagnostic feedback. Computers were put to the service of education effectively as soon as the first large electronic computers appeared; educational computer software has been around for decades. The use of information technology in education was, however, often motivated by the technology itself, i.e., the reasoning was that now that these tools were available, it made sense to use them in education. The development of online diagnostic assessment approaches the question from the opposite direction: An appropriate technology is sought as a solution to the problem of implementing a task of key significance in education. Paper and pencil tests are unsuitable for frequent and detailed assessments of student progress. From this perspective, info-communication technology is a tool that has no substitute in expanding the range of possibilities for educational assessment.

The third development, one which is closest to the concerns of this volume, is the cognitive revolution in psychology, which affected several areas towards the end of the last century and gave a new impetus to research efforts in connection with school learning and teaching. It has led to the emergence of new and more differentiated conceptions of knowledge allowing a more precise definition of the goals of public education and the development of scientifically based standards and goals. This process has also opened the way to a more detailed characterisation of student development processes.

As the crucial role of early childhood development was recognised, the focus of attention shifted to the first stage of schooling, especially to the encouragement of language development and the fostering of reasoning skills. Several studies have provided evidence that the acquisition of basic skills is indispensable for in-depth understanding of the subject matter taught in schools, which is in turn essential for students to be able

to apply their knowledge in new contexts rather than just reproduce exactly what they have been taught. If the necessary foundations are not constructed, serious difficulties will arise at later stages of study and the failures suffered during the first years of school will delimit students' attitudes towards education for the rest of their lives.

Reading plays a special role in learning in the sense that an adequate level of reading skills can be reasonably regarded as a prerequisite to all further learning. In the absence of confident comprehension of written texts, students cannot penetrate deeper levels of mathematics or follow and process science writings. Poor reading comprehension skills can also hamper performance in tests assessing other knowledge domains, i.e., reading difficulties may distort the validity of test results. It clearly follows from the above considerations that reading must be given special attention in education and, accordingly, special emphasis must be placed on the diagnostic assessment of students' progress in reading and text comprehension.

The developmental processes discussed above have provided the basis for the project entitled Developing Diagnostic Assessment launched by the Centre for Research on Learning and Instruction at the University of Szeged. The project focuses on the development of detailed frameworks for diagnostic assessments in three major domains – reading, mathematics and science – in the first six grades of school. Relying on the frameworks, item banks are developed containing several thousand items and tasks which will be accessible to students on the Internet through an online computer platform. The system – the implementation of which is a lengthy process involving several hierarchically organised steps – will fulfil the function of providing frequent individual student-level feedback on changes in various dimensions of knowledge.

The diagnostic tests are primarily designed to assess individual students' progress relative to various reference points. Similarly to system-wide surveys, the programme allows the population means to act as natural standards of comparison: Being able to compare an individual's performance to the performance of their peers can provide important information. The diagnostic tests should, however, go beyond that: They should follow student progress over time, i.e., compare an individual student's performance at a given point in time with the results of previous measurements.

The tools of measurement are based on content frameworks resting on scientific foundations, which are outlined in three volumes of parallel structure. The present volume discusses the outcomes of our work on the domain of reading while the two companion volumes contain the results of our work in the domains of mathematics and science. The development work for the three domains proceeded in parallel and the same broad theoretical framework and conceptual system were used for the development of the detailed contents of their assessment. Besides having an identical structure, the three volumes also contain some identical sections in their Introduction and in Chapter 4.

The work reported in this volume draws on the experiences of several decades of research on educational assessment at the University of Szeged and on the achievements of the University of Szeged and Hungarian Academy of Sciences' Research Group on the Development of Competencies, with special reference (a) to the results of studies related to the structure and organisation of knowledge, educational evaluation, measurement theory, conceptual development, the development of reasoning skills, problem-solving and the assessment of school readiness, and (b) to the technologies developed for test item writing and test development. The construction of theoretical foundations for diagnostic assessments is, however, a complex task requiring extensive collaborative effort in the scientific community. Accordingly, the development of the frameworks has been a local and international co-operative enterprise involving researchers in the fields that are to be assessed. The opening theoretical chapters of each volume have been prepared with the contribution of a prominent specialist in the relevant field; thus our work rests upon scientific knowledge on the cutting edge of international research. The details of the frameworks have been developed by researchers and teachers and other professionals with practical experience in curriculum development and test construction.

The frameworks are based on a three-dimensional conception of knowledge in line with a tradition characterising the entire history of organized education. The wish to educate the intellect, to cultivate thinking and general cognitive abilities is an ambition that dates back to the beginnings of organised education. Modern public education also sets several goals applying to the learners themselves as individuals. In order to attain these objectives we must first of all be guided by the achieve-

ments of scientific fields concerned with the human being and the developing child. The precise definition of these goals and the selection of the contents of assessment can draw on the results of developmental psychology, the psychology of learning and, more recently, on the achievements of cognitive neuroscience.

Another area of educational goals is related to the usability of school knowledge: The dictum "Non scholae sed vitae discimus." is perhaps more topical today than ever before, since our modern social environment is changing far too rapidly for public education to be able to keep pace with it. It is therefore essential that the question of the application of knowledge should appear as an independent dimension in the frameworks of diagnostic assessments. This constitutes a different system of goals, for which we must define what the school is expected to do to enable students to comprehend the texts they encounter during their studies and in various situations in their everyday lives. The role of reading is very different now from what it used to be, as the processing of different types of text is now part of daily life. It is no longer sufficient to teach students to read literature and other types of continuous prose; they must also be able to efficiently process, critically evaluate and use information represented in various forms, such as texts, diagrams and tables. In addition to linearly arranged texts printed on paper, students also need to be able to extract as much information as possible from electronic sources of information.

The third important issue is the question of which elements of the knowledge accumulated by the sciences and the arts should be selected as contents to be imparted at school. It is important not only because the above objectives cannot be attained without content knowledge but also because it is an important goal in its own right that students should become familiar with a given domain of culture, the knowledge generated by mathematics and science and organized according to the internal values of a given discipline. The school system organises the attainable knowledge into a curriculum and a syllabus, and teaching always proceeds via the study of specific contents. While the contents of teaching may serve distant goals reaching beyond the texts themselves, it is far from being immaterial what texts – what contents – are used to develop the skill of meaningful reading.

The above goals have been competing with each other over the past few decades with one or another coming into fashion at different times.

For the purposes of the present project we assume that education integrates the three main goals in fulfilling its function but that diagnostic assessments must differentiate among them. Diagnostic assessments must be able to show if there is insufficient progress in one or another of these dimensions.

The first three chapters of this volume summarise the theoretical background and research evidence related to the three dimensions mentioned above. In Chapter 1, Leo Blomert and Valéria Csépe discuss the psychological aspects of the issues in the teaching and assessment of reading literacy. An overview of research in cognitive neuroscience bearing on teaching and assessment is given and the latest results of interdisciplinary research on reading are analysed. Chapter 2 by Wolfgang Schnotz and Edit Katalin Molnár looks at the issue of application focusing on external requirements related to reading skills. The significance of this consideration has previously been highlighted by the PISA surveys and it has also become one of the most emphatic questions of the various Hungarian reading assessment programmes. In Chapter 3, Krisztián Józsa and János Steklács discuss the contents and curricular targets of the instruction and learning of reading skills and draw some conclusions with reference to assessments. All three chapters draw on a rich body of literature and the detailed bibliographies including up-to-date references at the time of compiling can assist future development work. Chapter 4 by Benő Csapó, Krisztián Józsa, János Steklács, Ágnes Hódi and Csaba Csíkos addresses theoretical issues in the development of frameworks, describes the special needs of diagnostic assessments and draws some conclusions pertinent to the detailed frameworks presented in the following chapter and to the practical component of the work.

Chapter 5, the longest chapter of the volume, contains the detailed frameworks of diagnostic assessment. The purpose of this chapter is to define the contents of measurement and to provide a basis for the development of measurement tools and test questions. For the purposes of diagnostic assessment, the first six grades of schooling are considered to constitute a continuous education process. The results of the assessments therefore place students according to their current level of development along uniform scales spanning all six grades. The content specifications of assessment questions could also essentially form a single continuous unit. However, in an effort to allow greater transparency and to follow

the traditions of educational standards, this process has been divided into three stages, each of which covers approximately two years. For the three dimensions, therefore, nine content blocks are described altogether.

In their present state, the frameworks detailed in this volume should be seen as the first step in a long-term development process. We have defined the direction that appears to be the best to take given the present state of our knowledge. As the domains covered develop at a very rapid rate, however, the latest findings of science should be incorporated from time to time. The content specifications can be constantly updated on the basis of our experiences of item bank development and an analysis of the data provided by the diagnostic programme in the future. Our theoretical models can also be revised in the light of empirical evidence through an evaluation of the test questions and an analysis of relationships emerging from the data. In a few years' time we will be in a position to look at the relationship between the various areas of early development and later performance.

We are indebted to so many of our colleagues for sharing their professional contributions and expertise in this volume. We owe a special acknowledgement to Krisztián Józsa, János Steklács, Ágnes Hódi and Csaba Csíkos for their valuable work in completing the detailed framework. Besides the authors of the chapters, several colleagues have assisted in the work and their contribution is gratefully acknowledged. Special thanks are due to the team responsible for the organisation and management of the project: Katalin Molnár, Judit Kléner and Diána Túri. The development and final presentation of the contents of the volume have benefited greatly from the comments of our reviewers. We would like to take this opportunity to thank Zsuzsanna Horváth, Marianne Nikolov and Dénes Tóth for their valuable comments and constructive suggestions.

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Psychological Foundations of Reading Acquisition and Assessment

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Cognitive Reading Development

Spoken language probably emerged some 100,000 years ago as a consequence of the evolution of the brain and as a function of a critical repositioning of the larynx, which from then on, in principle, enabled the articulation of speech as we know it (Liberman, 1996). Written language however is a relatively recent cultural invention which came into existence some 5,000 years ago (Rayner & Pollatsek, 1989), but remained the privilege of only a very small proportion of the human world population until a few hundred years ago. Our brains are therefore probably not prepared, through evolution, for learning to read and spell. Despite this gap between biological and cultural evolutions, there is emerging evidence that the learning of written language takes advantage of the existing neural mechanisms for spoken language (e.g., Van Atteveldt et al., 2004) even to the point that learning a script permanently changes the speech sound system in our brains (Castro-Caldas, Petersson, Reis, Stone-Elander, Ingvar, 1998; Dehaene, Pegado, Braga et al., 2010). Since our brains are not naturally inclined to learn a script, the biggest surprise is probably that almost 90% of all children learning alphabetic as well as

non-alphabetic scripts learn to read and write fluently without obvious problems. This amazing fact may only be possible because we might be recycling older evolutionary mechanisms for new purposes, such as reading and writing.

Two other noteworthy phenomena accompany the learning of a script; first, we need to be trained explicitly over longer periods of time before we start to show some reading fluency and second, there is a relatively small but consistent group of children who do not seem to be able to adequately master the basics of an alphabetic script. Since participation in our modern technology-based society without fluent reading and writing skills may be considered a serious disability potentially leading to drop-out at school, to problems attaining and retaining a job, and consequently to economic disadvantages and emotional distress, it is therefore essential to understand how reading skills emerge, and why some people show persistent difficulties acquiring written language skills despite adequate education, sufficient intelligence and normal sensory functioning (i.e., developmental dyslexia). Let us now return to the other salient characteristic of learning a script, mentioned above, i.e., the fact that we need explicit instruction over longer periods of time. This stands in strong opposition to what we know from the workings of a more or less fluent reading system: often only one exposure to a new word is sufficient to form an orthographic representation of it (Reitsma, 1983). So we have to ask ourselves what is so peculiar about the beginnings of reading and writing. One phenomenon immediately jumps to our attention; letters, or rather graphemes, represent speech sounds, although they do not share any feature with these sounds. In other words, the very basis of our alphabetic script is a relatively small set of letter-speech sound associations that consist of completely unrelated elements outside the script context. Learning natural associations, like the fact that dogs bark, seems to present a much easier, but also different learning problem from learning arbitrary associations between letters and speech sounds, which then form the basis for an infinite number of combinations of such associations, i.e., words. Natural learning is certainly different in the sense that we do not send our children to school because they need explicit instructions on how to associate natural phenomena in their environment. New, culturally-invented skills such as literacy and numeracy may be of a different quality from the mostly implicit learning skills we apply every

minute of our waking existence in interaction with our environment. Recently, the insight into this special nature of learning cultural inventions has gained ground in the scientific community, leading to the new field of educational neuroscience (e.g., Varma, McCandliss, & Schwartz, 2008; Ansari & Coch, 2006).

In the first part of this chapter the cognitive mechanisms contributing to the when and how of the development of fluent and effortless reading and spelling skills will be discussed. To this end it is necessary to grasp the basic principles on which reading and spelling are built. Although some orthographies, e.g., Chinese, use symbols to represent syllables and/or complete words (logographic scripts), most modern orthographies use alphabetic scripts, in which individual speech sounds (phonemes) are represented by written symbols (graphemes). Each orthography consists of a limited number of these letter-speech sound units, which can be combined to create an infinite amount of words (Perfetti & Marron, 1998). The first crucial step when learning to read an alphabetic script consists thus of a basic understanding of how to map symbols onto speech sounds; each grapheme (letter or letter cluster) of a written word has to be decoded into its corresponding phoneme (for review see Ehri, 2005). This phonological decoding process takes much time and effort for beginners. To achieve the high degree of automation which is the key characteristic of fluent skilled reading, complete words and morphemes have to be linked directly to their phonological and semantic counterparts (Perfetti, 1985). Thus, the development of fluent reading involves a developmental shift from laborious phonological decoding to the automatic recognition of whole word forms.

To explain this developmental shift in reading strategies, stage-like theories of learning to read assume that children move through a sequence of stages (Ehri, 1995; Frith, 1985; Marsh, Friedman, Welsh, & Desberg, 1981). For instance, Frith (1985) defines three stages: a logographic stage, in which words are recognized based on visual cues; an alphabetic stage, in which grapheme-phoneme rules are used to decode words and non-words, and an orthographic stage, in which words are recognized as an entity. Linnea Ehri (1995; 2005) preferred the term phases instead of stages because this allows the boundaries between stages to be fuzzier. She proposed four phases: (1) a pre-alphabetic phase, in which children only recognize some words based on visual

cues, (2) a partial alphabetic phase in which children know some letter-speech sound correspondences and may recognize words partially by phonetic cues and partially by contextual guessing, (3) a full alphabetic phase, when children's knowledge of the alphabetic principle is complete and they are able to decipher new words, and (4) a consolidated alphabetic phase, in which full connections are formed between morphographic units (e.g., words, morphemes, onsets) and their phonological and semantic counterparts. What these theories have in common is that they assume that children move from one phase/stage to a succeeding stage, and in each stage one reading strategy dominates.

In contrast to these stage-like models, Share (1999; 2008) proposed a more transitional, item-based perspective. According to the "self-teaching" model of Share (Jorm & Share, 1983; Share, 1995) the development of efficient automatic word recognition skills crucially depends on the successful phonological recoding of words. Consequently, the question of whether a child uses phonological decoding or automatic word recognition to read a word does not so much depend on the stage a child is in, but more on whether an item is familiar or not. Every time a word is successfully decoded, an opportunity is provided to build up a word-specific orthographic representation (Ehri & Saltmarsh, 1995; Reitsma, 1983), so that with increasing reading experience, a growing number of words will transit from unfamiliar to familiar. Since children are more often exposed to words that have a high frequency of occurrence, this transition probably happens earlier in time for high-frequency than for low-frequency words. Skilled readers will probably recognize most relatively frequent words by sight, but rare and new words will still require phonological decoding. Thus, rather than interpreting reading development as moving from a phonological stage to an 'orthographic' stage (e.g., Frith, 1985), reading development is now conceptualized as a dynamic process in a continuous 'unfamiliar-to familiar/beginner-to-expert' framework (Share, 2008, p. 592), which might well form the tapestry that guides us through the amazing palace of cognitive reading development.

Identifying Cognitive Contributions to Reading

The review of Ziegler and Goswami (2005) links three basic cognitive skills to reading, i.e., phonological awareness, letter knowledge and speeded naming of visual items.

Phonological Processing

One of the most important and most extensively investigated reading-related cognitive processes is phonological awareness (PA), the ability to recognize, identify and manipulate speech sounds within a word (e.g., Bradley & Bryant, 1983; Goswami & Bryant, 1990). It is assumed that a basic implicit understanding of the segmental structure of spoken speech is necessary to start to learn to read, and children in kindergarten show a certain understanding of the sound structure of spoken speech, even at the sub-word level (Ziegler & Goswami, 2005). However, pre-literate signs of phonemic awareness at the sub-syllabic, and more particularly phonemic level, are scarcely observable (e.g., Liberman, Shankweiler, Fischer, & Carter, 1974), and normal healthy adults who have never learned to read show obvious difficulties when performing phonemic awareness tasks (Morais, Bertelson, Cary, & Alegria, 1986; Morais, Cary, Alegria, & Bertelson, 1979). Thus, the awareness of phonemes, in contrast to the awareness of larger sound units, such as syllables, only seems to emerge after the start of literacy acquisition (Ziegler & Goswami, 2005). Learning to read thus not only builds on the sound structure of words, but also in turn facilitates the understanding of the sound structure of words, resulting in a strong reciprocal relationship between phonological awareness and reading (Perfetti, Beck, Bell, & Hughes, 1987; Wagner & Torgesen, 1987; Wimmer, Landerl, Linortner, & Hummer, 1991). The prominent role of phonological processing in learning to read is further emphasized by the fact that a specific reading disability, i.e., dyslexia, is characterized by well-established phonological awareness deficits (Snowling, 2000). When investigating the cognitive dynamics of reading and spelling development phonological awareness is thus a prime candidate for our attention.

Letter-Speech Sound Processing

Knowing which letter corresponds to which speech sound is the first crucial step in learning to read and spell in alphabetic orthographies

(Ehri, 1998), and successful letter-speech sound decoding forms the basis for subsequent fluent reading skills. Several studies have shown a strong predictive relationship between preschool letter knowledge and reading performance in grade one (Lyytinen et al., 2001; Lyytinen et al., 2004; Pennington & Lefly, 2001; Scarborough, 1990; Wimmer & Hummer, 1990). Yet, the influence of letter-speech sound knowledge on successful reading at later developmental phases is less extensively investigated, probably because it is widely assumed that children know which letter belongs to which sound after only a short period of reading instruction, estimated to vary from a few months (Ziegler & Goswami, 2005) to full mastery within a year in transparent orthographies (Aarnoutse, van Leeuwe, & Verhoeven, 2000), or within two years in an opaque orthography (Hardy, Stennet, & Smythe, 1973).

However, recent brain studies have fundamentally undermined this widely accepted 'truth' by revealing that it takes many years to fully automate and integrate letter-speech sound associations in typical readers (Froyen, Bonte, van Atteveldt, & Blomert, 2009; Froyen, van Atteveldt, Bonte, & Blomert, 2008) and dyslexic readers never seem to learn how to process letter-speech sound associations adequately (Blau, van Atteveldt, Ekkebus, Goebel, & Blomert, 2009; Blau, Reithler, VanAtteveldt, Seitz, Gerretsen, Goebel, R. & Blomert, 2010; Froyen, Willems & Blomert, 2011). This is the more surprising since all subjects in these experiments, dyslexic as well as normal readers, displayed accurate knowledge of the grapheme-phoneme associations in a given orthography from the end of first grade onwards, seemingly confirming the generally held belief. This discrepancy between letter-sound knowledge and the actual automation of these associations reminds us of the distinction that was made earlier between the learning of natural and arbitrary associations, where the latter is in need of explicit instruction. We may infer that knowing that the letter 'a' belongs to the sound /a/ is by no means the same as the efficient use of this knowledge during fluent reading; a declarative memory fact must be transformed into fast and automatic procedures. Together with the fact that abnormal letter-speech sound integration might be a persistent manifestation of poor reading up into adulthood (Blau et al., 2009) these findings ensure that letter-speech sound processing is the second prime candidate for our investigation of the cognitive contributions to fluent reading and spelling development.

Rapid Automatized Naming (RAN)

A third cognitive skill that has frequently been associated with reading skill and reading failure is the fast, automatic naming of well known visual items such as letters, digits, objects and colors (RAN). Several studies have demonstrated RAN (especially alphanumeric RAN) to contribute to reading ability, over and above the influence of phonological awareness (Bowers & Swanson, 1991; Felton & Brown, 1990; Manis, Doi, & Bhadha, 2000; Wolf, 1999). Moreover, many dyslexic readers perform poorly on RAN tasks (for an overview see Wolf, Bowers, & Biddle, 2000). While phonological awareness seems most strongly related to reading tasks requiring phonological decoding, such as pseudo-word reading (Bowers, Sunseth, & Golden, 1999; Cornwall, 1992; Manis, Doi & Bhadha, 2000), RAN is mainly related to tasks that are thought to depend on visual word recognition, such as exception word reading (Bowers & Swanson, 1991; Clarke, Hulme, & Snowling, 2005; Wile & Borowsky, 2004). It must be noted that this last phenomenon is not part of most orthographies and is rather characteristic for English orthography. Although attempts have been made to explain poor dyslexic RAN performance in terms of general cognitive dysfunctions that affect both reading and non-language processes, e.g., general speed (Kail & Hall, 1994) or general timing deficits, (Bowers & Wolf, 1993; Wolf, 1999), most research to date is in line with language-specific interpretations of RAN (see for a review, Savage, 2004). Some researchers have claimed that RAN reflects the retrieval of phonological codes from memory and in that sense should be interpreted as a phonological skill (Vellutino, Fletcher, Snowling, & Scanlon, 2004), whereas still others have claimed that RAN is an index of the ability to store and retrieve visual orthographic patterns (Bowers, Golden, Kennedy, & Young, 1994; Levy, Bourassa, & Horn, 1999; Savage, Pillay, & Melidona, 2008). This lack of theoretical validity for the RAN deficit has shifted the emphasis from a content to a task specific interpretation; i.e., RAN, like reading, requires the fast matching of print and sound, and RAN performance might be interpreted as a manifestation of the ability to match visual/orthographic to phonological information efficiently (Berninger, Abbott, Billingsley, & Nagy, 2001; Bowers & Ishaik, 2003; Vaessen, Gerretsen, & Blomert, 2009; Wimmer, Mayringer, & Landerl, 2000) or as the ability to form arbitrary associations between print and sound (Manis, Seidenberg, & Doi, 1999).

Despite the ongoing discussion about the exact nature of the RAN-reading relationship, RAN is a skill that contributes strongly and uniquely to reading performance of typical and atypical reading children and therefore presents as the third prime candidate to be included in the search for the cognitive development of fluent literacy.

The Role of Cognitive Skills in Reading
and Spelling Development

Now we have identified the core cognitive factors contributing to literacy performance it is time to actually focus on their role in development. The development of fluent reading skills is assumed to involve a gradual shift from slow sequential phonological decoding to fast, automatic word recognition (Ehri, 1995, 2005; Share, 1999, 2008). Since it is expected that fluent reading acquisition involves a shift in reading strategies, one might assume that the relative involvement of the related cognitive processes also shifts during the acquisition of fluent reading skills. That is, cognitive skills contributing to the ability to decode words letter-by-letter might be more important in the beginning stages of reading acquisition, when most written words are still unfamiliar, while cognitive skills associated with the ability to automatically recognize orthographic word patterns might only become relevant at later stages of reading acquisition. The results of several developmental studies in transparent orthographies and some English-language studies indeed suggest that the relation of PA with reading decreases relatively fast, while the influence of RAN presumably remains consistent or increases (e.g., Badian, 2001; Bast & Reitsma, 1998; De Jong & Van der Leij, 1999; Landerl & Wimmer, 2008; Lervåg, Bråten, & Hulme, 2009). However, the reported declining short-lived relationship between PA and reading might also be a (partial) consequence of methodological confounds. First, children learning to read in a transparent orthography often reach high levels of accuracy on phonological tasks after a short time of reading instruction, thereby reducing the statistical power of such tasks (Patel, Snowling, & de Jong, 2004) and consequently attenuating the correlations between PA and reading. Second, the contribution of PA to reading may have been systematically underestimated, because PA traditionally is expressed in accuracy

measures, while reading is always based on speeded measures in transparent orthographies (Georgiou, Parrila, Kirby, & Stephenson, 2008; Share, 2008).

A recent study has shed new light on this issue by investigating the concurrent contributions of RAN and PA to fluent word reading in a large Dutch (N > 1,400) sample from grade one to grade six, using speeded measures for all variables (Vaessen & Blomert, 2010). Furthermore, the reading task used in this study contained three types of words: high-frequency, low-frequency and pseudo-words, providing the possibility to study the cognitive development of fluent word reading in an unfamiliar-to-familiar/beginner-to-expert framework as required for developmental reading studies (see above; Share, 2008). The results revealed that, in contrast to most reports in the literature, both PA and RAN uniquely and substantially contributed to word reading fluency from the first to the sixth grade of primary school. In addition, a gradual change in the contribution of PA and RAN to word, but not pseudo-word, reading fluency was found; PA was most important in beginning readers, while RAN was more important for word reading speed in experienced readers. Furthermore, the shift in relative importance of the predictors of word reading fluency occurred earlier for high-frequency (HF) words than for low-frequency (LF) words; RAN was already the most important predictor of HF word reading fluency in grades 3–4, whereas RAN became the most important predictor of LF words only in grade 5–6.

In contrast to word reading fluency, pseudo-word reading fluency was best predicted by PA in all grades (except in grades 4 and 5 where the contributions of PA and RAN were equally strong). The results of this study indicated that individual differences in PA performance affected reading performance more strongly and for a longer period in time than is generally reported in transparent orthographies (e.g., Landerl and Wimmer, 2008, did not find significant contributions after grade 1, see above). This difference might be attributed to the fact that, in contrast to most previous studies (with the noticeable exception of Patel et al., 2004), in this study only speeded phonological measures were used to examine the role of PA in reading fluency, thereby avoiding confounded data due to incompatible measurement-parameters. Only under these conditions was a clear cognitive shift observable. The shift in the quality of the reading process thus seems to be reflected in a relative and gradu-

al shift in cognitive functions extending over six grades of reading development. While the influence of PA on word reading gradually decreased, and RAN became more important for word reading, it is noteworthy that PA as well as RAN both contributed strongly to pseudo-word reading fluency in all grades. These results do not easily fit a Dual Route framework (Coltheart et al., 2001), but seem to reflect the development of one and the same reading network for all types of words, in which processing load or type of processing may differ depending on the stimulus properties and reading experience.

One of the most important literacy skills, next to reading, is spelling. With spelling, we refer to the ability to apply one's knowledge of phoneme-grapheme mappings, spelling rules, morphological rules or word-specific knowledge in order to correctly produce the spelling of a word. Learning to spell is assumed to be an even bigger challenge than the acquisition of reading skills. While reading 'only' requires the recognition of words or letter-patterns, spelling requires the active production of letters and words. Moreover, most alphabetic languages are more consistent in the script-to-speech sound direction than in the speech sound to script direction, thus there are more phonetically correct ways to spell than to read a word (Bosman & Van Orden, 1997; Ehri, 1997).

Since reading and spelling both require the mapping of speech to script and vice versa, it is likely that these skills at least partly build upon shared cognitive mechanisms. Some researchers have even suggested that reading and spelling are 'two sides of the same coin' (Ehri, 1997, 2000; Perfetti, 1997). However, others have postulated that spelling and reading, even though they will partly rely on common cognitive processes, will additionally build upon unique cognitive skills (e.g., Berninger, Cartwright, Yates, & Swanson, 1994; Nikolopoulos, Goulandris, Hulme, & Snowling, 2006; Shanahan, 1984).

Spelling and reading heavily rely on phonological decoding and recoding skills (Ehri, 1997) during the initial phases of literacy acquisition. In line with this view, several studies show that PA and letter-speech sound (LSS) knowledge predict spelling performance at least as well as they predict reading performance in the initial phases of literacy acquisition (Landerl & Wimmer, 2008; Leppanen, Niemi, Aunola, & Nurmi, 2006; Nikolopoulos et al., 2006; Stage & Wagner, 1992; Strattman & Hodson, 2005; Wimmer & Hummer, 1990).

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However, the impact of these cognitive skills on reading and/or spelling performance might change developmentally. As stated before, theories of reading development assume children increasingly rely on automatic visual word recognition thereby reducing the importance of phonological decoding skills for skilled reading. Similarly, stage-based models of spelling (Ehri, 1992; Frith, 1980; Marsh, Friedman, Welch, & Desberg, 1980) assume that experienced spellers predominantely rely on word-specific knowledge or morphemic knowledge when spelling a word, possibly implying that individual differences in phonological recoding skills have little impact on spelling performance at later stages of spelling acquisition. In contrast, interactive theories of spelling assume that children use a wide range of spelling strategies from early phases of spelling acquisition on and continue to use these strategies adaptively throughout development (Keuning & Verhoeven, 2008; Snowling, 1994; Varnhagen, McCallum, & Burstow, 1997). These interactive models thus imply that such cognitive skills as PA and LSS knowledge, which are important in the beginning phases of spelling acquisition, continue to exert an influence on spelling skills during later phases of spelling development. Some studies found a diminishing relationship between PA and spelling performance (Jongejan, Verhoeven, & Siegel, 2007), but most studies reported a stable influence of PA on spelling performance over years (e.g., Caravolas, Hulme, & Snowling, 2001; Landerl & Wimmer, 2008). To our knowledge, only one study investigated the impact of LSS knowledge on spelling after the first stages of spelling acquisition (Caravolas et al., 2001) and reported that kindergarten letter name and letter sound knowledge predicted spelling performance at least until grade three.

In addition, analyses of spelling errors indicated the use of letter-speech sound strategies in third graders (Waters, Bruck, & Seidenberg, 1985), but also in adults (Perry & Ziegler, 2004), implying that the efficient associations of speech sounds with letters affects spelling performance even in more experienced spellers. Because developmental spelling data are sparse, a recent study examined which cognitive skills are shared and which are unique to spelling and reading in a large sample ranging from grade one to grade six (Vaessen & Blomert, 2012). The results suggest that phonological processing skills and letter-speech sound association skills continue to affect spelling performance in all grades and at least until the end of primary school. Apparently the brain did not de-

velop alternative powerful production processes for spelling analogous to visual word recognition processes for reading (Vaessen & Blomert, 2012). Overall the results support the view that spellers adaptively use a range of spelling strategies (including phonological recoding) throughout development. Moreover, the major common cognitive mechanism mediating the relationship between word reading fluency and spelling skills seems to be phonological processing. In contrast, RAN seems to reflect a cognitive process that is uniquely related to reading speed. Spelling and reading thus only partly rely on common cognitive mechanisms (i.e., phonological processing), and children rely less on these common and more on unique cognitive mechanisms during reading and spelling with growing expertise. The recognition of these orthographic presentations might thus be different from the cognitive mechanisms involved in the reproduction of these orthographic forms.

Orthographic Consistency and Cognitive Reading Development

Alphabetic orthographies strongly differ in the way letters map onto their corresponding speech sounds. In transparent orthographies, each letter corresponds to one phoneme and each phoneme corresponds to one grapheme. The English orthography, on the other hand, has extremely ambiguous letter-speech sound correspondences; the same letter may be pronounced in several ways (e.g., "a" in /cat/, /saw/, /made/, and /car/) and vice versa. Although English orthography was recently labeled an 'outlier' orthography (Share, 2008), there is still a reasonable variability within European orthographies; French and Portuguese are considered relatively opaque, while Hungarian, Finnish and Italian have a very transparent orthography (Borgwaldt, Hellwig, & De Groot, 2005; Seymour, Aro, & Erskine, 2003).

In transparent orthographies, the associations between letters and sounds are easy to learn, and therefore, words can usually be correctly decoded after only a short period of reading instruction. However, when the orthography of a language is bi-directionally ambiguous, the acquisition of the basic principles of reading might take much more time and effort. An EU research project comparing reading acquisition in 14 European countries demonstrated that most children learning to read in a

transparent orthography (e.g., Italian, German, Greek, Spanish, Finnish) reached ceiling levels on word reading accuracy within one year of reading instruction (Seymour et al., 2003). In contrast, reading accuracy levels were lower (around 80% words correct at the end of first grade) in less transparent orthographies (e.g., Portuguese, French, Danish). In English, the most extreme opaque orthography, children read less than 40% of the words correctly at the end of grade one and reading accuracy performance was still not at ceiling even after two years of reading instruction. Comparable effects have been reported in other cross-linguistic comparisons (e.g., Bruck, Genesee, Caravolas, 1997; Frith, Wimmer, & Landerl, 1998; Goswami, Gombert, & De Barrera, 1998; Goswami, Ziegler, & Richardson, 2005).

It has been hypothesized that the orthographic consistency of a language not only influences the rate at which reading develops but also fundamentally affects the cognitive organization of the reading system. For instance, the orthographic depth hypothesis (Frost, 2005; Katz & Frost, 1992) assumes that in opaque orthographies, in which many words cannot be read correctly using grapheme-phoneme decoding strategies, skilled readers have to rely heavily on orthographic word recognition, while skilled readers in transparent orthographies more heavily rely on phonological decoding. This would imply that the relative importance of underlying cognitive skills is also modulated by orthographic consistency.

The fact that several studies with English language learners found a strong consistent influence of PA over time and only a minor influence of RAN (e.g., Cardoso-Martins & Pennington, 2004; Wagner et al., 1994) seems to support the assumption that the cognitive dynamics of reading are influenced by orthographic consistency. However, direct comparisons of English-language studies with those conducted in transparent orthographies are confounded by the fact that most English-language studies measure reading accuracy while studies in transparent languages use fluency measures. The role of accuracy-based PA might therefore be underestimated in transparent orthographies because speeded measures of reading are used. Furthermore the role of (speeded) RAN in reading might be underestimated in opaque orthographies because reading accuracy measures are used (Georgiou, Parrila, Kirby, Stephenson, 2008; Share, 2008). Thus, in order to evaluate the modulating influence of orthographic consistency on the cognitive dynamics of reading acquisition,

it is essential to compare languages with varying orthographic consistency directly when using comparable measurement parameters.

Previous cross-linguistic comparisons have shown contrasting results. Mann and Wimmer (2002) and Georgiou, Parrila, and Papadopoulos (2008) claimed that PA was more important when learning to read in English, while RAN was more important learning to read in Greek or German. However, Patel et al. (2004) and Caravolas, Volin and Hulme (2005) found equally important roles for PA and/or RAN in transparent and opaque orthographies. To shed more light on this debate a recent study examined the moderating influence of orthographic consistency on the cognitive dynamics of reading in five writing systems lying on a continuum from transparent to less transparent: from Finnish and Hungarian, over intermediate Dutch, to Portuguese and French (Ziegler et al., 2010). The results revealed that PA was a key component of reading acquisition and decoding in all orthographies, although its influence was weaker in transparent than in opaque orthographies. RAN had a much weaker influence and was limited to reading speed. The authors concluded that the predictors of reading performance, at least in alphabetic languages, are relatively universal although their precise weight varies systematically as a function of orthographic transparency. These results from Ziegler et al. (2010) together with the results of Georgiou et al. (2008) and Mann and Wimmer (2002) indicated that orthographic consistency does have an impact on the strength of the contributions of PA to reading, but leaves open the question of whether and how orthographic consistency influences cognitive development of reading.

This last question was answered in a recent study including three orthographies (Hungarian, Dutch, Portuguese), that were also included in the Ziegler et al. study, but now covering four consecutive primary school grades in each country (Vaessen et al., 2010). The results indicated that cognitive development of fluent word reading (in alphabetic scripts) follows a similar pattern in orthographies varying in consistency of their letter-speech sound mappings. In all three included orthographies, the weight of the contributions of PA, Letter-Speech Sound (LSS) processing and RAN shifted as a function of reading expertise and word type/frequency, and orthographic consistency did not modulate this general effect. However, the contributions of PA and LSS to reading fluency were important for a longer period of time in less transparent orthographies,

suggesting that orthographic consistency did influence the rate at which the reading system develops. However, differences in orthographic transparency did not recruit different cognitive functions in consecutive developmental stages indicating that the universal predictors of alphabetic reading performance also follow a universal developmental pattern.

Reading Development in Transparent Orthographies

Transparency and Phonological Awareness
As discussed earlier, reading is a skill resulting from acquiring a visual-auditory association based on cultural convention on how speech is converted into printed text. However, there are several basic differences between speech and written text. First, it is well-known that speech emerges quite naturally and without any formal instruction, whereas reading requires specific instruction given by teachers in order to develop children's skills involved in reading. Second, while speech occurs in a serial incremental fashion, reading relies on many parallel processes. Third, while speech is highly serial in nature for the listener, as replay of the speech signals is not possible for natural spoken utterances, readers may look back in text at words not properly processed. Fourth, speech provides prosodic information that is lacking on the printed page and these differences may contribute to difficulties in beginning readers whose first task is to split the spoken words into sounds in order to associate with the newly acquired symbols, letters or letter combinations. Finally, various letter-sound correspondences typical for the orthography and fast access sight words have to be mastered and used in concerted action in order to comprehend texts.

As is known from hundreds of brain studies, acquiring reading requires a delicate process as well as delicate tuning of the brain networks involved in reading. The mental representation of speech sounds is especially important in a transparent orthography, e.g., Hungarian, where written words consist of letters with nearly one-to-one letter-sound correspondence. How this happens and how the access to the most important building bricks of words develops has been studied with less intensity in transparent orthographies in comparison to deep ones. Research into learning to read alphabetic scripts has been focusing for decades on

children learning to read English. Only the early 1990's was the first real change in the focus of studies seen, when a growing number of empirical investigations aimed to know more about the reading abilities of children learning alphabetic orthographies more transparent than English. They included investigations of reading acquisition of German (Wimmer & Hummer, 1990), Italian (Cossu et al., 1995), Turkish (Öney & Durgunoglu, 1997), Finnish (Leppenan & Lyytinen, 1997) and Hungarian (Csépe, 2003). All of these orthographies are known as transparent or shallow: their main feature is the consistent grapheme-phoneme relationship and a limited number of exception words. Therefore, transparent orthographies are the opposite of English with its highly variable grapheme-phoneme correspondence as well as with its high percentage of exception words.

Research reports on studies investigating transparent orthographies suggest that the word recognition skills in a transparent orthography develop very rapidly at school, with children making relatively few errors by the end of the first year of formal instruction. This means that the majority of children taught in schools using proper teaching methods and reading instruction can read out known and unknown words as well as pseudo-words with very few errors. Therefore, evaluations scheduled for the end of first grade should focus on testing the decoding performance of children.

The development of decoding relies to a big extent on a general ability of children, phonological awareness (PA, in detail see above). Since the first publication on strong association between PA and reading skills (Bradley & Bryant, 1993) a vast number of studies has been carried out, all speaking for the importance in and strong correlation with reading. However, a general impression of many practising experts is that PA may have a lesser importance in transparent orthographies than in those with an expressed orthographic depth. One of the first benchmark studies suggested a slightly different role of PA in reading (Wimmer, 1993). Based on experimental data Heinz Wimmer concluded that learning to read and write in a transparent orthography could be characterized by more rapid development of decoding skills as compared to an opaque orthography such as English or French. This claim counts as especially important, because for the first time the general view on the exclusive role of PA and the exquisite importance of logographic strategies in reading acquisition was questioned. Näslund and Schneider (1991) as well as Wimmer

and Hummer (1990) studied German-speaking schoolchildren whose decoding strategy was very good without showing any sign of using logographic strategies characteristic for English. Wimmer and Hummer (1990) studied 56 Austrian first graders (mean age 7 years and 5 months) who were learning to read German orthography. They found that virtually all of the children they studied possessed an alphabetic strategy for accurate phonetic decoding of letter strings in German. They also found that even poor readers could decode and blend words correctly, although it took them longer to do so. While the reading skill in English develops steadily over several years of formal reading instruction with many children experiencing persistent problems in reading words accurately, this phase is shorter for the transparent orthographies. Therefore, the level of PA in preschoolers and first graders may be crucial when reading in a transparent orthography is acquired.

However, one has to take into account that children acquiring reading in English start school around the age of five years, so they are definitely younger than those who start to learn to read more transparent orthographies. Germans, Austrians, Finns and recently Hungarians as well (parents decide about immediate or later school start when their children reach six years old) start school around the age of seven. It is therefore very important to shed light on the real factors of this rapid development of reading skills observed in children learning to read scripts of a transparent orthography. This rather fast development of reading skills during the first year of school might be due to age differences as well as to differences in orthographic transparency.

There are comparative studies that have investigated reading development both in transparent and in opaque orthographies in the same country in highly similar school environments. Ellis and Hooper (2001) and Spencer and Hanley (2003) studied different groups of children in Wales (UK): those who attended English-speaking schools and were taught to read in English, and those who attended Welsh and were taught to read in Welsh. The Welsh language uses a transparent alphabetic orthography where mappings from graphemes to phonemes are nearly as consistent and predictable as they are in Hungarian. Ellis and Hooper (2001) showed that children learning to read Welsh were able to read a much higher proportion of the items from a list of Welsh words than the English-speaking control children could from a list of English words. More-

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over, Spencer and Hanley (2003) found superior reading performance shown by children learning to read Welsh on words and pseudo-words: they also found that 6- and 7-year-old children learning to read performed better on a phoneme awareness task. This speaks for the interaction between reading and PA, as was suggested by Goswami (2003).

Despite the acknowledged importance of PA in emerging literacy skills, many factors remained unclear for a long time. It is very important to know how PA and other factors related to the mental lexicon influence reading acquisition, and if the PA's predictive strength is influenced by cognitive and non-cognitive as well as by environmental factors. A recent study comparing six European languages (Dutch, Finnish, French, German, Hungarian, Portuguese) shed light on the interplay of reading and different cognitive variables, including PA (Ziegler et al., 2010). For statistical analyses a two-level hierarchical linear model with the effects of script entropy (for details see Borgwaldt et al., 2005) and the effects of the five components on reading (or decoding) was used. It was shown that phonological awareness, rapid naming (RAN) and phonological short term memory (PSTM) had a positive association both with reading speed and with accuracy. According to the regression coefficients, phonological awareness was the most important factor associated with reading speed and accuracy. In addition, entropy had a statistically significant positive influence on the relationship between phonological awareness and reading and a significant negative influence on the relationship between vocabulary and reading accuracy. These results suggest that the impact of phonological awareness on reading was more important when entropy was high (i.e., inconsistent scripts) than when entropy was low (i.e., consistent scripts). On the contrary, the impact of vocabulary on reading was stronger when entropy was low than when it was high.

This study performed on a rather large group of children (1,265 second graders) allows us to argue for an orthography-related interplay of many factors. It is important to stress that although the modest correlation of naming speed (RAN) and phonological awareness suggests that RAN tasks incorporate only a relatively small phonological component (e.g., Swanson at al., 2003), this seems to predict reading performance the best (see above in detail, Vaessen et al., 2010). It has to be especially taken into account if PA measures are not sufficiently sensitive or reach a ceiling, the latter often the case in Hungarian. That also means that a

big part of shared variance is left to RAN, so it becomes the dominant predictor.

Although the Finnish and Hungarian data deviate in several ways, it is common that vocabulary correlates with both reading and decoding. It is important to keep in mind that correlation between reading, decoding, and vocabulary go in both directions in the Finnish sample. That means that the proficient reading level of Finnish children in grade two might boost their vocabulary knowledge through reading. The Hungarian children show a similar tendency, although the effect is weaker as compared to the Finnish sample. However, there may be some important differences between the orthographic and morphological complexity of the two languages, Finnish being the extremely regular one. Therefore, we may conclude that phonological awareness is a key component of reading acquisition and decoding in Hungarian although its influence lasts only a short time. This finding suggests that PA is not a pure phonological variable, but rather a variable that is itself influenced both by learning to read and by the transparency of a language (Castles & Coltheart, 2004).

As has been suggested by Goswami (2003), PA has two levels, a syllabic and a phonemic PA, each undergoing a different developmental course. The syllabic level PA studied in tasks requiring manipulations of syllables of words and pseudo-words is well developed by the age of 5 in typically developing children and shows a ceiling level in second grades (see Csépe, 2006). This means the syllabic PA emerges in development, and therefore its spontaneous occurrence should be helped with different tasks in pre-school and in the early school years and used as a fundamental building block of reading. Behavioural and brain research data (Csépe, 2006) suggest that syllabic manipulation and syllabic level blending tasks accelerate and strengthen early reading skills. This should be in focus of any reading instruction and remedial method in a transparent orthography.

The second level of PA is the phonemic one. This level, however, as Goswami (2003) also suggests, is the consequence of reading. Phonemic level PA is not part of the phonological repertoire of pre-reading children (Wimmer et al., 1991) nor of illiterates (Loureiro et al., 2004). This finding implies that well-defined phoneme categories of literates largely result from reading experience, thus, a reshaping of speech sound categories through learning to read is a typical example of a culturally-endowed

tuning mechanism multisensory in nature (Lewkowich & Ghazanfar, 2009). This means that the developing brain undergoes a forced reshaping, a slow and incremental tuning of the auditory cortex for distinct phonemes. It seems therefore that one of the main predictors of reading performance in alphabetic languages is PA, though not in pre-school age for the phonemic level. Moreover, as our European study (Ziegler et al., 2010) shows, learning to read activates a complex interplay of PA, vocabulary and phonological short term memory. Although these factors are relatively universal, their precise weight varies as a function of script transparency and reading experience. The more transparent the script the faster the vocabulary growth via reading and as a consequence, the effect of vocabulary on reading performance becomes stronger. Therefore, all measures of reading development in grades two to four should take into account this complex interplay among the phonological factors, vocabulary, reading speed, and accuracy.

Given the known complexity of speech perception and phonological processing, it seems more relevant to investigate the interplay of working memory, vocabulary and PA. Despite the fact that this complexity has been known for a long time in the literature in many countries, including Hungary, pre-school reading or learning disorder risk evaluation has been based on evaluating speech sound discrimination for years. The problem with this measure is its very weak predictive validity. Finnish children of familiar risk of dyslexia participating since their infancy in the largest European follow-up study on dyslexia (*Jyväskylä* Longitudinal Dyslexia Study) were recently investigated in second grade. The study by Puolakanaho et al. (2008) has resulted in intriguing data which reveals no significant pre-school phonological or spoken language predictors for later reading fluency. This result is especially surprising because reading fluency is the only relevant literacy measure in a fully transparent orthography like Finnish. Another study (Boets et al., 2007) reported similar results: none of the investigated speech and phonological variables in kindergarten and first grade of high and low risk of reading disorder showed a systematic performance pattern. This finding means that poor pre-reading phonological skills do not predict later reading performance; thus, preschool and early school year measures touch upon a more complex problem and are unable to reveal the real root of reading problems. Therefore, we should measure letter-sound associations as

well as the behavioural correlates of audiovisual letter-sound integration and phonemic PA as a result of learning to read. For this, accuracy and speed of letter-speech sound identification and discrimination performance should be measured in order to get reliable results of good predictive validity. By using a new computer-assisted neuropsychological test developed for dyslexia diagnosis Blomert and Vaessen (2009) showed that the essence of successful reading acquisition is the emergence of automatic letter-sound integration.

Taking all the recent studies together we conclude that reading development is a gradual process including a shift from letter-sound associations to automatic integration served by a cortical network that gets tuned and reshaped. This also means for school practice that complex letter-sound integration tasks can only reveal the proper development of decoding, while pseudo-word and word reading skills, in Hungarian easily measurable via accuracy and fluency parameters, can be linked to the development of orthographic processing. Measures of speech perception as well as those of letter knowledge trace different areas of the cognitive domain and their predictive value is at least questionable.

The Agglutinative Nature of Hungarian and its Consequences in Reading
As was stated in the above sections, reading comprehension has been less studied in transparent orthographies than in deep ones. This has consequences in many domains of reading research. As is known, fluent reading usually comes after a long period of extensive practice in general (Tan & Nicholson, 1997) although a good level of fluency is acquired in a shorter period in transparent orthographies such as German, Italian, Finnish, Greek and Hungarian where learning the regularities of the orthography becomes relatively easy due to the unambiguous grapheme–phoneme correspondence (see Landerl et al., 1997; Csépe, 2003). However, to our best knowledge, there are very few publications on how reading, especially word recognition, develops in orthographically transparent languages of agglutinative morphology. Due to the agglutinative nature of these languages (see Durgunoglu, 2006), readers need to deal with rather long words (for example, in the Hungarian word virágszirmaikról [from their flower petals]).

In transparent orthographies, rapid and accurate reading is achieved from seven to nine years of age depending on the level of consistency

and teaching method (Ziegler & Goswami, 2005). This fast achievement of children learning transparent orthographies is due to the fact that the very consistent grapheme–phoneme rules can be acquired without great difficulty. Thus, it seems clear that the age when automatic reading is achieved depends on the consistency with which the alphabet represents phonemes by means of graphemes (Aro & Wimmer, 2003). For example, German children are able to read words and pseudo-words without difficulty by the end of first grade, reaching the ceiling of competent reading relatively quickly (Wimmer et al., 2000). This is valid, however, only on the word level as is the case for Hungarians.

There are two consistent effects that have been used to examine the development of reading strategies during word recognition: the effects of frequency and length. The effect of frequency refers to the fact that low-frequency words are read more slowly than high-frequency words; therefore, frequency is a good indicator of word identification processes. This effect is greater when familiar words are strongly represented in the lexicon. The effect of word frequency is very robust when children begin to read both in less transparent orthographies like Portuguese (Alegria & Mousty, 1996) and in opaque orthographies such as English (Ellis, 2002). The effect of length implies that long words are read more slowly than short words, and it indicates the extent to which the decoding strategy is being used. Developmental studies have shown that this effect decreases with age, reflecting a change from a letter-by-letter reading strategy to an automatic word activation strategy (Bijelcac-Babic et al., 2004). In addition, this effect is particularly strong in children from a transparent orthography such as Spanish due to the extremely consistent grapheme–phoneme correspondence (Acha & Perea, 2008, Acha et al., 2010). Thus, the effects of frequency and length are reliable markers both for the development of word identification processes and for the reliance on grapheme–phoneme correspondences during reading respectively.

The early awareness of how words are built in a language is related to the ability to recognize word constituents automatically. The reason behind this is that early knowledge about word structure in a language helps to establish word-specific orthographic representations, at least in English or other languages not agglutinative in nature. Thus, the question arises how orthographic representation develops in agglutinative languages, where words are often composed of a stem with one or several

morphemes attached to it. Thus, the development of word recognition processes should be different in languages that share the same characteristics of transparency and consistency but differ in the typological properties of their morphology.

Finnish and Turkish children, similarly to Hungarians, decode complex pseudo-words accurately very early and become very sensitive to word-end phoneme–grapheme manipulations. This sensitiveness could mediate the progression from decoding to automatic reading. For example, Finnish seven-year-olds use the grapheme–phoneme correspondences to read Finnish words during their first school year (Holopainen et al., 2002). However, in third grade (approximately nine years of age), they are able to read morphologically complex words better and faster than monomorphemic words, particularly when the words involve a high-frequency stem (Bertram et al., 2000). This pattern is also observed in sixth graders (approximately 12 years of age). These findings suggest that Finnish readers learn to recognize the morphemic structure of the words in their language through the recognition of their constituent stems and morphemes. In addition, Lyytinen and Lyytinen (2004) showed that Finnish children who had problems with morphemic identification during their early years of reading instruction had a greater risk of dyslexia in the future. This also means than in agglutinative languages, morphological discrimination could be a better detector of reading impairments than simple vocabulary reading. This should be taken into account when reading skills of Hungarian children under 12 years of age are investigated.

Atypical Reading Development: Dyslexia

Some children show persistent difficulties in attaining adequate reading and spelling skills, despite normal intelligence, adequate educational instruction and normal sensory functioning (Lyon, Shaywitz, & Shaywitz, 2003). These children, referred to as developmental dyslexics, are characterized by slow, inaccurate word reading and/or inadequate spelling skills. In a nation-wide epidemiological study covering 150,000 sixth grade primary school pupils, the population prevalence of dyslexia in the Netherlands was conservatively estimated at approximately 4-5 percent (Blomert, 2005).

Numerous studies have focused on the question of which cognitive deficits underlie reading and spelling problems in dyslexia. Initially, it was believed that developmental dyslexia was a result of visual perception deficits ('congenital word blindness'; Morgan, 1896). This well-established visual perception deficit was fundamentally challenged by Frank Vellutino in his seminal book (Dyslexia: Theory and research; Vellutino, 1979), in which he argued that most if not all of the papers reporting visual perception deficits (presumably up to 1975) used visual stimuli encompassing linguistic information. When presented with visual stimuli devoid of linguistic context dyslexics performed like normal readers. He therefore postulated a verbal language deficit as the potential cause of dyslexia. In this same period Elizabeth Liberman and Donald Shankweiler developed their theory of Phonological Awareness as a prerequisite to learning to read (Liberman, 1973; Liberman, Shankweiler, Fischer, Carter, 1974). The verbal deficit formulated by Vellutino was cast into a phonological awareness deficit for dyslexia soon thereafter (e.g., Wagner & Torgesen, 1987). These phonological processing problems are assumed to cause reading problems because suboptimal phonological representations negatively influence the establishment of letter-speech sound associations (Snowling, 2000).

A wealth of evidence seems to supports this 'phonological deficit' hypothesis. First, dyslexics show low performance on a variety of phonological tasks (Beaton, 2004; Brady, 1997; Ramus et al., 2003), even in comparison to younger reading-matched controls (e.g., Sunseth & Bowers, 2002) and non-dyslexic poor readers. In addition, early phonological deficiencies predict later reading and spelling disability (Bradley & Bryant, 1983; Gathercole, Willis, & Baddeley, 1991; Wagner & Torgesen, 1987). Moreover, training focusing on improving phonological awareness has beneficial effects on reading and spelling abilities, however especially and most importantly when combined with training in letter-sound knowledge (Bus & van Ijzendoorn, 1999; Byrne & Fielding-Barnsley, 1993, 1995; Hatcher, Hulme, & Snowling, 2004). Dyslexics not only exhibit phonological awareness problems, but many dyslexics also show problems with speeded naming of visual items (for an overview, see Wolf et al., 2000). Although the theoretical interpretation of this last deficit is still under debate, the most likely interpretation favours a phonological processing problem augmented with a cross-modal mapping

problem introduced by the task demands (for a review see Vaessen, Ger-retsen & Blomert, 2009).

Since complex cognitive functions e.g., reading are built on connectivity within large-scale neural networks, rather than on strictly localized processes (Engel et al., 2001), it would be surprising if there was indeed one phonological processing deficit responsible for the reading problems of dyslexic children. This consideration is further complicated by many findings showing that phonological awareness probably is a consequence of learning to read and not a necessary prerequisite (e.g., Perfetti et al., 1987). Heinz Wimmer and colleagues (1991) had already shown that most children do not exhibit phonological awareness skills at school entry before they learn to read. A recent study added to this by showing that children genetically at risk for developing dyslexia did not differ from normal children in phonological processing skills in kindergarten before they learned to read (Blomert & Willems, 2010), but only develop phonological problems when they develop reading problems. Although phonological processing problems always co-occur with reading problems and therefore may be used as a diagnostic sign, it is thus highly unlikely that phonological problems are causing reading problems in dyslexia. It is therefore interesting to note that the children at risk for dyslexia in the above study showed a problem learning to associate letters and speech sounds, where all normal children profited from such training. This problem points to a basic requirement which is needed when learning to read starts: visual symbols must be associated with speech sounds before any reading can start. Children prone to become dyslexic thus revealed problems in connecting the neural networks for speech and visual object recognition.

This potential cross-modal association problem received strong support from a series of recent neuroimaging studies showing that the brains of dyslexics do not make a difference between congruent and incongruent letter-speech sound pairs. However behavioural tests revealed ceiling accuracy, when asked to decide which letter belongs to which speech sound (Blau et al., 2009; 2010). An electrophysiological study added to these results by revealing that dyslexics did not show any signs of automatically integrating letters and speech sounds even after four years of reading instruction and specific reading interventions (Froyen, Willlems & Blomert, 2011). A recent theoretical review of these results therefore

qualifies orthographic-phonological binding problems as the proximate cause of reading problems in dyslexia (Blomert, 2011). Such a specific cross-modal binding deficit of letters and speech sounds may interfere with and/or slow down the incremental tuning of the auditory and multisensory cortex for the fast integration of unique audiovisual orthographic–phonological objects and negatively influence and/or delay the tuning of the fusiform cortex for the recognition of letters and words. A specific audiovisual binding deficit may thus not only act as a proximal cause for reading deficits in dyslexia, but also tentatively explain the most notorious characteristic of dyslexic reading, i.e. a consistent lack of reading fluency.

In conclusion, three core cognitive variables related to reading, spelling and reading development in general also qualify as strong predictors of reading failure. We may now tentatively add multisensory binding of orthographic and phonological units as a new predictive variable for reading failure.

Assessment of Typical and Atypical Reading Development

In the first part of this chapter we examined the cognitive contributions to reading and spelling and the dynamic changes of these contributions during development. The pattern of relative (in)dependencies between these cognitive factors and their systematically changing relation with reading and spelling performance under the influence of increasing experience provides a firm theoretical and empirical frame for the formulation of principles and procedures for literacy assessment. The assessment of literacy may serve different purposes and the adequacy of the assessment instruments depends on the purposes of the measurement. The two most common purposes concern first, the necessity to obtain a reliable assessment of the progress children make during primary education and second, a reliable and valid assessment of the probable causes of poor reading performance. If these assessments are not executed with psychometrically sound instruments, reliable interpretations and evaluations of general educational performance remain elusive and interpretations of the performance of individual children will necessarily remain mostly sub-

jective. Let us start with a closer look at conventional educational assessment, which is in most countries often the only standard assessment available for assessing reading and spelling progress and failure.

Reading Assessment in Regular Education

In educational contexts it is a well established practice in most countries to develop and calibrate instruments for the assessment of reading and spelling skills in a direct relation to the literacy curriculum in the schools. Teachers and/or special educationalists want to know if a child has sufficiently mastered the contents that were taught during a given school period. If a child fails to meet the average norm set for sufficient mastery, the professional wants to estimate the backwardness in terms of the curriculum content, which is then often expressed in a measure indexing backwardness in terms of the amount of months of teaching. This form of assessment, if carried out with standardized instruments, provides valuable information for teachers, parents, and pupils alike about the degree of mastery of a given curriculum content and the progress or failure made by a given pupil. Recurrent assessment of individual reading skills within and over grades is the only source that may provide real insight into the reading performance of individuals and individual schools and that will allow meaningful comparisons within and between individuals, schools and geographical districts and even countries. Regular assessments at school also provide (or should provide) the primary information on the development of poor literacy performance and thus constitute the gate for the signalling of special needs children.

Reading Assessment
for Diagnostic Purposes

If the regular school screening has signalled a child who repeatedly fails the required mastery criteria, one may want to know what the cause of these reading and/or spelling problems is. If there are indications that the cause may reside in a specific learning problem, and not in the child's environment, a special diagnostic assessment seems indicated. Unfortu-

nately, it is not the case that the type of information usually collected by means of educational screening assessment instruments can be directly or indirectly used to infer why a pupil has developed a reading and/or spelling problem. Educational screening tests correctly concentrate on the levels of reading/spelling performance in a curriculum context. An educational school anamnesis of poor literacy performance is the necessary start for a special needs investigation, but is itself mostly not suited to addressing the cognitive inquiry necessary for an informed diagnostic judgment. An error analysis of reading and spelling performance may inform on the mastery of curriculum elements, but may fail in the case of specific learning problems, because there is no one-to-one correspondence between reading and/or spelling errors and the cognitive dysfunction causing these errors. The diagnostic evaluation of specific learning disorders like dyslexia requires the cognitive profiling of an individual child by means of specially developed instruments valid for testing cognitive functions relevant for the specific dysfunction.

Reading Assessment in Need of Cognitive Assessment

Let us take the case of developmental dyslexia as an example to illustrate the need for cognitive assessment in literacy assessment, because it is the exemplary case of atypical literacy development. There is an undeniable problem in the attempt to find or diagnose children suffering from a well-known specific reading and spelling disorder, like dyslexia, purely in terms of reading and/or spelling backwardness, and this problem is known to each and every teacher. There is no ideal dyslexia reading and spelling test, which in and of itself allows us to identify and classify dyslexia, because dyslexics do not exhibit characteristic reading and spelling errors which are exclusive to dyslexia. There may be other poor readers performing even worse over several grades which cannot (or should not) be classified as dyslexia.

The fact that dyslexic children often show concomitant phonological deficits seems to lead to a correct classification, but general poor learners, who often also have long-lasting reading problems may also exhibit poor phonological performance. Therefore, unfortunately, phonological problems are also not exclusive to dyslexia. This is illustrated for in-

stance by Specific Language Impaired (SLI) children, who may also show phonological problems, however, often in combination with semantic and/or syntactic problems (see Bishop, 2006), which is not the case for dyslexic children (Ziegler et al., 2010). It is thus obvious that specific problems in a given cognitive domain should be evaluated in combination with related cognitive performances to acquire meaning. Comparable dissociations and associations of cognitive problems may be formulated for other developmental disorders, pointing to the need for a differential diagnostic procedure focusing on the pattern of positive (good performance) and negative (poor performance) diagnostic signs, which would allow the construction of a cognitive profile in relation to the specific learning problem. The theoretical review of cognitive factors relevant for reading and spelling development in the first part of this chapter now reveals its immediate relevance for assessment purposes, because it identified the relevant cognitive factors contributing to reading and spelling development, which may thus serve as a point of departure for constructing differential cognitive diagnostics of poor reading and spelling performance.

A similar reasoning unfolds if we consider in a nutshell the international attempts to define dyslexia so that it discriminates dyslexic learners from other poor readers. The prevalence of dyslexia may be estimated at between 5-10 percent, depending on the criteria used (Blomert, 2005). This implies that prevalence higher than 10 percent of poor readers, sometimes close to 20 or even 30 percent in inner city schools, indicates large groups of poor readers, who suffer from reading and/or spelling problems for other reasons than dyslexia. Thus, there is a clear need to differentiate dyslexia from other forms of poor literacy, because, e.g., they might need different rehabilitation approaches. Past and present international definitions of dyslexia bear witness to this problem. In the light of our discussion it is therefore noteworthy to observe that these definitions have evolved over time from domain general to rather specific cognitive descriptions of dyslexia. If we accept definitions as a kind of working hypothesis, it is instructive to contemplate the following three definitions.

(1) "Developmental dyslexia is a disorder manifested by a difficulty to read, despite conventional instruction, adequate intelligence and socio-cultural opportunity. It is dependent upon fundamental cog-

nitive disabilities, which are frequently of constitutional origin." (World Federation of Neurology, 1968)

(2) "Dyslexia is one of several distinct learning disabilities. It is a specific language-based disorder of constitutional origin characterized by difficulties in single word decoding, usually reflecting insufficient phonological processing abilities. These difficulties in single word decoding are often unexpected in relation to age and other cognitive and academic abilities; they are not the result of generalized mental deficiency or sensory impairment. Dyslexia is manifested by a variable difficulty with different forms of language, often including, in addition to reading, a conspicuous problem with acquiring proficiency in writing and spelling." (Orton Dyslexia Society Research Committee, 1994)

(3) "Dyslexia is a specific learning disability that is neurobiological in origin. It is characterized by difficulties with accurate and/or fluent word recognition and by poor spelling and decoding abilities. These difficulties typically result from a deficit in the phonological component of language that is often unexpected in relation to other cognitive abilities and the provision of effective classroom instruction." (Lyon et al., 2003).

Although most definitions are history now, a closer look at them may help in clarifying some fundamental issues in assessing literacy and literacy disorders. The first definition had an unexpected effect in the western world, as it unfortunately led to the widespread use of the intelligence-reading discrepancy criterion to diagnose dyslexia. This may have happened because intelligence was the only cognitive measure explicitly mentioned in the definition. The discrepancy criterion stated that someone might be classified as dyslexic if there was a sufficiently large discrepancy between the actual reading level and the reading level which might have been expected based on IQ. Since technical reading and IQ hardly correlate, this criterion was abandoned (Fletcher et al., 1994; Stanovitch & Siegel, 1994); however, only after a heated debate spanning more than a decade (see Stanovitch, 2000). The immediate and worldwide effect of a first-time international definition however clearly illustrated the urgent need for a clear demarcation in the field of poor literacy. The decision to abandon the IQ-reading discrepancy criterion, however also had an undesirable consequence in some countries, in which practi-

tioners decided to throw out the baby with the bathwater and abandon any measurement of general intelligence in their differential diagnostic procedures. The fact that IQ is not valid for defining dyslexia does not mean that IQ measurement may not be helpful in differentiating other literacy problems which may in turn help in estimating the prognosis for the response to intervention.

The second international definition obviously resulted from the discrepancy debate and concentrated on unexpected discrepancies between reading and other educational (academic) skills, but not between cognitive skills. Although the reading problem was now clearly situated at the word level (excluding a syntactic deficit as the cause of problems in sentence reading), and spelling was also recognized, although still cautiously, most importantly a specific cognitive problem, i.e., phonological processing, was explicitly mentioned.

The last and most recent definition evolved clearly into a definition of dyslexia as a cognitive disorder, since reading and/or spelling problems were now considered the consequence of a phonological problem, which should be identified as a problem in comparison to other cognitive functions. The message from this short overview of dyslexia definitions is that an adequate diagnosis of reading and/or spelling problems requires a comparative cognitive investigation of an individual in addition to the measurement of reading and spelling backwardness; a conclusion very similar to our earlier plea for a cognitive profile analysis as the basis for a cognitive differential diagnostics in the field of poor literacy.

This conclusion thus brings us back to the opening statements on reading assessment: the theoretical review of the experimental literature together with the critical evaluation of the criteria and means needed for meaningful reading diagnostics point to the need to investigate the cognitive predictors of reading and spelling development in typical and atypical populations. The theoretical review suggests three potentially strong indicators for specific reading disorders like dyslexia: phonological processing, letter-sound processing and rapid naming. In what follows we illustrate how the implementation of this theoretical knowledge in practical criteria may indeed help actually to discriminate between dyslexic and other poor literacy performers.

The merits of Theoretically Informed Reading Assessment

In the foregoing three cognitive skills have been identified as strong contributors to reading success and reading failure. It was also established that the effective strength of these core cognitive parameters was greatly enhanced if not only accuracy (as is often the case), but also speed of cognitive performance was measured. Together this creates potentially six parameters indicative of dyslexia that may be used to explore their discriminative power in a sample of poor reading performers.

A study was designed in the Netherlands to investigate the discriminatory power of these six 'core cognitive dyslexia indicators' in a group of poor literacy performers (Blomert, 2005). To this aim, first, criteria for poor reading and spelling were constructed in such a way as to minimize false positives and negatives when used in a normal school population. This resulted in the following criteria for poor literacy performance: (1) a reading score in the lowest 10% of the population, or (2) a reading score in the lowest 16% of the population plus a spelling score in the lowest 10% of the population. Thereafter a sample of poor readers and/or spellers was selected from a large sample of primary school children (N=1,716) who had been individually tested on a range of literacy and cognitive skills, resulting in n= 10% poor readers and/or spellers. In order to test the power of the putative 'core cognitive dyslexia indicators', a criterion for poor cognitive performance was also constructed. Since the knowledge of the exact strength of the contributions of each of these six parameters was not known, all six potentially 'core cognitive dyslexia indicators' were assigned equal weights. This was expected also to account for the possibility that dyslexics might vary in severity of the one or the other cognitive indicator. Again a procedure minimizing false positives and negatives resulted in the following cognitive criterion: If an individual satisfied the poor literacy criterion formulated above and performed within the lowest 10% on two of the six putative 'core cognitive dyslexia indicators', then he/she might be classified as dyslexic. It was hypothesized that if this cognitive criterion was just measuring the severity of the literacy deficit, the same proportion of poor readers would be selected in each participating school. If however this cognitive criterion led to a disproportional selection of subjects in agreement with the dyslexia prevalence expectations in random groups of unselected primary

school children then this might be an indication that a specific literacy disorder had been selected. To further validate this apparently successful use of a cognitive dyslexia criterion, all poor reading performers selected in the schools by means of the above-explained reading and spelling criteria were also sent to specialized dyslexia institutes, which would diagnose these individuals according to their own criteria and with their own instruments. The selection of dyslexics by means of the six putative 'core cognitive dyslexia indicators' was then compared with the diagnosis made by the independent dyslexia institutes. Again we hypothesized that if the cognitive dyslexia indicators were mainly measuring severity or another general quality of poor reading performers, then there would not be much overlap with the group dyslexics selected by the experts. In case of significant overlap this might be interpreted as offering validity for the cognitive dyslexia criterion. Thus, the research question was as follows: How well can a composite reading/spelling criterion together with a composite cognitive criterion discriminate dyslexics in a sample of poor readers?

The results showed that this cognitive dyslexia criterion selected maximally 6% potentially dyslexics (range 0-5.9) in each school (n=11), independently of the total number of poor literacy performers in these schools (range 4-27%). Furthermore, it was found that 3% of the 11% poor literacy performers that were identified at school in the total sample by means of educational screening tests indeed showed very low reading/spelling performance, but did not show any cognitive abnormality; that is, they performed in the normal range on all putative 'core cognitive dyslexia indicators'. These findings remind us that poor literacy does not have to be a condition caused by the child's cognitive abilities. Lastly, the results of the selection by the cognitive dyslexia indicators were compared to the selection made by the experts in the specialized dyslexia institutes from the same sample of poor literacy performers. All dyslexic subjects identified by the cognitive dyslexia indicators were also classified as dyslexic by the experts; this means 100% hit, no false positives. However there were 15% false negatives; children that were not classified as dyslexic by the criterion analysis, but were classified as dyslexic by the clinical experts. All these cases showed mild reading and spelling problems and thus were excluded by definition by the rather strict cognitive criteria. However, this did not mean the experts were

wrong, it only meant that experts may also recognize milder dyslexia forms which were excluded by the defining criteria.

These results illustrate what the modern definitions of dyslexia already indicated and what the theoretical literature review suggested: dyslexia is a specific reading and spelling disorder characterized by a specific cognitive deficit profile such that this discriminates them from generally poor learners or otherwise poor readers. Assessment of reading and reading development should therefore incorporate sensitive measures of reading and spelling in combination with speed and accuracy measures of literacy-relevant cognitive functions.

These research findings have been taken as decisive evidence that convinced the Dutch parliament and the Ministry of Health to change the health care law to include dyslexia as a neuro-cognitive disorder, in principle entitling every Dutch citizen to reimbursement of costs for diagnosis and treatment of dyslexia as of January 1, 2009. This Dutch study is of course only one perspective on a complex problem and therefore not final, but it shows convincingly that literacy assessment definitely needs cognitive assessment to be meaningful for teachers, diagnosticians and above all for the children affected by a specific learning disorder.

Reading Comprehension

Reading comprehension is a difficult construct; therefore, one should not be surprised by the statement that studying and properly assessing reading comprehension development is an even more difficult task. Our task is to understand first the complex nature of comprehension, decompose its cognitive and non-cognitive parameters and develop, as a second step, a complex and reliable assessment tool for touching upon the most reliable and best predictive characteristics of reading comprehension and its development during the school years. In order to understand the cognitive construct we are measuring we have to take into consideration that the measured performance varies considerably according to at least four variables:

   (1) the type of text the child is asked to read (sentences, paragraphs, pages).

(2) the response format (closed-, open-ended questions, multiple choice, think aloud).

(3) memory demands (answering questions with and without the text available).

(4) the aspects of comprehension being measured (gist understanding, literal understanding, and inferential comprehension).

Therefore, a single assessment especially for diagnostic purposes is rarely adequate, and it is difficult, if not even impossible, to determine the source of the child's difficulties based on a single measure. Thus, when comprehension, but not word recognition or fluency, appears to be an issue, multiple assessments using measures that tap different aspects of comprehension are necessary.

In order to understand all aspects of the development of reading comprehension one has to take into account that reading involves a complex interplay between reader and text characteristics. This is especially problematic because most of the cognitive models of reading comprehension tend to focus on formal properties of reading, such as propositional knowledge representation, the nature of inferences in comprehending narrative versus expository text, or idea density and coherence (for details see Graesser et al., 1994). Moreover, when individual differences are in focus the best recognized and accepted cognitive models deal with information processing constraints, such as working memory capacity (e.g., Just & Carpenter, 1992). These models in general tend to ignore an active reader's engagement that is typically addressed only in the motivation literature. It is, however, a crucial factor if we agree on how important motivational aspects are in children learning to read and understand written texts.

Reading research has witnessed a major shift in the last two decades toward a broader definition of reading and the related research agenda (Kamil et al., 2000). Therefore, the role of motivation in reading comprehension has long been recognised as one of the foci (Guthrie & Wigfield, 1999) reflecting changes in reading research as well as in a larger context of education (Goldman, 1997). This emphasis coincides with emergent theories of text comprehension as involving a more active role of the reader (e.g., Kintsch, 1998) than previous theorists thought.

Reading comprehension, as written above, is a multifactorial construct; therefore, research in cognitive psychology and neuroscience produce a

vast amount of data. In the next part the focus is on the factors which may have a particular importance in the development of text comprehension and should be considered when comprehension is assessed in children.

Visual Decoding and Word Reading

As is well known, visual properties of the text are encoded via a series of eye movements from left-to-right across the line of text. The visual information is encoded during fixations, typically lasting about 200-250 ms and the between-fixation movements (saccades) last in general for 20-30 ms. On average, the eyes move 7-8 letter spaces (range:1-20 spaces) for readers of all alphabetic writing systems. 10-15% of the saccades are backwards in text eye movements (regressions). As text difficulty increases, readers tend to increase fixation durations, decrease saccade size, and increase regressions. Skilled readers of any alphabetic writing system acquire information from a region extending from 3-4 letter spaces to the left of fixation to about 14-15 letter spaces to the right of fixation. However, this perceptual span is very limited in beginning readers and takes time to be developed. The developing reading span gives rise to a very important skill that is the preview benefit from words to the right of fixation. The growing perceptual span and preview benefit results in more fluent reading and gives rise to a complex type of reading, where high frequency words are fixated longer than low frequency or unpredictable words. All these processes together help the advanced readers to identify words very fast and complete lexical access while the word is fixated.

Two main groups of skills emerge during development: one with all those that underlie decoding and one with skills providing fast access to the visual word form lexicon. This means that beginning readers should be checked at least for letter knowledge, though not for predicting acquisition success, as well as for reading accuracy and reading fluency. These measures should be designed according to our knowledge on the effect of word frequency, predictability and length, as well on that of reading span and preview benefit.

It is however clear from all the measures on reading speed that recognizing a word is not determined entirely by its visual or phonetic make-

up. It is neither solely affected by the words' frequency nor predictability, nor only by their coherence in context. Research in the "visual world" paradigm (the listener's eye movements to potential referents are measured while hearing speech) has indicated that words are recognized as denoting potential referents in the visual scene essentially as quickly as the auditory information arrives (Allopena et al., 1998; Tanenhaus et al., 1995). Moreover, co-articulation and prosodic information is used very early in the process of recognizing words (see for details Dahan & Gaskell, 2007). The same paradigm suggests that comprehension, as reflected in eye movements, is sensitive very quickly to the syntactic possibilities afforded by the speech stream as constrained by the referential context (Spivey et al., 2002). These results suggest that hearing words and sentences while reading can accelerate text comprehension. Therefore, it is plausible to ask why reading aloud in beginning readers is not obligatory in all reading acquisition instructions used in Hungary. Reading aloud and reading enough are of high importance in automation in reading. A particular amount of reading leads to overlearning that accelerates recognition and comprehension.

A convincing amount of scientific data suggests that a new 'expert' area of the occipital cortex, the fusiform gyrus, undergoes a slow and incremental sensitization to letter strings with meaning e.g., words, or without, but of legal phonotactic structure e.g., pseudo-words (Grill-Spector & Witthoft, 2009). Since 2002 (see Dehaene et al., 2002), this area has been called the Visual Word Form Area (VWFA) despite the fact that many other functions are associated with this cortical region. Nevertheless, studies on the VWFA revealed that words and pseudo-words are processed very fast. This is universal for all orthographies and correlates mainly with reading experience. The build up of a well functioning word form lexicon takes years; therefore, measures on reading development should focus on word-level performance during the first to fourth grades as follows:

> 1st grade – letter knowledge, decoding, word reading accuracy and fluency, word/pseudo-word reading;
> 2nd grade – accuracy and fluency measures with variables on word frequency and length;
> 3rd grade – accuracy and fluency and letter-sound integration measures, vocabulary;

4th grade – accuracy and fluency and letter-sound integration mea-
sures, reading of canonic sentences, text comprehension.

All these stages of learning to read are associated with changes in the
cognitive system where maturation, characteristics of the curriculum as
well as the effects of functional and strategic reading interact and influ-
ence the development of successful text comprehension. The stages of
reading development are summarized in the Table 1.1.

Inference and Reading Comprehension

Several different theories and cognitive models have been proposed to
explain how meaning is constructed during the process of reading com-
prehension. However, there is a common element in all the models
known: the development of a mental representation of the situation de-
scribed by the text. The expressions 'mental representation' or 'mental
model' are used for explaining that the meaning constructed via reading
comprehension goes beyond the literal meaning of the text. This process
embodies spatial, temporal, causal, motivational, and person- and object-
related information. As the reader progresses through the text, the mental
model is continuously updated as new information is read and interpreted
(Kintsch, 1998; Zwaan & Singer, 2003). One of the often-cited models is
the structure-building framework of Gernsbacher (1990) that sees the
mental model as one constructed from memory nodes containing all pre-
viously comprehended information that become activated by the incom-
ing information. If the activated information is relevant for structure
building, its level of activation is enhanced. If the activated information
is not relevant for ongoing comprehension, suppression of this informa-
tion occurs and frees up memory resources, which then become available
for the information activated by subsequent sentences and paragraphs.
Several studies which have reported that children with specific reading
comprehension deficits (poor comprehenders) lack the ability to suppress
irrelevant information underlie this hypothesis. Poor comprehenders
show an impaired ability to suppress irrelevant information from working
memory, thus limiting their reading comprehension performance (Pim-
perton & Nation, 2010). The process of activating relevant information,

Table 1.1 Stages, tasks, changes and acquired skills during reading development

	Stage	Grade/Age	Task	Change	Acquired skill/ knowledge
Pre school	Pre-reading	Pre-school/ Kinder-garten	Understandings about reading	Syllabic level phonological awareness	Knowledge about reading
SCHOOL YEARS	Initial reading	Grades 1–2/ Ages 6–8	Learning arbitrary letters Letter-sound rules Associating spoken letters and words	Phoneme-level phonological awareness, Initial letter-sound integration	Decoding, knowledge about reading
	Consolidation	Grades 2–4/ Ages 8–10	Functional and recreational reading	Growth of lexical vocabulary, Intermediate letter-sound integration, Faster access to meaning, Spelling	Sight word vocabulary, automation
	New stage	Grades 4–8/ ages 10–14	Acquisition of facts Use of prior knowledge in reading	Growth of special vocabulary	Inference use Advanced reading comprehension Understanding science text
	Multiple strategies	Secondary School/ Ages 14–18	Instruction in reading/ study skills	Skills Knowledge Competence Meta-cognition	Reading strategies used in text comprehension
	Construction/ Recons-truction	University, College Ages 18 and up	Special texts Adult literacy	Skills Knowledge Competence Meta-cognition	Reading strategies in text comprehension

updating the model, and suppressing irrelevant information continues throughout the whole reading process and allows the reader to connect relevant information. This happens both within and outside the text in order to develop a coherent understanding generated in different ways depending on which of two dissociable neural subsystems (lexical or semantic) underlie the activation of background information (Sundermeier et al., 2005).

The making of connections between distant information is referred to as inferencing, one of the processes that contribute to the construction of the mental representation derived from all details described by the text. The ability to make inferences has been a strong predictor of reading comprehension in a number of studies (Cain et al., 2001; Cain et al., 2004). As we know, skilled comprehenders make many different types of inferences as they proceed through the text, but bridging inferences is considered as essential for developing and maintaining coherent understanding. Developmental studies of inference-making have found that this skill improves with age and although young children are able to make inferences similar to those made by older children and adults, young children are less likely to show successful inferences when prompted or cued. Moreover, inference is also affected by text-related factors such as the distance between ideas in the text, as well as by certain developmental factors, such as the maturation of working memory components. When integration of information with particular within-text distance is required, younger children show lower comprehension performance, meaning that they are more affected by the separation than older children or skilled comprehenders (Cain et al., 2004).

The inference-making involves a strong working memory component and this is confirmed by data both on showing that children and adults with reading comprehension problems do not perform well on working memory tasks (Just & Carpenter, 1992). Although inference making is important for constructing meaning during reading, an efficient reader is not able to connect all the information read to all the prior knowledge activated. To determine which information remains activated and which information is to be suppressed, the reader relies on contextual cues to determine whether the incoming information coheres with the previously comprehended information (Gernsbacher, 1990; Kintsch, 1994). For ex-

ample, sentences that refer to previously mentioned concepts or those that maintain previously-established time frames or locations are powerful cues that the information should be integrated into the current mental model (see Gersnsbacher, 1997)

It has been proposed that illustrations are one of the cues used by readers, especially young readers, to facilitate the development of the mental model (Glenberg Langston, 1992; Gyselinck Tardieu, 1999). Illustrations could act as contextual cues used in deciding about the information remaining active in the mental model and pictures providing a salient depiction of between-elements relations may act as facilitators in the process of transforming text into a mental model. Thus, it is possible that pictures may facilitate reading comprehension to the extent that they accurately represent the parts of the text that are important to integrate and keep activated for comprehension. This assumption is confirmed by a recent study (Pike et al., 2010) showing that 7- to 11-year-olds use illustrations to play a contextual role though the effect depends on the type of information depicted. These effects get reduced with grade in parallel with an overall age-related increase of inference-making. Given the complexity of inference-making the variety of proposals for the functional neuroanatomy is not surprising at all. However, the most studied candidate is the medial and dorso-medial prefrontal cortex (for reviews see Frith & Frith, 2003; Northoff & Bermpohl, 2004). This proposal is consistent with most of the inference accounts, in which the information given in the text needs to be integrated with background knowledge via inductive reasoning or evaluative judgments.

Siebörger and his colleagues (2007) have investigated task-induced inference processes during comprehension of short texts by using fMRI where deliberate inferencing was induced via coherence rating. The distribution of responses enabled the authors to dissociate stimulus- and process-related aspects of inferencing and as expected, the results confirmed the above mentioned theories of text comprehension. The influence of the task instructions on the dorso-medial prefrontal cortex activation confirms its role for coherence building. Independently of the particular interpretation of this region's functionality, its activation can be considered an index of non-automatic intentional inference processes. We may expect that further research will help to dissociate automatic,

associative, or memory-based inferences from strategic, explanation- or knowledge-based inferences. These differences, however, should be taken into consideration in any measures of reading comprehension of text requiring different types of inference making.
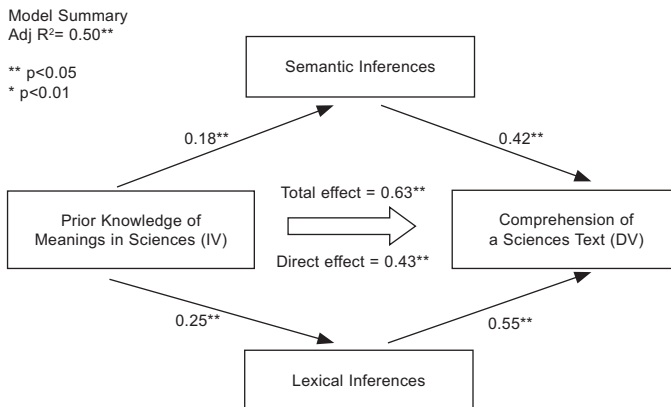
Prior Knowledge and Reading Comprehension

Prior knowledge as well as external strategy use are personal factors influencing intratextual processing. There is an ever-increasing amount of experimental data available in the literature that are consistent with the constructivist theory (Kintsch, 1994) saying that topic knowledge provides a basis both for remembering the text and understanding it (Alexander et al., 1994). Topic knowledge together with external strategies exert an influence on reading comprehension to a great extent in skilled readers. External strategies are cognitive operations (e.g., paraphrasing, summarizing, organizing, explaining, evaluating) with the concurrent production of external representations, such as notes, annotations, and underlines (Kobayashi, 2009).

As a very recent study of Christian Tarchi (2010) shows, both the topic and the domain of prior knowledge play a central role in text comprehension. As agreed by many researchers of the field, prior knowledge is constituted from two main constructs: domain and topic knowledge. Furthermore, the construct of topic knowledge has two subcomponents to describe the growth of understanding: knowledge of facts and knowledge of meanings. This distinction reflects the view of cognitive psychology on factual knowledge and semantics. There is a general agreement on the importance of assessing both constructs, thus, any detailed analysis may lead to a deeper understanding of the nature of topic knowledge comprising different subcomponents.

In the Tarchi study (2010) 147 seventh graders took part and their prior knowledge was assessed via a multimodal method that is the combination of open-ended and multiple-choice questions. As stated by Dochy and his colleagues (Dochy, 1992; Dochy et al., 1999), the use of multimodal methods is more reliable than single ones. Their data demonstrate that results on investigating prior knowledge and reading comprehension might be seriously affected by the assessment method per se. The ex-

perimental data of Tarchi (2010) showed that prior knowledge plays a central role in comprehension where reading performance on different texts is predicted by different sets of components. The study's results are especially important from the point of view of assessment where it seems that domain characteristics of prior knowledge should be taken in account. While meta-cognition was confirmed to be an important component for both of the text types investigated in science and history. Performance in science was predicted by a general ability to comprehend informative texts, lexical inferences and readers' prior knowledge of meanings, whereas performance in history was better predicted by semantic inferences and prior knowledge of facts (see Figures 1.1 and 1.2). These results speak for the fundamental importance of meta-cognition and inferences.

Model Summary
Adj R^2= 0.50**

** p<0.05
* p<0.01

Semantic Inferences

0.18**

0.42**

Prior Knowledge of
Meanings in Sciences (IV)

Total effect = 0.63**

Comprehension of
a Sciences Text (DV)

Direct effect = 0.43**

0.25**

0.55**

Lexical Inferences

IV means independent variable, DV means dependent variable.

Figure 1.1 Mediation model for comprehension of science texts
(from Tarchi, 2010)

Model Summary
Adj R^2 = 0.26**

** p<0.05
* p<0.01

```
                    ┌─────────────────────┐
                    │  Semantic Inferences │
                    └─────────────────────┘
              0.17**                    0.86**
┌──────────────────┐  Total effect = 0.68**  ┌──────────────────┐
│ Prior Knowledge of│ ──────────────────────> │ Comprehension of │
│ Facts in History (IV)│  Direct effect = 0.46** │ a History Text (DV)│
└──────────────────┘                          └──────────────────┘
              0.30**
                    ┌─────────────────────┐
                    │  Lexical Inferences  │
                    └─────────────────────┘
```
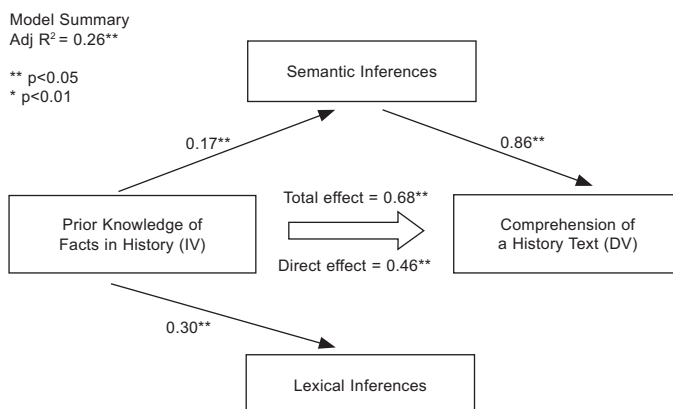
IV means independent variable, DV means dependent variable.
Note the lack of effect of lexical inferences on history text and an increased
effect of semantic inferences as compared to the science texts model.

*Figure 1.2 Mediation model for comprehension of history texts
(from Tarchi, 2010)*

It is worth mentioning that domain knowledge showed a robust effect on comprehending both, confirming other researchers' findings (Alexander & Jetton, 2000; Halikari et al., 2007). We may assume that there is a dynamic interplay between knowledge and text comprehension. While topic knowledge has a direct effect on text comprehension, domain knowledge is mediated both by specific (lexical and semantic) and general inference-making (between lexical and semantic).

It seems that comprehension of science texts is mediated by a dynamic interplay of both types of inferences; therefore, developing reliable assessment methods requires proper understanding of further factors of inference. In a recent study Cromley and her coworkers (2010) further tested the fit of the direct and inferential mediation (DIME) model of reading comprehension (Cromley & Azevedo, 2007). The DIME model hypothesizes relationships among background knowledge, inferences, reading comprehension strategies, vocabulary, and word reading, and the model addresses the direct and mediated effects of these predictors on

comprehension. The authors tested the fit of the model and its three variations on data from 175 students in ninth grade. The DIME model explained 66% of the variance in comprehension. Vocabulary and background knowledge made the largest contributions to comprehension, followed by inference, word reading, and strategies.

The Cromley et al. study (2010) reports on the results of 737 students enrolled in an introductory biology course required for majors. The participants completed multiple-choice tasks on biology-specific and prior-to-topic knowledge, inference and reading strategy use, reading vocabulary, word reading fluency, and reading comprehension. They used structural equation modelling in order to test the fit of the DIME model to the data and they found excellent fit indices for all models. However, the original DIME model fit significantly worse than the measurement model; it was therefore modified by including a path from reading vocabulary to reading strategy use that fit significantly better. Results from the modified model suggest that comprehension interventions for undergraduate students with biology majors might use pre-teaching to build topic knowledge.

Comprehension of Idioms

An idiom is a figurative expression that can usually be interpreted literally while it takes a nonliteral meaning when used in a specific context. As Levorato and Cacciari (1992, 1995) have proposed, the ability to use contextual information is one of the crucial skills of children in acquiring idiomatic meanings. The meaning of idioms is learned by children when they encounter them in spoken and written contexts (see Nippold, 2006). Therefore, it is reasonable to assume that idiom comprehension is related to the text processing skills of children. As many experimental data suggest (see later), there is a well-established relation between children's reading comprehension performance and their ability to generate inferences from text. For example children with weak reading comprehension show low performance in integrating information between sentences in a text in order to ensure cohesion (Cain & Oakhill, 1999), in generating coherence and elaborative inferences (Cain et al., 2001), as well as when using context to derive meaning of novel words (Cain et al., 2004).

As Nippold and his colleagues (2001) found, 12-year-olds with a good

level of reading and listening comprehension were superior in selecting the target meaning of idioms presented in short story contexts compared to age-matched poor comprehenders. In an elegant study Levorato and her colleagues (2004) explored the relation between reading comprehension and idiom understanding in 7- and 9-year-olds with different levels of reading comprehension skill and found that the idiom comprehension performance was accurate even for the poor comprehenders. Analysis of the incorrect choices, however, revealed qualitative differences between the groups; the poor comprehenders were more likely to select literal responses than were the better comprehenders, indicating that less attention was given to context. A similar finding of Cain and her coworkers (2005) further strengthens this view when showing that 9-year-old children are better able to explain the meanings of idioms in context than in isolation. The good and poor comprehenders differ in interpreting transparent and opaque idioms, poor comprehenders being significantly worse at using context to work out the meanings of opaque idioms. Therefore, idiom comprehension studied in context gives reliable information about the development of text comprehension, especially when transparency and opaqueness is taken into consideration.

Summary and General Conclusions

The cognitive factors of literacy development represent a universal set of abilities whose contribution to skilled decoding and understanding of texts is well documented and empirically confirmed to large extent. In order to develop an optimal reading acquisition instruction corresponding to the nature of orthography used as well as a reliable assessment one has to rely on data on the developmental course of these important abilities as well as on the main internal and external factors contributing to a successful reading comprehension. There are several pieces of scientific evidence teaching and assessment can rely on.

Children need to be trained explicitly over longer periods of time before they start to show some literacy fluency and secondly, there is a relatively small but consistent group of children who do not seem to be able to master the basics of an alphabetic script adequately. These children are either poor readers or dyslexics. The training methods used for chil-

dren with less success in reading acquisition should depend on the results of literacy assessment in educational as well as in diagnostic context.

There are three cognitive factors that play a prominent role in reading development. The prime role of phonological processing in learning to read is emphasized by the fact that a specific reading disability, i.e., dyslexia, is characterized by well-established phonological awareness deficits. When investigating the cognitive dynamics of reading and spelling development phonological awareness is a prime candidate for our attention. The development of decoding relies to a large extent on a general ability of children which matures around the fifth to sixth year of age that is the first stage of phonological awareness (PA). The PA at the syllabic level is the result of a sufficiently mature speech-processing system, and its phonemic level results from learning to read. Reading as a technique relies heavily in beginners on letter-sound association and on complex letter-sound integration in skilled readers.

While letter-sound tasks reveal the development of decoding, pseudo-word and word reading skills are measurable via accuracy and fluency parameter variations. These can be linked to the development of orthographic processing. However, an efficient use of the knowledge on letter-sound correspondence is the prerequisite of fluent reading that means during reading development a declarative memory fact must be transformed into fast and automatic procedures. Together with the fact that abnormal letter-speech sound integration might be a persistent manifestation of poor reading up into adulthood these findings ensure that letter-speech sound processing is the second prime candidate for investigating the cognitive contribution to fluent reading and spelling development.

The third cognitive skill that has frequently been associated with reading skill and reading failure is the fast, automatic naming (RAN) of well-known visual items such as letters, digits, objects and colours. Several studies have demonstrated RAN (especially alphanumeric RAN) to contribute to reading ability over and above the influence of phonological awareness. RAN is a skill that contributes strongly and uniquely to the reading performance of typical and atypical reading children and therefore presents as the third prime candidate to be included in the search for the cognitive development of fluent literacy.

The cognitive development of fluent word reading in alphabetic scripts follows a similar pattern in orthographies varying in the consistency of

their letter-speech sound mappings. In all three the weight of the contributions of phonological awareness, letter-speech sound processing and RAN are shifted as a function of reading expertise and word type and frequency and this general effect is not modulated by orthographic consistency. Although the universal cognitive predictors of alphabetic reading performance follow a universal developmental pattern including phonological awareness as key component, in transparent orthographies like Hungarian its influence is shortlived. Therefore, in these orthographies all measures of reading development in grade two to grade four should take into account a complex interplay of the phonological factors, vocabulary and reading speed and accuracy.

An acceptable reading fluency is acquired in a shorter period in transparent orthographies as compared to deep ones. However, in agglutinative languages like Hungarian readers have to learn to recognize the morphemic structure of words used in their language through recognizing their constituent stems and morphemes. The morphological discrimination of written words is a better detector of reading impairments than simple vocabulary reading. This should be taken into account when the reading skills of Hungarian children under 12 years of age are investigated.

Two main groups of skills emerge during reading development; one consisting of all those skills that underlie decoding and one with the skills providing fast access to the visual word form lexicon. That means beginning readers should be checked at least for letter knowledge, though not for predicting acquisition success, as well as for reading accuracy and reading fluency. These measures should be designed according to our knowledge on the effect of word frequency, predictability and length as well on that of reading span and preview benefit.

One of the most important literacy skills, next to reading, is spelling. Learning to spell is assumed to be even a bigger challenge than the acquisition of reading skills. While reading 'only' requires the recognition of words or letter-patterns, spelling requires the active production of letters and words. There is scientific evidence to suggest that phonological processing skills and letter-speech sound association skills continue to affect spelling performance in all grades and at least until the end of primary school.

Moreover, the major common cognitive mechanism mediating the relationship between word reading fluency and spelling skills is phono-

logical processing. In contrast, RAN seems to reflect a cognitive process that is uniquely related to reading speed. Spelling and reading thus only partly rely on common cognitive mechanisms, and children rely less on these common cognitive mechanisms during reading and spelling and more on unique ones as their expertise grows.

All aspects of the development of reading comprehension can be assessed when the complex interplay between reader and text characteristics is understood and taken into account. The cognitive models of reading comprehension focus on formal properties of reading, such as propositional knowledge representation, the nature of inferences in comprehending narrative versus expository text or idea density and coherence.

The ability to make inferences is a strong predictor of reading comprehension, and skilled comprehenders make many different types of inferences as they proceed through the text. Developmental studies of inference-making have found that this skill improves with age. When integration of information of within-text distance is required, younger children show lower comprehension performance meaning that they are more affected by the separation than older children or skilled comprehenders.

Domain and topic knowledge together with external strategies influence reading comprehension to a great extent in skilled readers. While topic knowledge has a direct effect on text comprehension, domain know-ledge is mediated both by specific (lexical and semantic) and general inference-making (between lexical and semantic). The external strategies are cognitive operations (e.g., paraphrasing, summarizing, organizing, explaining, evaluating) with the concurrent production of external representations.

Metacognition is an important component of comprehending different text types. However, while one is better predicted by a general ability to comprehend informative texts, lexical inferences and reader's prior know-ledge of meanings, the other relies more on semantic inferences and prior knowledge of facts.

The text comprehension of poor and good readers differs in how they interpret transparent and opaque idioms; poor comprehenders are significantly worse at using context to work out the meanings of opaque idioms. Therefore, idiom comprehension studied in context gives reliable information about the development of text comprehension, especially when transparency and opaqueness is considered as variable.

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2

Societal and Cultural Aspects
of the Assessment of Reading Literacy

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Introduction

Due to modern communication technologies, documents are produced in numbers never seen before. These documents are social and cultural products, and their processing and critical interpretation demands highly developed reading literacy. However, equally important is an individual's social and cultural environment as far as exposure to documents is concerned. Research has demonstrated that the development of the basic psychological processes of reading and the acquisition of reading skills (decoding) are simple prerequisites for text comprehension and reading literacy. Regular formative reading assessments must enable the evaluation of different aspects of reading, for example, whether students are able to handle text comprehension tasks in different situations.

As part of the framework for the assessment of reading literacy for the grades of 1 to 6, the present chapter is oriented towards the alignment of both the needs and the cognitive and motivational capabilities of children, who are expected to learn to read with the expectations and requirements of a modern knowledge-based society. We regard reading, from its earliest beginnings, as the acquisition of a socio-cultural tool, a fundamental prerequisite for achieving personal and social goals and actively partici-

pating as a responsible citizen in society. Thus, we examine the issues of reading literacy discussed in the chapters on the psychological background of learning to read (Blomert & Csépe, present volume) and on curricular issues in reading (Józsa & Steklács, present volume) from the perspective of social and cultural demands. In a broad sense, social, societal and cultural expectations are related to the individual's ability to read documents and process texts (this is the reason why we have opted for a psychological principle in organizing the present chapter). In a narrower sense, social, societal and cultural expectations can be seen as related to the individual's ability to use, and reflect on, given texts (written for given purposes and exhibiting given characteristics) to achieve their own purposes in the given situation.

The development of reading skills between grades 1 and 6 is a highly sensitive phase of an individual's life which is decisive for their future position and function in society. Social and cultural demands for reading literacy for this age group are seen as the acquisition of knowledge and skills that enable children to cope with gradually increasing demands in processing verbal and pictorial information in a growing variety of content areas and contexts. In the following, the developmental aspect is reflected by the weight given to the components of reading literacy and by the indication that all these components must be learnt, and taught. In this chapter, we can point out what needs to be known when reading processes, texts, and the demands of adult life are considered. This gives a good basis for the development of standards, but more research and large scale assessment is needed to complement these with appropriate benchmarks.

Accessing and retrieving information, the processes of reading comprehension, motives and contexts to read are introduced. The texts on which these operations should be performed are discussed with regard to their types, formats and medium. Each component is first characterized in terms of what is generally accepted in the literature. Then a brief account is given of research with Hungarian subjects to show what is known about it and what has been discussed regarding its significance. The objective is partly to emphasize why certain areas should be included in the standards and diagnostic assessments for reading literacy, and partly to highlight research needs in areas neglected so far. Findings from national and international assessments on how Hungarian students perform

in respect of different reading tasks, operations etc. are not discussed here; for an overview, see D. Molnar, Molnar & Józsa (2012). The processing of pictorial information is an area where the relevant Hungarian literature is psychological, and is not related to reading literacy or societal expectations and needs in information processing. Thus in this case, only the components themselves will be introduced.

This framework has similarities to the framework for the PISA 2009 reading assessment, but also differs from it in various respects. Firstly, it addresses earlier levels of reading proficiency, starting from the very beginning of learning to read up to an intermediate skill level, which must be further developed before the PISA evaluation takes place. Secondly, it takes cognitive psychological and linguistic research on reading and text comprehension more systematically into account (cf. Graesser, Millis & Zwaan, 1997; Kintsch, 1998; van Dijk & Kintsch, 1983; Gernsbacher, 1990), whereas the PISA framework is primarily based on a less cognitively-oriented model of document literacy (Mosenthal & Kirsh, 1991). Thirdly, the framework entails not only a cross-sectional view, but includes also a developmental dimension, because reading skills acquired at level n have to provide the basis for the acquisition of reading skills at level n+1, and so forth. The two latter points apply to a comparison with the PIRLS studies, too. Furthermore, neither of these international projects functions as a diagnostic assessment, whereas the present work is intended to provide a framework for such an endeavour.

Defining Reading Literacy

A still wide-spread naïve view is that reading is simply the decoding of graphic (printed or hand-written) verbal information into auditory verbal information, which can be demonstrated by reading aloud (cf. Gósy, 2008; D. Molnár, Molnár & Józsa, 2012). If this were true, the acquisition of reading literacy would only entail learning of decoding skills in the first grades of schools, which skills would then be used throughout the rest of life. In fact, reading is a highly complex activity on multiple levels, and the acquisition of reading literacy means to learn, use and perfect a corresponding set of highly interrelated operations, skills, and strategies which can and should be improved until adulthood even in the

case of highly skilled readers (for the history of the literacy concept see Lafontaine, 2004). Texts do not consist of sentences randomly stringed together. Instead, they are coherent both on a local and on a global level. Their authors intended to create a meaning and they had a purpose to achieve with their texts. Likewise, readers turn to texts with purposes of their own. Following Bühler's (1934) view of language as a tool for conveying a message about something by someone to somebody else, reading documents can be seen as the externalization of an author's knowledge or intentions that can be used by a reader to acquire the corresponding knowledge or to follow the author's intention, although the reader is free to accept the author's message or not.

Texts are documents but there are documents which are generally not considered as text, such as photographs or graphs or tables. In the PISA framework, the inclusion of pictures, diagrams and graphs has been dealt with by a terminology that broadens the concept of text. A distinction is made between continuous text (ordinary verbal text) and non-continuous text (pictures, diagrams, graphs, and tables). The combination of (verbal) text and pictures or diagrams or graphs or tables is referred to as 'mixed texts'. However, the PISA decision to refer to all of these as text is not universal. In this chapter, we use the term document to denote a composed message, regardless of whether it contains verbal text in any format and/or graphic information.

Written documents contain not only verbal information. The information explosion in modern societies has also enhanced the use of pictures, diagrams and graphs. Accordingly, written documents are usually combinations of visually presented verbal and pictorial information. A definition of reading literacy has to take this new development into account (Baumert, Stanat & Demmrich, 2001).

We do not assume that realistic pictures, diagrams and graphics will replace written texts in the near future. Although a picture can (sometimes) be worth more than 10,000 words (Larkin & Simon, 1987; Mayer & Gallini 1990), because it allows direct access to a large amount of spatial information or information transformed into a spatial format; still, the conceptual content to be conveyed by the document remains the task of the verbal information. However, despite the important role of different kinds of pictures, verbal texts will also take the lead in guiding readers' comprehension processes in the future. Nevertheless, one should

realize that reading literacy refers not only to the processing of verbal information. Instead, it means the competency to understand documents consisting of written text (verbal information) as well as pictures, diagrams, and graphs (pictorial information) or other formats (e.g., tables) by conjoint processing of multiple sources of information (Ainsworth, 1999; Rouet, Levonen, Dillon & Spiro, 1996; Seufert, 2003). Comprehension of documents including different kinds of information sources requires therefore not only coherence formation within each source of information (for example, the verbal text or the diagram), but also coherence formation between the different sources information (for example, between the text and the diagram).

We consider reading literacy a key competency for active participation in modern knowledge societies for achieving personal goals as well as for social and cultural activities, such as schooling, higher education and graduation, finding a job, fulfilling job demands and extending one's personal social, political and cultural life by active citizenship. Accordingly, reading literacy assessment should cover a broad range of situations, in which reading skills play an important role in the present as well as presumably in the future.

Therefore, we define reading literacy as the necessary skills for (1) accessing and retrieving information, (2) decoding and understanding of information from typed or hand-written documents including texts, pictures, diagrams, graphs and tables, (3) reflecting on this information and (4) using it to develop one's knowledge and individual potential in order to participate in society and achieve individual and social goals. Reading literacy includes the competency for active and purposeful application of these skills for various purposes in a broad variety of situations, and thus requires the use of strategies. Although children at grade 6 are still far away from dealing with such real life situations as adults do, they should gradually be made familiar with these various kinds of documents in various kinds of situations with corresponding uses of reading literacy.

Reading Literacy as a Prerequisite of Individual, Social and Cultural Development

The world of external written documents has dramatically expanded during the last decades. Not only has the number of written documents grown tremendously, but more types of documents can also be found that have been developed for different purposes. A growing number of individuals all over the world are confronted with a world of written documents and are expected to use these documents in a meaningful and purposeful way. As a result, literary skills required to participate in modern societies differ remarkably from the skills required 20 or 30 years ago.

In modern knowledge-based societies, literacy provides numerous advantages to those who have acquired the corresponding skills (Olson, 1977). The European Community (2001) has stated that reading literacy skills are a key to practically all areas of education, because they facilitate participation in the broad context of life-long learning, contribute to individuals' integration into society and enhance their personal development. Literacy is a prerequisite for successful participation in numerous areas of life (Cunningham & Stanovich, 1998). Rapid technological development has created and will further create new job requirements. The corresponding vocational training usually needs reading literacy. The same is true for various kinds of life situations outside schools such as self-education as well as educating one's own children, health care, participation as a citizen in the community and in society as a whole. Reading literacy is needed more than ever before in human history. It is a requirement for participation in the professional world, in personal growth and social welfare, and it matters both for the individual and for the society as a whole. Reading literacy also allows access to essential parts of one's own culture in terms of its written historical documents or belles lettres, poetry and fiction as a source of enjoyment and recreation.

Schools should be aware that reading literacy is a central part of enculturation and participation in society in everyday life. They should prepare pupils for mastering these challenges in the full range of situations that require skilled reading of various kinds of documents. Due to the ubiquity of electronic, web-based media, acquisition of reading literacy should not only focus on print reading, but also on so-called 'elec-

tronic reading'[1], because more and more information is provided on the web. We expect that in about ten years a large majority all over the world (the vast majority in Western countries) will read electronic web-based documents. Electronic reading will be a general requirement for staying informed and involved in society. In order to enhance the development of reading literacy, schools should also emphasize the situatedness of reading literacy by referring to real-life situations which implicitly convey that reading is a highly relevant skill in everyday life. In this way, situational interest in reading and, as a result, the engagement in reading, may be enhanced (Krapp, Hidi & Renninger, 1992; Guthrie & Wigfield, 2000).

As for Hungarian discussions regarding the concept of reading, there appears to be a duality in education (D. Molnár, Molnár & Józsa, 2012). On the one hand, educators' thinking seems to be largely influenced by a behaviouristic view which originally took shape in the 1960s (e.g., Adamikné, 2006). System-level educational assessment projects of reading and reading literacy, on the other hand, rely on the recent concepts of international reading literacy assessments (e.g., Balázsi, Felvégi, Rábainé Szabó & Szepesi, 2006).

Pléh (2002) provides a useful framework for conceptualizing reading as communication and the changes in reading and communication with technological development. He interprets reading from an evolutionary angle as communication based on human cognitive architecture. Accordingly, the evolution of the organization of knowledge among humans changed with culture, and for most of human history, its sharing (communication) was dominantly vertical, from generation to generation. Printing made it possible to share ideas on a large scale, a remarkable novelty compared to earlier possibilities. Written communication enabled by the use of ICT [information and communication technologies] in the past few decades allowed the horizontal transmission of knowledge on a mass scale and thus made shared knowledge possible on a much larger scale than before. – What is written down has changed; consequently, purposes of reading have also changed. Information related to everyday activities or mundane events may also have written records; it is not

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1 For simplicity, we use the same term as the PISA framework despite its semantic impreciseness. The delivery of information is electronic, whereas the reading itself is not, but remains a cognitive psychological process.

only in distinguished professions that work-related knowledge is presented in written texts.

Reading electronic texts has attracted linguistic, philosophical, sociological and technical attention (Kerekes, 2010), but there is very little research yet on reading processes or performance under such conditions in Hungary (e.g., R. Tóth & Hódi, 2009; Kiss, 2002). E-texts have quickly become subjects of linguistic analysis, which focuses on text characteristics (e.g., Benczik, 2001). Their nature as secondary orality (i.e. when these are mere transcriptions of oral utterances and not texts composed to be read) has been an issue in discussions of philosophical and theoretical discourse on communication. While there are electronic genres that belong to orality in spite of their appearance in written form, many exhibit all the features of written texts. The issue at hand is the new processing requirements their medium presents, and this has received little attention (e.g., Golden, 2009). Benczik (2010) summarizes what is often seen as another threat to written texts, the iconic turn, with technological advances making it easy to share visual images. The section on processing pictorial information in the present chapter shows that this issue may be better approached as that of reading pictures, an analogy to reading verbal text. The inclusion of a psychological perspective reveals that gaining information from an image is just as complex and in certain cases involves a difficult learning process.

It appears that many authors from the fields of sociology and communication would still prefer a traditional view of reading: information processing and knowledge acquisition from text, as in reading literature or reading to learn (e.g., Nyíri, 2006). They see this concept challenged, perhaps even threatened, by the characteristics of reading of electronic texts, which seems to be rather superficial and focusing only on small information segments. From another point of view, however, the distinction actually does not result from the medium, but from the different purposes of reading. Electronic texts composed for this medium are quite often written with the purpose of giving information the reader may need in certain situations. Abundant on-line, such texts also appear in print format, but, from the traditional viewpoint, they are almost invisible, since they have not been written or read with the purpose of long-term knowledge acquisition.

With all the differences of defining reading in the above fields, research findings clearly indicate differences in performance even amounting to a digital divide and a correspondence between practices and habits in computer and library use (A. Nagy, 2003). Differences in e-reading performance by social background have also been shown in PISA 2009 (OECD, 2011). Csepeli and Prazsák (2010a), partly drawing on data from an international study (the World Internet Project), claim that the causes of the digital divide among adults include other factors in addition to poverty, e.g., lack of skills. Their analysis focuses on values and their data reveal slight, but tangible differences in value orientations among those using and not using the internet. For the present discussion, this seems to confirm the presence of different reading purposes and a different use of on-line written texts. Csepeli and Prazsák (2009) found in a 2008 survey that those using the internet can be differentiated from those not using the internet by demographic and sociological factors, and these two groups have markedly different concepts of culture, that of the former being wider.

More importantly though, those not using the internet seemed to belong to two groups: on the one hand, those who do not engage in any other literacy related activities, and, on the other hand, those who are familiar with high culture but their conservative understanding of this concept makes them reject electronic media. Later Csepeli and Prazsák (2010b) differentiated four social groups on the basis of their reliance on books and texts available on-line. The 'old poor' (37% of the population) do not use either – they are typically old people with low educational levels, for whom social and cognitive poverty interact. The 'new poor' (25%, 'Gutenberg orphans') use the internet, but do not read books. They are young, with relatively high educational levels. The 'old rich' (19%) are the opposite: they read books but do not use the internet; they, too, are typically elderly, and prefer to turn to the past, not the future. Finally, the 'new rich' (25%) read books and on-line texts; this group comprises young, well-educated people who have access to information in both traditional and novel ways (p. 18). The authors' conclusion is, 'The internet is not a medicine for poverty, but it may enrich those further who are already rich' (p. 18.). However, it also follows from their study that the internet, and the ability to process electronic texts, may contribute to the widening of possibilities of the 'new poor' and give them options not available to the 'old poor'.

Józsa & Steklács (present volume) discuss how some of the above issues are reflected in reading instruction. In mother tongue education, a number of paradigms can be differentiated, informed by different concepts of culture and education, as well as different concepts of reading and reading instruction (Horváth, 2003, 1998). Which of these find their way into central curricula depends on educational and social policies. However, research on reading literacy has proven that this is crucial, basic knowledge. Its standards and diagnostic assessment should be rooted in research evidence in the psychology of reading and in the assessment of societal needs.

Levels of Reading Literacy

Reading literacy includes skills for gaining access to and finding information within documents, decoding and understanding information in written documents including texts and graphics, reflecting about this information and using it for specific purposes (Kirsch, 2001; Kirsch & Mosenthal, 1990). Readers do not passively pick up information from a document, they also create their own ideas about what they read. They construct meaning, on the basis of the information found in the written document by the usage of their prior knowledge, of text type cues and of situational cues. When constructing meaning, readers decode graphic information, have access to their internal lexicon, parse syntactic structures, form micropropositions, reduce them to macropropositions (van Dijk, 1980), perform internal visualizations and construct mental models (Kintsch, 1998). They apply strategies for combining information from different sources (such as text and graphics). These strategies are goal-specific and they should be sensitive to the kind of text and the information at hand.

In this section, we describe (1) the requirements of accessing and retrieving information; (2) the requirements of reading and understanding texts; (3) the requirements of reading and understanding graphics; (4) the requirements of integrating texts and graphics; and (5) strategic aspects of reading written documents including texts and graphics. Hungarian research findings are discussed where they are available.

Accessing and Retrieving Information

The application of reading skills does not always require that a whole text be read. Sometimes, only a search for specific information is required as, for example, when the departure times of a bus or train have to be read from a table in a written document. In that case, only isolated pieces of information have to be searched for. The reader must scan the document, locate and select the relevant information. Retrieval of information usually requires the use of access structures within a document. Access structures play a role both in print documents and in electronic documents. In print reading, access structures include content tables, headings, indexes, etc. In electronic reading, relatively sophisticated systems of navigation tools have been developed. Nowadays, children are often more skilled in using these electronic access structures when retrieving information from the internet than their parents or their teachers, at least at lower levels of information access such as downloading documents, games, songs or movies. Reading literacy assessment should not ignore these access and retrieval skills, but should consider the purposeful and meaningful usage of available access structures for searching, finding, evaluating and retrieving information both in print reading as well as in electronic reading.

Both printed and electronic texts include tools and features that help readers to find their way through the information space of the document. In print, these navigation tools and features are tables of content, indexes, chapter and section headings, headers or footers, page numbers, footnotes and glossaries. In electronic documents, these navigation tools and features are navigation icons/buttons, arrow boxes, menus, scrollbars, tabs (e.g., for different websites), embedded hyperlinks, site maps and text-search functions. Scrollbars allow readers to move a 'reading window' up and down a page. Sometimes, navigation tools in electronic texts use analogies to print text. Examples are micro page-sets at the side of the screen or graphical representations of the available access structure.

Menus in electronic text are often hierarchically embedded so that the selection of one menu point causes another, hierarchically subordinated menu to be displayed. Hypertext links are signs (words, icons, or arbitrary symbols) that connect the present information to another piece of information and, thus, define the formal access structure of the hypertext.

Because the formal access structure can usually be mapped on the semantic structure of the hypertext, hypertext links usually follow the semantic relations within the hypertext. Whereas network-like document organization was originally considered as beneficial for multi-perspective comprehension and non-linear thinking, empirical research has found that these structures are more likely to cause confusion and disorientation than hierarchical structures. Hypertext links can be presented in separate lists (row, column or drop-down menu) or embedded in content page, marked by color or typography. Readers who are skilled in reading electronic text are familiar with these devices (Rouet, Levonen & Biardeou, 2001).

While it now seems obvious that operations to access and retrieve information are essential, the necessity to teach these directly is not necessarily explicit in the teaching of reading. Because several of these tools and the corresponding operations seem self-explanatory to many, their use is acquired by many readers without explicit help, and this seems to apply both to instruction for usage of access structures and to reading strategies relying on these (cf. Csíkos & Steklács, 2006; Csíkos, 2007). To ensure that all readers or users learn these skills, both the standards and the diagnostic assessment of reading must target them. At present, not enough research evidence is available on the nature and development of these skills to inform either benchmarking or assessment. (Since cultural and instructional factors influence the acquisition of reading literacy, it is not evident that tendencies identified elsewhere will apply.)

Comprehension of Texts

Reading a text can take place on different levels with different depths of processing (Craik & Lockhart, 1972; Cermak & Craik, 1979). According to reading research and research on text comprehension, the following processes are essential parts of reading literacy as demonstrated by skilled reading and comprehension of texts:

   (1) letter identification and phonemic encoding,
   (2) identification and recognition of words,
   (3) parsing and constructing propositional representations,
   (4) identification of topics and topic structure,

(5) construction of mental models,

(6) awareness of author's intention and of text genre (Graesser, Millis & Zwaan, 1998).

These processes interact through bottom-up and top-down processes in highly skilled reading. However, because resources of working memory (i.e. for conscious cognitive processing) are limited, only some processes can be performed consciously at a specific moment; whereas the lower processes (mentioned earlier in the list of reading processes above) have to be automated. Easy processing on one level requires that processing on subordinate levels be sufficiently automated. For less skilled readers, this implies that as long as some lower processes are not sufficiently automated and still require working memory capacity, the higher order processes cannot be performed by the reader. The main requirement for gradual automatization is a high amount of practice, and this makes the acquisition of reading literacy a time-consuming process – one that needs effort, practice, and mindfulness.

Letter Identification and Phonemic Encoding

Whereas beginning readers fixate every letter, skilled readers fixate only about 80% of the content words (nouns, verbs, and adverbs) and only about 40% of the function words (articles, prepositions, and connectives; see e.g., Csépe, 2006; Rayner, 1999). Fixations last usually 250 ms, whereas the saccadic eye movements between fixations last about 15 to 20 ms. 85 to 90% of the saccades are moving forwards, 10 to 15% of the saccades are moving backwards. During the saccades, no visual information can be picked up.

Based on the graphic information picked up during the fixation, the reader can identify letters and letter clusters (Rumelhart, 1977, 1980; Vellutino, 1979) that can – especially in phonetically highly transparent languages such as Italian, Finnish, Hungarian or German – be connected to speech sounds. Beginning readers learn the names of letters or letter clusters as well as the association between letters or letter clusters with specific speech sounds. Phonetic encoding requires phonetic awareness, that is, awareness of phonetic sound patterns within words. Phonetic awareness can be measured with syllable and phoneme segmenting tests. Empirical research indicates that phonetic encoding seems to be important for good reading (Mann, Liberman & Shankweiler, 1981). Although

correlations do not necessarily imply causal relations; although deaf children can also learn to read, obviously without phonetic encoding; and although skilled readers can grasp word meanings from pure graphemic encoding, one can conclude that phonetic encoding should not be skipped in learning to read (cf. eg. Blomert & Csépe, present volume).

These processes and the skills involved are the basic building blocks of reading literacy; therefore, they generally receive great emphasis in the instruction of beginning readers. At the same time, the objective of the present framework is to provide a basis for reading standards and diagnostic assessment, with objectives defined for the end of grades 2, 4 and 6. By grade 2, letter identification and phonemic encoding should be fully acquired by all and serve as the basis of more complex reading tasks. To ensure that this takes place, grade 2 tests should include tasks for letter, syllable and word reading.

Identification and Recognition of Words

The perceptual reading span (i.e. the number of letters that are processed by one fixation) includes about two letters left and six letters right from the fixation point (McConkie & Rayner, 1975; Rayner & Duffy, 1988; Underwood & Zola, 1986). This perceptual reading span seems to be the same for good as well as for poor readers (Jackson & McClelland, 1975, 1979). The information picked up during a fixation is used by more skilled readers to identify the word and to get access to the mental lexicon. There are differences between better readers and not so good readers with regard to their access to the mental lexicon (Hunt, Lunneborg & Lewis, 1975; Jackson & McClelland, 1979). Lexical access is enhanced by phonological encoding. Accordingly, children who are good readers are more likely to transfer the graphic information in a phonological code. The phonological code allows faster and more precise access to the corresponding lexicon item (Frederiksen, 1982; Jorm & Share, 1983; Liberman, Shankweiler, Liberman, Fowler & Fischer, 1977).

Fast and precise access to the mental lexicon seems to be critical for reading comprehension, and a broader lexicon might be more beneficial for comprehension than a smaller one. The more word entries there are in the lexicon, the more likely the words encountered in the text will be recognized and the more likely they will be further cognitively processed (Thorndike, 1973). It seems that, on the one hand, a larger mental lexicon

is beneficial for reading literacy, and on the other hand, reading literacy also increases the size of the mental lexicon (cf. Tuinman & Bardy, 1974). Sternberg and Powell (1983) found that the size of the lexicon correlates with reading comprehension, which in turn correlates with the ability to identify new words based on the context of reading.

It is not an easy task to give an estimation of one's vocabulary, or the vocabulary one should have at one phase of life or another. Research distinguishes between the breadth and depth of vocabulary, and also defines different layers of vocabulary. The breadth of vocabulary refers to the number of words an individual knows. The depth of vocabulary concerns the meanings attributed to the words. These two aspects are targeted in psychological and linguistic research and also appear as elements in standardized tests of intelligence. Because of the usually small scope and the rather different objectives of these endeavors, these have not yielded enough information to provide a solid information base for the development of diagnostic tests in reading literacy in Hungarian. For example, in the Hungarian version of Wechsler intelligence scale for children (WISC-IV), a 50 item vocabulary test is used, standardized on a sample of N=1,000 of 6- to 17-year-olds, as one of 15 sub-tests (Bass et al., 2008).

Children's vocabulary growth is determined by their life experiences, the communities and cultures they live in (including schooling); these bear on the areas in which and the speed with which this development occurs. Of the few Hungarian studies on this process, Neuberger (2008) presented a study of 6-year-old kindergarteners' breadth of vocabulary with a word association test (N=72). She found big differences in this regard by maternal education, the assessed width of 6-year-olds with mothers of higher education being twice the size of children of mothers with only lower secondary schooling. This finding also confirms that vocabulary should be a major consideration in diagnostic assessment, both in testing for it as a control variable and in selecting texts to be included in the test battery. – Gósy and Kovács (2001) used the same methodology of word associations for an estimation of 12-13-years-olds' vocabulary. Word frequency lists have been compiled from children's written texts (e.g., Cs. Czachesz & Csirik, 2002), but these are rather limited by the topics the subjects were given to discuss in written composition tasks.

Different fields of life, activities, and social strata need and use special sets of words. Linguistic research aims to define and map general and specific vocabularies and to establish the frequency of their elements (e.g., Nation & Waring, 1997; for a Hungarian overview, see Lengyelné, 2006). There is educational research to identify the vocabulary children need for reading to learn and which should, therefore, be taught (e.g., Bailey et al., 2007). In this regard, Bácsi and Kerekes (2003) published the only study in Hungarian, when they compiled a list of the words used in 15 children's first grade primer readers, that is the first printed words children meet when they start to read. A different approach was utilized in the empirical research of Kojanitz (2004a, 2004b) for the characterization of vocabulary of history and science in a few textbooks. The main focus of this quantitative study was partly the readability of textbook texts, partly the way they promote conceptual development in the content area.

Nagy (2006) combined these two questions (what vocabulary children have and what they need to be successful readers) in developing a criterion-referenced diagnostic test battery for word reading. First, using diverse sources, he identified a 5,000 element set of the words probably the most frequent in Hungarian. Then, he created instruments to study the acquisition of this vocabulary from several aspects: reading entry words, reading words with prefixes and suffixes, identifying synonyms, identifying meaning, and fluency. The publications from this research so far have focused on identifying developmental trends in the width of vocabulary and the fluency of reading. Detailed results and findings that could inform the development of standards and tests for reading literacy are yet to be published. Nagy's general findings suggest it would be beneficial to include the direct assessment of vocabulary when developing diagnostic assessment for reading. On a nationally representative sample (Nagy, 2006), 23% of subjects in grade 2, and only 72% in grade 6 reached or surpassed the 80% performance criterion in reading this basic 5,000 word vocabulary.

In the light of the above findings, further research is needed to provide a good basis for the identification of the vocabulary of texts to be used in diagnostic testing. It also seems necessary that tasks explicitly targeting the reading of words be included. The standards for reading cannot prescribe in detail a vocabulary to be taught, but it is necessary that they

call for instruction and study materials that help the expansion of students' vocabulary to prepare them for their academic tasks as well as their future social, economic and civic roles.

Parsing and Constructing Propositional Representations
When processing a text, a reader has to segment the text into groups of words with a common syntactic function (phrases). This parsing serves as a basis for further semantic processing, leading to propositional representations of the text. Parsing of written text can cause difficulties in reading. There is empirical evidence that texts are better understood by primary school pupils when they are written in a more familiar than a less familiar syntax (Semel & Wiig, 1975; Tatham, 1969, 1970).

Most researchers on reading and text comprehension agree that skilled mindful reading implies the construction of multiple representations (Graesser, Millis & Zwaan, 1997; Kintsch, 1998; van Dijk & Kintsch, 1983). Word recognition, lexical access and syntactic parsing lead to a representation of the text surface structure, which includes the whole graphical, lexical and syntactic characteristics of the corresponding text segments, including verbatim formulations. The text surface representation allows repetition of what has been read, but it does not constitute comprehension yet. Comprehension starts when, based on the surface representation, a propositional representation is constructed. This representation includes the ideas expressed in the text on a conceptual level, which are relatively independent from the specific wording and the syntax of the read sentences. Propositions are considered as internal complex symbols, which contain the specific ideas and conceptual relations presented in the text. The propositions explicitly expressed in the text are usually referred to as the text basis, whereas further propositions that are only implicit in the text have to be inferred by elaborative processing on the basis of prior knowledge as, for example, the construction of higher-order macro-propositions (van Dijk, 1980).

Constructing a propositional representation requires both local and global coherence formation. Local coherence refers to semantic relations between successive sentences. Global coherence refers to semantic relations between larger text paragraphs and text segments. Reading literacy means that readers can re-construct this coherence in their mind, that they understand both the local meaning of sentences and the global

meaning of a text as a whole, that they make inferences and reflect both on the content and the form of the text as well as the author of the text (Graesser, Singer & Trabasso, 1994). Global coherence formation is usually more challenging than local coherence formation. Frequently, readers engage only in local coherence formation, while the higher order semantic relations do not come to their attention (Albrecht & O'Brien, 1993; Cook & Mayer, 1988; Hess, Foss & Carroll, 1995). Poor readers often face problems with relating different topics and propositions to one another (Lorch, Lorch & Morgan, 1987), recognizing or inferring the super-ordinate macro-proposition of a passage (Daneman & Carpenter, 1983), identifying the correct referent of a pronoun (Oakhill & Yuill, 1986) and making use of cohesion markers (McNamara, Kintsch, Songer, & Kintsch, 1996; Soederberg Miller, 2001). Coherence formation is generally supported by visual text segmentation signs such as indentations or increased line pitch that signal the beginning of a new paragraph, by different font types and font sizes, or by discourse markers such as numberings in the text (such as "first", "second", "third" etc.) that also indicate the relations of one text unit to another text unit. Skilled reading requires also the recognition and use of these signals.

Psycholinguistic research on parsing and sentence comprehension provide the basic body of information (e.g., Pléh, 1998), but there is little evidence to guide the development of standards and instruments for assessment as to what could be reasonable to expect as objectives in the targeted grades.

Written communication presents challenges partly because it differs from face to face oral communication (e.g., lack of shared context, lack of additional information from nonverbal communication, etc.). If children have a problem with a skill in oral communication, it will most probably be even more difficult for them to do the corresponding operation in written communication. In an empirical study on comprehending oral language, Gósy (1994) showed that kindergarteners are better at comprehending orally presented sentences than orally presented texts, and she found large individual differences among them in this respect. If indeed a significant ratio (almost half) of students is not yet at the level of oral text comprehension necessary for studying upon entering school, then standards and diagnostic assessment for reading literacy should target the comprehension of written sentences explicitly.

It is known from large scale assessments that students often face problems with logical operations and reasoning skills. This might be an obstacle for them in constructing appropriate propositional representations of the texts they read. Evidence for this comes from educational research of specific cognitive operations (e.g., Csapó, 2002; Csapó, Csirikné & Vidákovich, 1987; Nagy, J., 2000, 2003; Vidákovich, 2008), from studies on reading literacy (e.g., Kádárné, 1985; Horváth, 1998) and from developmental experiments of content- and text-based operational enrichment programs (e.g., Csapó, 1997; Pap-Szigeti, 2007).

Identification of Topics and Topic Structure
Linguistic analyses distinguish two different kinds of information within each text segment: topic information and comment information. Whereas the topic information indicates what the text segment is about, the comment information provides the (usually) new information about the corresponding topic (Halliday, 1970). Identification of topics is especially important due to the limited working memory capacity of the reader. Because of this limited capacity, only a part of the available information can be in working memory at any time. In order to follow the text, the reader has to know at each moment what the sentence or paragraph is about, in order to activate their appropriate prior knowledge (Kintsch, 1998). If the author changes the topic, the readers have to identify the topic shift and re-direct their focus of attention appropriately (Chafe, 1994; Gernsbacher, 1990). Authors use various means to signal to the reader whether or not the topic has changed, whether a small or a big shift of topic is necessary and where to find the new topic (Fletcher, 1984; Givón, 1983).

The topics of the various segments of a text are usually connected by general rhetorical relations (Meyer, 1975) which form the top-level structure of the text and therefore contribute to the coherence of the text. This formal top-level structure is frequently referred to as the superstructure of the text (van Dijk, 1980). Proficient reading requires the identification of this superstructure, which serves also as an organizing principle for storing the global text information in long term memory. Specific types of texts such as narratives or reports frequently have a highly conventionalized superstructure, which is specifically useful for the corresponding communicative function. The same is true for other communi-

cative functions such as describing, explaining, arguing, entertaining, and so forth. When readers are familiar with and aware of the corresponding superstructure, comprehension is usually improved. The topic structure is often signalled by headings, often combined with a hierarchical numbering system that indicates the hierarchical organization of topics.

It appears again that there has been little research with Hungarian subjects in this regard. Even though early Hungarian reading assessment projects considered this aspect heavily in their framework, influenced by the 1971 Study of Reading Comprehension of the IEA Six Subject Survey, only one publication, Kádárné (1985) discussed this aspect of reading comprehension in detail. Her empirical evidence suggested that students in grades 4 and 8 had increasing difficulties with more complex rhetorical structures. This partly reflected an instructional hiatus, because at the time her research was carried out, students in Hungarian schools were exposed to literary texts, mostly narratives, and no conscious, curricular developmental efforts were made to introduce them to superstructures characteristic of lessons in textbooks and other non-literary genres. Lengyelné's results (2011) suggest that even today and even in higher education, students look for elements emphasized in the beginning of an academic text, rather than trying to identify its rhetorical structure from the whole – that is, the instructional hiatus may still persist in practice, in spite of curricular changes in the past decades.

This issue is still rather neglected, though the principles of mother-tongue education have changed to accommodate needs identified in the 1970s (e.g., Szépe, 1979), which create tangible pressures for effective communication in all fields of life in the present day. Although explicit instruction is given in topic and comment structures, in practice it is usually more strongly tied to descriptive grammar than to application in reading (cf. Adamikné, 2003; 2006). Rhetorical structures still seem to be neglected, but Adamikné's discussion of argumentation (2009), intended for mother-tongue educators and presented from the perspective of effective reading, may signal the beginnings of change.

Construction of Mental Models from Written Text
Reading and comprehending texts requires the construction of mental models of the text content under the guidance of the topic structure. In narrative texts this representation is also referred to as a situation model

(van Dijk & Kintsch, 1983) or as a scenario (Sanford & Garrod, 1981). A mental model is considered as an analogue (depictive) mental representation of the content described in the text. It is constrained both by the propositional representation and by domain-specific world knowledge. Evidence for a differentiation between propositional representations and mental models has been found in several investigations (Kintsch, Welsch, Schmalhofer & Zimny, 1990; Schmalhofer & Glavanov, 1986).

The various construction processes are based on an interaction between bottom-up and top-down activation of cognitive schemata, which have both a selective and an organizing function. Task-relevant information is selected through top-down activation, and the selected information is then organized into a coherent mental representation of the text surface structure. Processes of conceptual organization, starting from the text surface representation, result in a coherent propositional representation, which in turn triggers the construction of a mental model.

Thus, propositional representations and mental models are assumed to interact continuously via processes of model construction and model inspection guided by cognitive schemata. Based on the propositional information and the default values of the schemata, the mental model is constructed in a way that represents a typical instance of what is described in the text. After a mental model has been constructed, schema-directed processes of model inspection can be applied in order to read off new information from the model. This information is encoded in a propositional format and, thus, elaborates the propositional representation which can be externalized by verbal utterances (Schnotz, 1994; Schnotz, 2005).

Mental models and propositional representations seem to be useful for different purposes. On the one hand, forming a propositional representation is assumed to require less cognitive effort, and to preserve much of the structure of the text and is therefore well-suited for the recall of the meaning of the text. On the other hand, a mental model is assumed to require a higher cognitive effort and to be especially well-suited for drawing inferences, because the corresponding information can just be 'read-off' from the representation, whereas recall of text information is less precise, because it has to take place as a free description of the mental model. Mental models seem to have a lower rate of forgetting than propositional representations and of text surface representations (Kintsch,

Schmalhofer & Zimny, 1990; Schmalhofer & Glavanov, 1986; Sachs, 1967).

The above discussion established that research results indicate the construction of the three kinds of mental representations during mindful reading (with comprehension), the functions of these representations and their different rates of forgetting. Forgetting has an influence on what can be used after reading – a representation that disappears very quickly from memory will not be useful in the long run. The construction of propositional representations and mental models is especially crucial when one reads to learn, e.g., when reading should be the means of concept formation and development. As early as in the first IEA Study of Reading Comprehension, Hungarian students' problems in this area became manifest. Discussing this issue from a Piagetian standpoint, Kádárné (1979, p. 115.) highlighted two paramount lessons to be learned from the correlations of reading processes:

(1) We should not leave students to acquire reading comprehension on their own before their thinking reaches the formal operational stage, because thus we actually deprive them of guidance in the most critical phase of becoming independent readers.

(2) As reading in itself is also a means to satisfy all kinds of interests, it has a transfer effect on the development of abstract reasoning which is stronger than that of any other school subject.

The Hungarian Monitor assessments (for an overview, see D. Molnár, Molnár & Józsa, 2012) revealed that this area remained a source of persistent difficulties for 9-18-year olds for decades. However, with relatively little published from the Monitor framework and its results often presented mainly from the perspective of educational policy, there is not enough research evidence to guide educational diagnostic assessment in this regard (for the most detailed discussion, see Horváth, 1997). It seems that the problems lie both in the inferences to be drawn from the text, and the operations to be performed on the information presented in the text. At the same time, 10-year-old Hungarian students in the PIRLS assessments seem to perform better than average on evaluation tasks (discussed next) that also rely on the construction of mental models.

Awareness of Author's Intention and of Text genre

The full scope of reading literacy includes also the reader's reflection about, and awareness of, the communication situation, especially of the author and his/her intention and credibility. This communication level of comprehension represents the pragmatic context of the communication between the author and the reader, including the identity of the author and his/her institutional context, his/her expertise as well as the intended readership and the communication aim. In many cases (such as reports, for example), the agent of communication is a 'non-visible' observer of what is going on. In other cases, the story-teller resents him/herself in a narration. Skilled reading includes awareness of the communication agents, the text genre used and the communicational intentions. The genre level captures knowledge about the class of text and its corresponding text function such as, for example, narration, report, argumentation, explanation, warning, or entertaining.

Reflecting about the formal structural features of the text requires the reader to evaluate its structural features, the author's style, the text's communicative appropriateness and genre and to evaluate how successfully an author was portraying something or persuading the reader.

Some elements in this area are stable elements of Hungarian mother-tongue education, especially in literature, and lately in history and social science. However, they are not necessarily discussed in relation to all subject areas or many fields of life. Genre knowledge regarding functional texts is still in the background (cf. Molnár, 2006). Identifying the author's intention and stance, evaluating the text from stylistic, pragmatic, communicative etc. aspects requires a reflective attitude, which, in turn, necessitates conscious attention devoted to the reading process at this level. This means that instruction in the use of (metacognitive) reading strategies should also be promoted in the standards, even though their diagnostic assessment may not be a task easily carried out as yet.

Comprehension of Graphics

As mentioned above, reading literacy refers not only to text (i.e. verbal information), but also to graphics (i.e. pictorial information), including realistic pictures, diagrams, or graphs. When understanding realistic pic-

tures, diagrams, or graphs, the reader also constructs multiple mental representations (cf. Engelkamp & Zimmer, 1994; Kosslyn, 1994; Schnotz, 2001; Weidenmann, 1994). A surface structure representation includes the perceptual (visual) image of the graphic in the individual's mind. The mental model represents the subject matter shown in the graphic on the basis of common structural features (i.e., based on an analogy) between the graphic and its referential content. The propositional representation contains information, which is read off from the model and which is encoded in a propositional format. The communication representation contains information about the pragmatic context of the pictorial communication including the author's communication intention, and the genre representation contains knowledge about the class of graphics and their corresponding functions. Accordingly, the following hierarchically organized processes can be distinguished:

(1) perceptual processing,
(2) construction of mental models,
(3) construction of propositional representations,
(4) awareness of author's intention and of graphics genre.

Although there is clearly a demand for the comprehension of graphics in several fields of life, including school-based learning from the early grades, this issue has not received notable attention in educational research in Hungary yet. Even though large scale assessments of reading comprehension and reading literacy include tasks where pictorial information should be processed, no detailed findings are available either from the Hungarian Monitor studies, or from the international PIRLS and PISA studies to inform the development of standards and diagnostic testing at present.

Perceptual Processing

In graphics comprehension, the individual first creates a visual mental representation of the graphic's display through perceptual processing and then constructs a mental model as well as a propositional representation of the subject matter shown in the picture through semantic processing. In perceptual processing, task-relevant information is selected through top-down activation of cognitive schemata and then visually organized through automated visual routines (Ullman, 1984). Perceptual processing includes identification and discrimination of graphic entities as well as

the visual organization of these entities according to the Gestalt laws (Wertheimer, 1938; Winn, 1994). The resulting visual perception created as a surface representation of the picture in the imagery part of working memory, the so-called visual sketchpad (Baddeley, 1992; Kruley, Sciama & Glenberg, 1994), is an internal depictive representation. It retains structural characteristics of the picture, and it is sensorically specific because it is linked to the visual modality (Sims & Hegarty, 1997). As perception and imagery are based on the same cognitive mechanisms, the same kind of representation can also be referred to as a visual image, if it is created on the basis of internal world knowledge rather than external sensory data (cf. Kosslyn, 1994; Shepard, 1984).

Construction of Mental Models in the Comprehension of Pictorial Information

In order to understand a picture rather than only to perceive it, semantic processing is required. The individual has to construct a mental model of the depicted subject matter through a schema-driven mapping process, in which graphic entities are mapped onto mental entities and in which spatial relations are mapped onto semantic relations as encoded in the mental model. In other words, picture comprehension is considered as a process of analogical structure mapping between a system of visuo-spatial relations and a system of semantic relations (cf. Falkenhainer, Forbus & Gentner, 1989/90; Gentner, 1983; Schnotz, 1993). This mapping can take place in both directions: it is possible to construct a mental model bottom-up from a picture, and it is also possible to evaluate an existing mental model top-down with a picture. In understanding realistic pictures the individual can use cognitive schemata of everyday perception. However, when understanding logical pictures, the individual requires specific cognitive schemata (so-called graphic schemata) in order to read off information from the visuo-spatial configuration (Lowe, 1996; Pinker, 1990). Understanding graphs is a cultural skill that was only invented two hundred years ago; it requires explicit training in schools.

   Although mental model construction is triggered by visuo-spatial information in graphics comprehension, mental models are not simply visual images. Firstly, they are more abstract than visual images, because they are not bound to a specific sensory modality. Secondly, mental models differ from visual images with respect to their information content.

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On the one hand, a task-oriented selection takes place in mental model construction. Those parts of the graphic configuration are included in the process of structure mapping which are considered as relevant to current or anticipated tasks. On the other hand, the mental model is also elaborated through information from world knowledge and thereby adds information to the representation.

Construction of Propositional Representations in the Comprehension of Pictorial Information
After a mental model has been constructed in graphics comprehension, schema-directed processes of model inspection can be applied in order to read off specific new information from the model. This information is encoded in a propositional format. In this way, graphics comprehension leads through conceptual analysis also to a propositional representation of the depicted content. The result of this conceptual analysis, the corresponding propositional representation, can then again be verbalized by answering questions or describing what is displayed by the graphic (Schnotz, 2001; Schnotz & Bannert, 2003).

Awareness of Author's Intention and of Graphics Genre in the Comprehension of Pictorial Information
Fully developed reading literacy with regard to graphics implies also the readers' awareness of the communication situation, including who the author is, who the addressees are that the author might have had in mind, what expertise and what aims he/she has. Skilled reading of graphics includes also the awareness of the graphics genre, that is, what kind of graphic has been created or selected in the document and for what reason. Similar to text genre, a graphic genre is associated with a specific communicative function such as visualizing, explanation, organization, instruction, exploration, problem solving, persuasion, motivation, or decoration.

Integrating Texts and Graphics

We assume that text and graphics comprehension takes place in a cognitive architecture including a working memory of limited capacity, mo-

dality-specific sensory registers as information input systems and a long-term memory (Fig. 2.1). Verbal information (i.e. information from written texts or spoken texts) and pictorial information (i.e. information from graphics) are transmitted to working memory through the eyes (the visual channel) and the ears (the auditory channel). The channels have limited capacity to process and store information. Further information processing in working memory takes place in two different representational channels: the verbal channel and the pictorial channel. Information from written or spoken text is processed in the verbal channel, whereas information from graphics is processed in the pictorial channel. The channels also have limited capacity to process and store information. Text and graphics comprehension are active processes of coherence formation. In comprehension, individuals engage in building coherent knowledge structures from the available external verbal and pictorial information and from their prior knowledge (Schnotz, 2005).
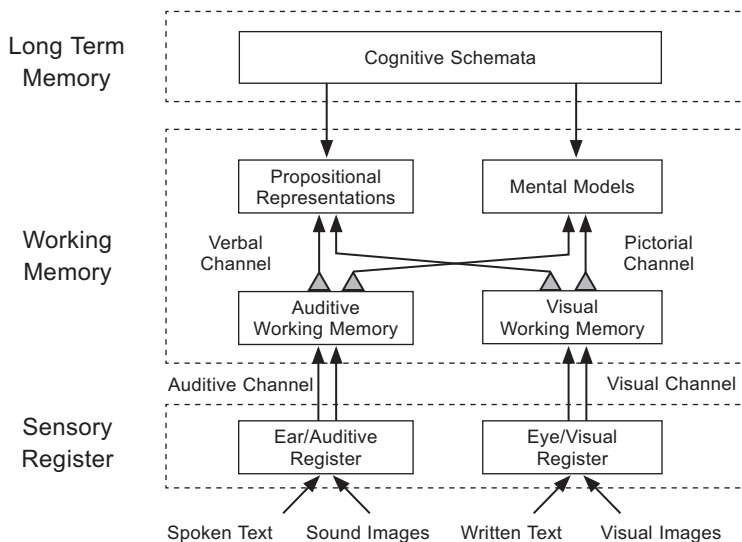

Figure 2.1 An integrated model of text and picture comprehension from Schnotz (2005)

As has been mentioned above, the reader of a text constructs a mental representation of the text surface structure, generates a propositional

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representation of the semantic content, and finally constructs from the text base a mental model of the subject matter described in the text. These construction processes are based on an interaction of bottom-up and top-down activation of cognitive schemata, which have both a selective and an organizing function. Task-relevant information is selected through top-down activation, and the selected information is then organized into a coherent mental representation of the text surface structure. Processes of conceptual organization starting from the text surface representation result in a coherent propositional representation, which in turn triggers the construction of a mental model. Mental model construction implies a transition from a descriptive to a depictive representation. Propositional representations and mental models are assumed to interact continuously via processes of model construction and model inspection guided by cognitive schemata. After a mental model has been constructed, schema-directed processes of model inspection can be applied in order to read off new information from the model. This information is encoded in a propositional format and, thus, elaborates the propositional representation. In picture comprehension, the individual first creates a visual mental representation of the picture's graphic display through perceptual processing and then constructs a mental model as well as a propositional representation of the subject matter shown in the picture through semantic processing.

There is a continuous interaction between the propositional representation and the mental model both in text comprehension and in picture comprehension. In text comprehension, the starting point of this interaction is a propositional representation which is used to construct a mental model. This model can again be used to read off new information in order to further elaborate the propositional representation. In picture comprehension, the starting point of the interaction is a mental model, which is used to read off new information that is also added to the propositional representation (Schnotz & Bannert, 2003).

Text and picture comprehension are not only based on external sources of information (i.e. the text and the picture), but also on prior knowledge as an internal source of information. Prior knowledge can partially compensate for a lack of external information, for lower working memory capacity (Adams, Bell & Perfetti, 1995; Miller & Stine-Morrow, 1998), and for deficits of the propositional representation (Dutke, 1996; McNa-

mara, Kintsch, Songer, & Kintsch, 1996; Soederberg Miller, 2001). There seems to be a trade-off between the use of external and internal information sources: Pictures are analyzed more intensively, if the content is difficult and the learners' prior knowledge is low (Carney & Levin, 2002).

As indicated in the previous section, the processing of pictorial information in reading does not attract much research attention at present in Hungary, even though texts in all fields of life do demand the integration of verbal and pictorial information.

Reading Strategies

Reading is an intentional, goal-directed process. Readers apply different processing strategies according to their specific intentions. These strategies are mental programs, which influence the sequence of and the emphasis on the specific operations in order to improve acquisition, retention, and retrieval and usage of the processed information (van Dijk & Kintsch, 1983). Microstrategies focus on the comprehension of consecutive sentences and their semantic interrelation; whereas macrostrategies focus on the identification or construction of the main ideas within a text. Macrostrategies are only required after the microstrategies have been learned (van Dijk & Kintsch, 1983).

When readers perform a retention strategy which primarily focuses on good retention, they put emphasis on the encoding of the propositional representation, because recall is closer to the original text. When readers perform a comprehension strategy, they will put emphasis on the mental model, because this provides a better basis for answering comprehension questions and for application of what has been learned. When processing belles letters, poems etc., special attention is given to the mental representation of the surface structure, whereas in processing expository texts, the main focus is on the construction of propositional representations and mental models (Zwaan, 1994).

Meaningful and purposeful reading requires that these strategies be selected, applied and coordinated with sufficient sensitivity with regard to the situation and the goals at hand. Processing is most successful when appropriate usage of strategies occurs on an automated basis. Only when comprehension problems occur does processing become a matter of con-

scious reflection and control (Forrest-Pressley, MacKinnon & Waller, 1985). Deficits in processing are often due to inadequate standards of comprehension, when readers apply low benchmarks to their own processing (Baker, 1985). Strategies of reading can also be implemented in a social setting such as the reciprocal teaching proposed by Palincsar and Brown (1986), where individuals learn on the basis of a structured dialogue to process a text paragraph by paragraph and to perform strategic activities such as identifying the topic and the main statement, formulation of questions, identification and clarification of open questions, and making predictions about the following paragraph.

Research on Hungarian readers' strategy use showed that cultural and educational traditions may deeply influence strategy use and its development (e.g., Csíkos, 2008; Csíkos & Steklács, 2009). To foster effective reading instruction, reading standards should address this area as well, even though it may not be feasible to include it in diagnostic testing.

Reading Contexts and Motives

Reading is always situated, the reading situation consisting of a reader with specific goals or tasks to fulfil and a text document written by an author with specific expertise, knowledge and intentions for a specific audience. The situatedness of reading is an important aspect for the motivational aspects of reading and learning, when the individual searches for information about interesting topics in school or outside of school settings (including sports competitions, rules of games, etc.). It should also be considered for the assessment of reading literacy.

Reading is per se a unidirectional communication. Although there are many communication situations which are interactive and bi-directional, for example, when letters are answered after reading, when readers can write to authors, when websites expect users to respond to questions, or when Wikis invite users to edit or re-write articles, these bi-directional kinds of communication are a blend of reading and writing and will therefore be kept out of focus of this framework.

A reading situation is always embedded into a broader context. The Council of Europe (1996) suggests a distinction of four categories of reading contexts: reading for private use, reading for public use, educational

use and occupational use.[2] The categories are not distinct, but overlap. We will describe them in the following in more detail.

Reading for private use. This category of reading context refers to any kind of reading documents for satisfying the reader's personal interests, including practical and intellectual ones, and social interests of being connected to other people. Reading for private use includes also reading of any kinds of documents (including belles letters) for the purpose of leisure and recreation.

Reading for public use. This category refers to reading official (public) documents with information about public affairs or events such as newspapers, information about new law regulations (i.e. juridical texts), announcements of public events such as concerts, games etc. Besides the print world, in the electronic world this can also refer to news-websites, homepages of public institutions, and so forth.

Reading for educational use. This category of reading context refers to reading of texts written for the purpose of instruction. It can include printed textbooks as well as interactive learning software. This kind of reading to learn is the 'natural continuation' of the predecessor learning activity of learning to read (Sticht & James, 1984; Stiggins, 1982).

Reading for occupational use. This category includes reading of job offers in print newspapers, and also online. It further includes reading for satisfying job requirements by, for example, reading how to operate a system, or reading of workplace directions and related issues (Stiggins, 1982). Even though at grade 6, reading for occupational use is still far ahead, some precedent-related reading requirements may also be included at this level, with some reference to the occupational life and also for motivational reasons. Also, as part of developing social and civic competence, students should learn about the economy, and the world of labour. Thus the inclusion of such texts in diagnostic assessment is both possible and necessary.

Assessment of reading literacy should cover a sufficiently large variety of reading contexts with a correspondingly large diversity of content. As mentioned above, all contexts could and should be introduced both in reading instruction and in assessment, in order to prepare students for future tasks and roles and as a means for this preparation.

2 The distinction of reading contexts suggested by the Council of Europe has been modified by PISA 2009 into personal, public, educational, and occupational domains.

Some of the personal and social motives are discussed at length in the available Hungarian literature, but research questions are phrased more in terms of the texts read than in terms of reading as a purposeful activity. The sociology of reading discusses some elements from the reading purposes identified in other fields of reading research (for an overview of these see Szenczi, 2010). Reading literature and different narrative genres (e.g., Gereben, 2000, Péterfi, 2009) have privileged status in studies, as the way to improve aesthetic sophistication, and for shaping national identity, or as plain entertainment. Library use features heavily in these reports, even though they also admit that access to books and literature, hence accessing them from the library, is a function of family sociocultural background (cf. Kelemen-Molitorisz, 2009a). Since reading literature has long been a distinguished curricular objective, the result of such instructional efforts is tangible in the responses of Hungarian students in the PISA assessments (for an overview, see D. Molnár, Molnár & Józsa, 2012).

In research on the sociology of reading, data about e-reading (e.g., Péterfi & Nagy, 2009) are also organized by medium and general activity rather than reading motivation and processes. For example, it is not unusual to find the general term 'computer use' and 'internet use' among items inventorying reading habits and leisure activities, and the diversity of reading necessary or probable for these ICT-related activities seems to be ignored. Research interests in this field include the frequency of reading activities, reading habits, text types/genres or content categories read, favourite authors, books read (favourite books), sources of reading material, library use; and reading among leisure activities (including, earlier: using a computer; now: use of the internet).

Only a few studies address the reading tasks and content areas in which reading occurs not for pleasure but for information to be used in problem solving or for knowledge building for future use. When A. Nagy (2003) asked his subjects to list why they read, they mentioned interest in the subject matter, as laypeople would. Researchers typically duplicate this view when they ask about reading activities related to medium, genre and subject matter – interests to be satisfied by a close reading and appropriation of the text, for intellectual and educational gains or for pleasure. Again, researchers seem to take a narrow definition and do not look at the activity itself, or at everyday situations where information

must be accessed and processed in a written form. When investigating reading in the private sphere, even Terestyéni (1996) and Gereben (2000) focused only on the occupational context and use a limited range of readings. What is surprising, though, is that reading for learning also seems to be outside the scope of investigations, even though problems in this regard have been articulated quite early (Kádárné, 1985; Lénárd, 1978; Kelemen-Moltorisz, 2009b). (What is known about contexts of reading beyond the private sphere and literary experience mostly comes from large-scale international assessments of reading literacy.) Discussions on civic education sometimes include references to reading requirements, while this area includes some of the most difficult document types (Mátrai, 1982; Kinyó & Barassevich, 2010).

It is even more difficult to find estimates of reading needs in the economy as yet. Terestyéni calculated in his studies on adult literacy (1987 and 1996) that about a quarter of the Hungarian population may have been functionally illiterate at the time, with no reading and writing activities in their private sphere. In the workplace, more than half of his subjects indicated a total lack of reading and writing tasks. Vári et al. (2001) summarized and contextualized the results of the 1998 International Adult Literacy Survey: about two thirds of Hungarian adults fell in the two poorest categories in reading documents, while their performance was somewhat worse in reading prose and somewhat better on quantitative texts (later numeracy tasks). Based on data and results from the same assessment, Köllő (2009) proposed the hypothesis that problems in reading and writing may be both the cause and consequence of unemployment or of working in jobs requiring no literacy skills. More importantly, Köllő showed that workplaces in socialist economies were not literacy intensive, and in fact demanded a third of the effort from workers in this respect than the Western labour market. However, those workplaces created in East-Central Europe after the regime change differ only a little in this regard from Western requirements, that is, workers now face a greater number of reading, writing and calculation tasks here in their daily work compared to before and the number of these tasks correlates with income levels. That is, it is essential that the development of reading literacy encompasses all its elements for all students – a lack of doing so would lead to dire consequences on both the personal and the societal level.

De Glopper and Horváth (1996) conducted a mother tongue validity survey, in which they collected data on the frequency, importance and perceived personal mastery of communicative tasks related to work, study and citizenship, in varied language functions, from people with a GCSE, from teachers in secondary education and from employers. The ways in which these three sub-samples evaluated literacy tasks by the above mentioned criteria show rather high agreements (r>0.78). Although little has been published of the reading-related findings, it is known (Horváth, 1996) that self-reported reading problems include forms to be filled in, instructions and argumentative texts; that Hungarians tend to underestimate these problems when they compare them to their knowledge gaps in literature; and that employers attribute a higher importance to orality. (There are no data regarding whether the latter may be a cultural phenomenon or a consequence of the literacy problems mentioned.) The communication problems manifested from the responses were related to the public sphere. Horváth observed that subjects attributed these to their own mastery problems.

Giving an overview of adult literacy studies, Vári et al. (2001) call for a variety of texts, including the introduction of non-traditional, non-literary genres in the development of reading literacy at school. All these would lend support for the inclusion of reading purposes and topics to be included in diagnostic assessment, too, of course through texts that are appropriate for the given populations in both content and language.

Assessment standards typically focus on knowledge and skills, and not on aspects of motivation. Yet in the light of the above, it may be worth considering the inclusion of a reading motivation component in the standards, even if its assessment would be, at present, not feasible.

Texts in the Assessment of Reading Literacy

Text Types

From a pragmatic perspective, one can distinguish texts according to their communicative function; that is, the purpose the texts have been written for. Texts can be fictional (such as novels) or non-fictional (such

as expository texts). The notion of text types is not based on well-defined, clear-cut categories. Instead, the categories are fuzzy and they overlap. Whereas some authors distinguish only a few text types, others differentiate among 30 or more types (Biber, 1989). We find it useful to distinguish text types according to the following functions: narration, report, exposition, persuasion, instruction, and entertainment.

Narrative texts convey information about events in time and space due to actions of individuals. They inform us about when something happened, how, why and in what sequence. They are usually given by someone from a specific point of view with subjective selectivity and emphasis. Reports also convey information about events in time and space due to actions of individuals, and they, too, inform us about when, how and in what sequence something happened. However, the information is given within a more objective frame of reference. Expository texts provide information about the structure of an object or system, about how the elements are interrelated, what changes can occur in the system and why. Persuasive texts convey arguments that explain why something should be considered as true or why something should happen. Instructional texts provide directions on what should be done and how it should be done; examples are recipes, how to give first aid, manuals on how to operate software, apply social regulations or rules. Other documents such as novels, essays, letters, or reviews can be subsumed under these main text types or can be considered as combinations of them. Texts dealing with the interpretation of texts are basically texts about texts ('metatexts') and may be necessary to assess the reader's reflection about a text. The various text types are not necessarily associated with different reading difficulties. Nevertheless, the notion of text types is important to cover the full scope of reading literacy.

Formats and Combinations of Documents

Reading literacy refers to written documents usually consisting of verbal text, but often also augmented by graphics such as realistic pictures (including maps), diagrams or graphs. Texts, on the one hand, describe their content by referring to the intended objects or events by names, by further specifying these objects or events through attributes and by specifying

relations between these objects or events. Graphics, on the other hand, employ a fundamentally different representational principle: They display structural analogues of their depicted content. Although they can also include verbal labels, these labels (usually names) only help to map the graphical entity on to the corresponding verbal signs in the text; but do not describe the depicted content. Description is given in the body of the text or in explanatory notes, often provided after the caption of the graphic.

Tables are a further format within documents. In the majority of cases, they use verbal symbols (words, phrases) for the specification of columns and rows and as entries for the cells of the table. However, in some cases, these specifications (especially those within cells) can also be pictorial (as, for example, in a table that indicates the appearance of different groups of animals). The entries of cells in a table usually provide the building blocks for propositional structures. The relational framework for these propositions (their predicates) is usually defined elsewhere – often in the heading or as verbal explanation of the table.

In order to assess reading literacy, the documents to be read should include a variety of documents with varying formats, including pure texts with no other format, combinations of text and realistic pictures, maps, diagrams or graphics and tables[3].

Reading in everyday life often requires usage of multiple documents (e.g., two texts with adjunct tables, diagrams or graphs). Although reading literacy in grades 1 to 6 is not yet at the level of grade 10 (the grade associated with PISA-assessments), it should be made clear in learning to read, that reading frequently requires the combined use of more than one document in order to fulfil a specific task. Accordingly, some reading tasks in the assessment of literacy should involve more than one document. These texts have generally been generated independently and they also make sense independently. They are only put together accidentally or for some specific purpose (e.g., for the purpose of test), and they may complement each other or may contradict each other.

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3 In the PISA 2009 framework, these combinations are referred to as 'mixed texts' (i.e. mixture of continuous with so-called non-continuous tests).

Technologies

Until recently, reading was (and still is) so much associated with reading printed documents that most people are not aware of alternative technologies for reading. However, a historical view back to the use of clay tablets or papyrus scrolls a few thousand years ago reminds us that written documents bound together in the form of books is only one specific technology used for written communication, complemented by blackboards, whiteboards or flipcharts used for hand-written writing. Since the parts of a print document in sheets, brochures, magazines, books etc. are physically connected, their interrelation and associated access-structure to the specific parts of the text is highly transparent, because the information space is equivalent to the physical space. Printed text as the major part of printed documents suggests processing the presented information in a specific sequence corresponding to the linear surface structure of the text. Printed documents allow a higher amount of information to be presented at one time and they allow the reader to underline or to make annotations without much effort.

Nowadays the ubiquity of new information technologies has made reading electronic documents displayed by computers and web-based technologies such a widespread phenomenon that it can no longer be ignored. In electronic documents, the interrelation of the different parts of the text is mostly much more complex, more flexible, and less transparent. Accordingly, navigating in the information space and using the access structure of the document is much more demanding for the reader. The borders between print documents and electronic documents are blurred. A document in an electronic medium can be printed out as a pdf file, and documents written on paper can be electronically encoded for transmission by fax and then recoded in print for the receiver. In order to define print documents and electronic documents in a most distinctive way, we will apply the term 'electronic documents' only to hyper-documents with navigation tools as mentioned previously.

Hyper-documents allow and require navigation. Whereas the sequence of reading itself is always necessarily linear (i.e. there exists no 'non-linear reading'), readers have multiple ways of linear reading at their disposal. Although electronic documents with a complex network-like structure do not suggest processing the presented information in a spe-

cific sequence, it is possible that some elements on the screen have a higher salience than others, which may suggest one should enter the document at this point (Kirsh, 2010). Due to the reduced visual perceptibility of information, less information can be displayed at any time in electronic documents: screens contain fewer words than printed pages. Accordingly, readers of electronic documents (everything else being equal) have to keep more information in working memory and have to retrieve more information from long-term memory for successful coherence formation than readers of print documents. Put more simply: readers of electronic documents must cope with reduced visual readability and with piecemeal presentation of information. Finally, electronic documents make underlining and annotations less easy or even, when the display software does not allow personal copies with included annotations, impossible.

Conclusions

In this chapter we have looked at reading as the tool for gathering information, for learning and for participation in social activities. Texts and documents were seen as social and cultural products created by their authors with definite communicative purposes in mind. Similarly, readers have purposes of their own when reading, and it is these purposes that determine what skills and processes will be used in text processing.

We gave an overview of the different prerequisites and levels of reading literacy, including the reading of letters, phonemic coding, the reading of words, parsing, the construction of propositional representations, the identification of topics and topic structure, and the construction of mental models. We also discussed the processing of pictorial information. We showed that, when compared to the significance of the issue, very little Hungarian research has targeted the identification and assessments of needs for reading literacy, regarding either cultural, or economic, or social expectations. We found only a limited effort in different academic domains to relate different concepts of reading to each other. Few publications give the detailed information necessary for the estimation of general developmental levels for different elements of reading literacy for individual age-groups. Remarkably rare are Hungarian studies to assess

the achievement of the curricular objectives of reading instruction, whether for literary and other texts, or for print or electronic documents.

Given the previous description of literacy and expectations related to it, we can identify the relevant parameters of reading requirements to be presented for the purpose of reading literacy assessment. Reading literacy assessment needs a reading and comprehension task that must be performed in a specific situation with a specific document or set of documents with a specific purpose. Main parameters are the following. 1. The situation where the reading is meant to take place, as reading is always embedded into a broader context and serves a specific aim in this context. In assessment, the inclusion of several situations seems desirable. 2. The type of presented written document(s) with their different formats. The inclusion of several types and formats seems also necessary. 3. The technology used to display the documents(s) to the reader in order to communicate the message from the author to the reader. Judging from the course of technological development, it is highly probable that the generations in school today will face reading tasks related to electronic documents to a great extent in the future. It is also highly probable that future students will increasingly learn from electronic documents, thus their academic achievement will be increasingly dependent on their ability to process electronic texts. Therefore the inclusion of electronic documents (in addition to print ones) seems necessary in diagnostic reading assessment. Documents should be authentic texts, reflecting the world the children know (and including what they would learn about the world through their studies in school). Similarly, the reading tasks should be realistic and varied enough to cover all elements of reading literacy.

This chapter has given an overview of reading processes (regarding both verbal and pictorial information) in order to characterize the elements of reading literacy and to provide a basis for standards and diagnostic assessment in this field. We have shown that research has given a solid base for the standards and for the construction of instruments. However, at this point, our knowledge of the demands for reading is not detailed enough, and there is not yet sufficient research evidence for setting standards and benchmarks for the targeted age-groups.

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3

Content and Curriculum Aspects of Teaching and Assessment of Reading

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Introduction

In this chapter, reading is discussed from the aspect of learning and teaching. We analyze the elements, activities and methodology of school learning related to reading. Texts and curricular contents used in instruction are reviewed. The study focuses on the practice of the teaching of reading in Hungary, with international comparisons. Emphasis is given to reading motivation, reading strategies and metacognition according to reading ability. The presence of all these in national curricula is discussed.

The purpose of our study is to provide a starting point for the development of assessment frameworks for reading literacy with reference to these considerations. Our conclusions shall primarily concern educational evaluation. Our approach is seen as a content and disciplinary dimension of reading frameworks.

There are two possibilities for defining the curricular and disciplinary dimensions of reading. The first is the classical approach. Looking at the curricular aspect of reading from this perspective, we find an interpretation that has been developed over the centuries, namely, that the disciplinary dimension of reading embraces works of fiction and concepts of

literary theory, including literary texts to be learned by heart, stories, legends and narratives. It encompasses everything that students learn at school by reading, under the subject established by the integration of Hungarian language and literature. In Hungary, this school subject was created based upon Latin language and literature, in accordance with European traditions – just as it was in Europe and later all over the world in cultures rooted in Christianity.

The second possibility for interpretation covers a wider spectrum, which is being shaped by the cognitive research of recent decades. In this case reading is seen not merely as a literary objective, but also as the essential method of learning and acquiring information. Taken in this sense, the curricular dimension of reading also includes knowledge related to language, reading and one's own reading skills. This approach crucially extends beyond the limits of belles lettres to incorporate every text type and the conditions their comprehension requires. It also entails attention to the text, the author and the contexts of the reader. The educational definition of, and approach to, reading has changed necessarily, though slowly, as a result of social changes and the achievements of cognitive sciences. Using this approach, reading significantly extends beyond the framework of the subject of Hungarian language and literature. Its development can be facilitated by the majority of other school subjects.

Our aim in this chapter is to present the most important elements and attributes of the curricular and disciplinary dimension of reading through the integration of these two approaches.

Transformation of the Concept of Reading

Our understanding of reading has been significantly transformed over the past few decades, due partly to social changes and partly to the results of research findings. According to the oldest approach, those who know their letters can read. Later, reading out aloud and expressively came to be considered the most important aspect. Then the communicative aspect of the reading process came to the foreground. In Kingston's (1967) often-cited definition, reading is a process of communication during which the message appears, mediated in graphic form, between individuals.

It is very difficult to synthesize definitions, since educational researchers, linguists, sociologists, psychologists and teachers examine reading from various different aspects. Several models have come to light that work both in theory and practice, but which still differ from each other. The present definition of reading emerged about twenty years ago.

The RAND Reading Study Group proposed a three-dimensional definition, synthesizing transactional, social and functional theories of text comprehension, "Text comprehension is the process of simultaneously extracting and constructing meaning through interaction and involvement with written language." Its three elements are the reader, the text, and the act of reading or its purpose itself. (Snow, 2002, p. 33).

Growing significance has been attributed to the social dimension recently, and its concept has also changed. It is understood as the construction of meaning through interaction, in particular situations, for example in the classroom. Regarding functionality, text comprehension concentrates on the purpose of reading, which most often means acquiring information or finding enjoyment, and it often includes the creation of mental images and other creative processes. The differentiation of reading functions had already appeared in the seventies, with the basic distinction being made between aesthetic reading and reading for the purpose of acquiring information (efferent reading). The objective of the former is involvement, immersion and the enjoyment of the text, whereas that of the latter is to extract, highlight and rank information (Rosenblatt, 1978).

A simplified definition of reading comes from Pressley and his associates, who understand it as the acquisition of meaning from written text (Block, Gambrell, & Pressley, 2002). However, this definition raises several questions, for example whether the reader obtains a meaning or the meaning. This is a cardinal point because it is exactly what is at issue regarding text type and the purpose of reading. That is, whether the readers construct their own meaning from the alternatives offered by the text, or whether they take in the information and meaning intended by the author as precisely as possible. Pressley and his associates also formulated a more widely contextualised definition, in which reading is seen as an interactive process in permanent change that includes the reader, the text and the context (Block, Gambrell, & Pressley, 2002). This is a good illustration of the characteristic view of reading research in the last decade.

However, it is worth complementing the above with a psychological consideration, i.e. effective reading comprehension comprises the inter-action of macro- and micro-processes as well as preliminary knowledge, and this results in the construction of a mental representation of the text by the reader (van den Broek & Kremer, 2000). The authors interpret macro-level processes as the summary of the text and the structure of text constructed by the author, whereas micro-level processes refer to the readers' attempts to create a meaning in the course of processing words and sentences, and to classify and arrange the clear conceptual units thus constructed for themselves.

The definition of reading literacy by the PISA survey resulted in a definitive change as regards text comprehension. The PISA frameworks regard reading comprehension skills as applicable knowledge, an indis-pensable tool for successful academic performance and solving the prob-lems of everyday life (Molnár, Gy. & Józsa, 2006).

Nagy (2006a) proposed a comprehensive model of reading ability as a psychic system. In his theory he points out that reading ability includes several components: it is made up of particular routines, skills and knowledge. For proficiency in reading comprehension, all of these com-ponents are required and are indispensible. Delay or stagnation in the development of any of these components will constitute an obstacle to the development of all other components as well, and will affect reading ability (text comprehension). Therefore it follows that attention must be directed to developing all of these components. The development of cer-tain prerequisite skills of reading (for example, phonemic awareness and the verbal representation of logical operations) is already under way in the kindergarten. Considerable individual differences exist among children entering school (Józsa, 2004), which significantly determine the subse-quent success of learning to read (Józsa, 2007b). The development of these prerequisite skills can be effectively facilitated through playful methods, and the successful preconditions of learning to read can be es-tablished by the time children enter school (Fazekasné, 2000, 2006; Józsa & Zentai, 2007). However, current kindergarten education makes use of the opportunities inherent in facilitating development only partially.

Oral and Written Communication

As literacy is not independent from orality, neither are reading comprehension skills independent from oral language competences. In Saussure's theory (1916), the task of writing is to represent language, and in the course of history, writing has aspired to rise above spoken language and to assume the main role. The reason for the authority of writing is the illusion of objectivity. He believes the main reason of the opposition between writing and speech is that while writing tries to be constant, language is constantly changing. Of course, orality is of importance not only in the period before, but also in the course of, learning to read. The developmental level of oral communicative competence correlates with reading skills (Proctor, August, Carlo, & Snow, 2006). Almost all elements of oral language competence constitute important factors in the reading process, e.g., the developmental levels of phonemic awareness, speech comprehension and vocabulary. The reverse is also true, so there are several possibile reading exercises for improving children's oral language skills (Ediger, 2002).

Vocabulary extension is another cardinal factor in this regard. The prerequisite of students' good text comprehension is an adequate vocabulary. Vocabulary building is an essential component of processing the readings in class (Pap-Szigeti, Zentai, & Józsa, 2006). Children need a rich linguistic and learning environment in order to develop their vocabulary, speech comprehension, reading and writing. A curriculum for the improvement of vocabulary is considered well-structured if it can provide for the growth of students' vocabulary in various topics and fields (Eidiger & Rao, 2001).

The presence of a certain body of lexical knowledge pertaining to spoken and written language as well as to literature is a criterion of learning to read. In an optimal scenario, knowledge and beliefs develop together with reading skills. This area of knowledge includes such fundamental concepts of communication, language and literature as letters, sounds, words, sentences, punctuation marks, paragraphs, text, titles, topic sentences, authors, stanzas, dialogue, etc. We should take into consideration that some of the terms listed are related to written language, while others relate to both spoken and written language. The acquisition of these concepts is greatly regulated by the curriculum, yet we have

hardly any information about the depth and accuracy of students' knowledge regarding them.

The system of rules and the logic of written communication are acquired both directly and indirectly when learning to read. Based on their experiences, children understand the rules of the difference between spoken and written language as well as linguistic logic rather early. This development starts well before school age, when a child first encounters literacy. The learning of letters in the first grade of school, traditionally considered as the beginning of reading, is an important, but not the initial stage of this process. However, the explicit exploration of differences between spoken and written language does not appear in our present Hungarian curricula at all. We believe it is possible that by paying greater attention to these areas, the Hungarian educational system could achieve significant and positive changes.

The Foundation of Reading: Technical skills

Language Awareness and Knowledge of Language and Language Use

In Donmall's definition, language awareness is 'a person's sensitivity to and conscious perception (awareness) of the nature of language and its role in human life (Donmall, 1985). Wider appropriations of the concept include more dimensions, e.g., experiences with language, confident language use, linguistic behaviour and motivation (James & Garrett, 1991).

Anna Adamikné Jászó summarises the fundamental relationship between language awareness and reading as follows. '[L]anguage awareness is a linguistic analytical skill that can be situated between cognition and metacognition. As an intuitive activity, it cannot be called metacognition, but there is also similarity as it is an awareness directed at language. It develops in children gradually, through stages. Children notice syllables first, then sentences, larger units of a sentence, words, components of words, and finally they realise that words consist of sounds. Awareness of the sequence of sounds develops at the latest stage. Reading can be taught to only a child who already has this skill, therefore facilitating language awareness is a very important area of the development of skills"

(Adamikné, 2006, p. 261). This highlights the importance of the assessment and development of phonemic awareness, the issue already addressed above.

Several studies emphasize that phonological awareness, or, in other words, the skill of identifying and analyzing speech sounds, is a necessary element in learning to read. This view also appeared in curricula in the past two decades (National Reading Panel, 2000). Nevertheless, this field does not receive enough attention in Hungarian reading instruction and assessment.

Phonological consciousness, together with the reading of words, seems to have a direct effect on text comprehension (Kame'enui & Simmons, 2001). Furthermore, it can be easily verified that phonological processing is the main cognitive factor of word reading, especially for beginning readers (Wagner & Torgesen, 1987).

The Role of Phonemic Awareness in the Reading Process

Phonemic awareness enables us to distinguish speech sounds in various sound environments. The identification is performed on the basis of the attributes (components) of the sounds. Speech sounds may differ in characteristic qualities of articulation, i.e. their place and manner. In addition, differences exist in the vibration of the vocal cords, the length of pronunciation, and also the process of phonemic awareness. This spontaneously developing skill is one of the prerequisites of learning to speak. This makes it possible to understand verbal utterances and to perceive differences in spite of the similarities of phonemes. When children learn to speak, they rely on information both from speech recognition and from speech comprehension. Phonemic awareness has a controlling role in the regulation of the articulation process, thus it becomes a prerequisite of forming speech sounds by the articulation rules of one's mother tongue. While its exact starting point in time is not known, this process is generally seen as taking about three to five years. The skill of phonemic awareness functions on the perceptual and verbal levels, and its regulation occurs on the level of acoustic perception in verbal communication. However, the developmental process does not end here because

several years are necessary for optimization (Fazekasné, 2006; Fazekasné & Józsa, 2008; Gósy, 2000).

The quality of phonemic awareness has an effect on the formation of speech sounds, the process of speech recognition and comprehension, reading and spelling. An impaired differentiation of speech sounds can be a cause of certain speech defects (problems of speech articulation) and of poor or dysfunctional reading and spelling (dyslexia, dysgraphia), in spite of clear articulation. The success of learning a foreign language is affected by the extent to which its students can distinguish the differences in the pronunciation of speech sounds and the way they can segment, and thus comprehend, foreign sound and word sequences.

The recognition of individual phonemes one by one is not required for speech comprehension, because they function as the elements of the word recognition routine (Nagy, 2006b). This means that speech comprehension occurs on the basis of the recognition of some characteristics of the sound sequence, without the differentiation and identification of each speech sound separately. Thus one's partially developed phonemic awareness may remain hidden, and would come to light only through direct assessment revealing that the differentiation of the components of sounds functions imperfectly. However, in such cases the learning of reading and spelling is significantly hindered by difficulties (Fazekasné & Józsa, 2008).

The hearing skill required for reading is not specifically phonemic in nature. It is associated with musical hearing skills, too. There are certain similarities between phonemic awareness and musical hearing. It seems likely that musical skills are related to cognitive skills that play a role in both phonological awareness and reading. Based on a review of research results, Janurik (2008) concluded that phonological awareness and phonemic awareness, both of which play an important role in the developmental level of early reading, can be improved by special musical training. A highly developed ability to differentiate between musical pitches is predictive of subsequent success in reading. All this shows that "a new opportunity may be opened in reading instruction by the creation of a developmental music programme to support the development of acoustic-phonetic analysis at kindergarten and school age, in the initial period of learning to read" (Janurik, 2008. p. 310–311).

Children can learn to read and write correctly if they are able not only to perceive a word globally, but if they can also concentrate their audi-

tory attention on its elements and speech sounds, and analyze the sound sequence. Poor or dysfunctional reading is basically determined by a phonological deficit (Csépe, 2005. p. 216). Children with a phonological deficit mistakenly analyse auditory stimuli, thus their phonemic awareness is underdeveloped or disturbed (Csépe, 2005). Regardless of the actual language we learn to read in, the level of phonological processing determines the success of reading and writing (Ramus, 2003). A new dyslexia model, based on findings from electrophysiology research, attributes the serious dysfunction of reading to the dysfunction of auditory perception, and not to higher levels of speech recognition (semantics, syntax and discourse). "It is largely the phonological module at the lowest level of hierarchy, the processing and the dysfunctional operation of distinctive sound elements that comprise the components of language, that play a significant role in the failure of learning to read and write" (Csépe, 2002. p. 2). One of the triggers of dyslexia may be found in deficiencies regarding the processing of acoustic divergence. For some dyslexics, such deficit affects only certain consonants, but in more serious cases vowels are also affected. The difference between consonants by the place of formation (here the rapid temporal changes of frequency components should be perceived) is not or is only slightly processed by dyslexics (Csépe, 2006a, 2006b).

Symptoms similar to dyslexia are often found in the acquisition process of reading among children with learning disabilities. For them, the initial problem of learning to read is the correspondence between phonemes and graphemes, or, in other words, basically associating sounds with letters. It is well known from practice that they are uncertain in the recognition of letters for a rather long time, and they frequently transpose letters (Fazekasné & Józsa, 2008).

The two components of phonemic awareness are speech sound recognition (phonological perception) and speech sound differentiation (phonological awareness). The term phonological awareness denotes syllabification, the perception and articulation of initial and final sounds of words, phonemic awareness, and associating speech sounds with letters (Nagy, 2006b). Phonological awareness develops later than phonological perception. The differentiation of individual sounds inside words is not a strict condition for successful word recognition. The Hungarian language uses phonetic writing, therefore the successful acquisition of reading and

writing indispensably requires sound differentiation, i.e. the perfect acquisition of letters (letters and combinations of letters) representing speech sounds. Phonological awareness will significantly improve if, in the beginning, learning to read is accompanied by appropriate preparation in phonetics. The systematic nature and the intensity of the exercises vary by methods of reading instruction. If the recognition of individual speech sounds functions poorly, the grapheme-phoneme connections will not be steady. Educators usually attribute the uncertain recognition and naming of letters to the dysfunction of visual recognition, although phonemic awareness can also be responsible for this. Phonemic segmentation is the basis, and the use of letters is the superstructure. Beginning readers learn the basis and the superstructure at the same time. In practice unfortunately, generally the superstructure is studied thoroughly, but the basis is just a by-product. The use of letters is constantly controlled, but the supervision of phonemic segmentation does not take place (Kassai, 1998).

Reading progresses letter by letter at the beginning of learning to read. In the decoding process, it is not only sounds which must be substituted for the appropriate letters, it is not only a simple process of letter to phoneme sorting. The two components of decoding mutually shape each other, governed by rules. When established, reading is a global operation, where words are perceived in their entirety as sight words. However, the letters following each other within words each maintain their independence.

Time devoted to practising reading aloud plays a significant role in learning to read. But the substitution of the decoding process by reading aloud may also pose a danger. There are children who learn the text to be read by heart, and it is only when the quantity of reading is more than they can handle that their poor reading level comes to light, i.e. the consequence of the deficiencies of decoding (Fazekasné & Józsa, 2008).

All these research findings highlight that the development of phonemic awareness is a critical precondition of successful reading instruction. Looking at this issue from an assessment perspective, this means that assessing phonemic awareness has a significant role in the beginning period of learning to read. One of the tests of the DIFER Program package (Diagnostic test battery and criterion-referenced development system for 4-8-year-olds; Nagy, Józsa, Vidákovich, & Fazekasné, 2004a, 2004b)

provides criterion-referenced, diagnostic feedback on the development of phonemic awareness.

From Sounds to Words

Reading instruction in the traditional sense includes the preparation with letter to sound, then grapheme to phoneme correspondence rules, the teaching of reading letter combinations, the development of decoding (the technical skills of reading) and the facilitation of reading comprehension in the educational system. Basically, three phases are distinguished: the phases of preparation, acquisition (system formation) and automation (optimization).

The importance of literacy research before school age has been considerably re-evaluated in the past two decades. This is well demonstrated by the papers presented at the latest European Reading Conference held in Berlin in 2007. Two different approaches are present in the literature on the preparation of reading and writing in the kindergarten. The first emphasises reading readiness. Its proponents claim that kindergarten age is not suitable for any preparation for reading and writing instruction, because children will be mature enough for this only by school age. The other approach is referred to in the literature as emergent literacy. Its proponents emphasize that children encounter countless forms of literacy before school age, and they do command linguistic awareness, albeit at different levels, which naturally includes the awareness of literacy. As part of this, they know some letters and have some idea about the functions of reading and writing, and all this constitutes the basis for learning to read (McMahon, Richmond, & Reeves-Kazelskis, 1998; Szinger, 2007).

In the course of reading instruction, the learning of letters, the acquisition of phoneme-grapheme correspondence rules and the reading of combinations of letters probably have system-organizing functions in the development of reading skills. In the first grade of school, these are what organise the sub-skills already existing, linguistic awareness, the knowledge of, and experiences with, written language and through this reading becomes possible (cf. Szinger, 2002). This theory is supported by the proposition that reading skill is not an independent skill but a family of skills.

The kindergarten and primary school age skill development programme of the DIFER Program package, based on tales and stories, is associated with this latter approach (Nagy, 2009). Tales and stories which are well-known to, and many times heard by, children are accompanied by conversations that can improve the different elements of linguistic logic (Nyitrai, 2009a, 2009b). An appropriate developmental level of the linguistic-logical system is an indispensable condition to reading comprehension (Józsa, 2007b).

Relatively few studies address the preparatory phase of school-based reading instruction. The same applies to the phase of teaching the letters. What is treated as first priority in this area is efficient and automatic word recognition as the basis of fluent reading. The three elements of fluency are worth mentioning. The first one has already been referred to, i.e. fast and precise word recognition. Its main pillar is the automation of phoneme-grapheme correspondence rules, one of the fundamentals of which is frequent reading activity. The second element is the knowledge of prosodic factors in reading aloud, which should appear in the course of reading. This means that children should reach a stage where they can read out a piece of text expressively and focusing on its meaning. The third important element of fluent reading is comprehension itself, which is an indispensable factor in reading and involvement in the text. More capacity can be devoted to the making of meaning (comprehension) only if one's attention is not occupied by word recognition, the mental process of decoding. It is also easy to conclude that a highly developed prosodic skill would make the transmission of the characteristics of oral language to the written text more effective. The literature discusses two developmental methods for this. One is the method of individual repetition and practice, and the other is the so-called assisted reading method, where children follow the teacher and try to model the process (Kuhn, Schwanenflugel, Morris, Morrow, Woo, Meisinger, Sevcik, Bradley, & Stahl, 2006).

The development of the technical skills of reading also belongs among the areas receiving little research attention. The established methods are very similar in different countries (Wood & Algozzine, 1994). The authors emphasize the importance of variety, the use of several different methods and strategies, as well as their alternation and combination.

Vocabulary

The quantity and quality of vocabulary can be improved most effectively by extensive reading. In addition, vocabulary also contributes considerably to text comprehension and helps to establish and expand the conceptual system. Passive vocabulary can be improved expressly by belles lettres, and its elements are activated most by literary education. Vocabulary growth is closely connected with the development of reading skills, the genres of the pieces read, the frequency of reading and other reading attitudes. While reading new words, we acquire new concepts, and our existing conceptual system is expanded by associating new attributes and relations to the words and concepts already known. The more varied the contexts we read the words in, the more nuanced their meaning becomes, and yet another perusal may change the meaning further. Thus continuous reading is a permanent formative force of our knowledge and conceptual system (Cs. Czachesz, 1998).

In discussing the curricular and disciplinary dimensions of reading, a significant portion of our vocabulary must be seen as knowledge acquired by reading. Archaic, rarely used expressions, words and synonyms that belong to the stylistic register of belles letters and are mediated by readings, should be highlighted in this regard. A further characteristic of the quantitative and qualitative development of vocabulary belonging here is that it mostly entails the extension of passive vocabulary, or it activates expressions and words from this passive vocabulary. In addition, this segment of vocabulary is only accessible by reading because these expressions are not or are rarely used in spoken language.

In the Hungarian language the most frequent 5,000 words constitute about 95 per cent of the vocabulary of standard language texts (Nagy, 2006b). The indispensable precondition of reading comprehension is that the decoding of these words be automated and so-called word routines be formed. This study explored the development of the word reading skill. Nagy's (2006b) results show that it improves very little after the fourth grade. A little more than a quarter of eighth graders reach the optimal level of development, while for 40% of them the state of development of the skill of word reading does not make reading comprehension possible. The results of this survey refute the claim sometimes made that pupils have no problem with the technical skills of reading, only with text com-

prehension. All this makes it very clear that the development of the skill of word reading must be continued in lower secondary education, too. The effectiveness of development can be promoted by assessments performed with diagnostic, criterion-referenced tests.

Swanson, Trainin, Necoechea and Hammill (2003) provide empirical evidence for the importance of the factors discussed above. In their study, a global meta-analysis is presented about the close relationship between phonological awareness, rapid letter and word recognition, vocabulary, text comprehension and related cognitive skills. Cross-cultural linguistic studies have also proven the relationship between the phonological awareness and the development of the vocabulary of bilingual elementary school age pupils on the one hand, and their reading comprehension performance in a second language on the other hand (Dickinson, McCabe, Clark-Chiarelli, & Wolf, 2004; Swanson, Rosston, Gerber, & Solari, 2008).

Reading and The Knowledge of Grammatical Structures

Knowledge of Linguistic Levels

The visual representation of language also necessarily appears in the process of learning to read. During childhood development, language awareness, earlier based on acoustic representation as an exclusive experience, is fundamentally shaped and completed with new elements by a new, a visual dimension. The process of the acquisition of reading and writing also has a significant effect on the development of thinking (cf. Vigotszkij, 1967). First we review the most important elements and concepts of this process, by linguistic levels and the logic of spelling.

The learning of reading, writing, grammar and spelling do occur simultaneously in school, but their impact on one another – except for phonetic consciousness – is little explored in the literature. We therefore consider it important to present them for the benefit of future research and surveys.

Phonetic Level

One of the important elements of the preparation of school-based reading instruction is the teaching of sounds. This concentrates on the differentiation of the groups of sounds, human voices and speech sounds, as well as the development of the skill of perception. This preparation makes pupils aware that words are made up of speech sounds and that they have meanings. The sound-letter, actually the phoneme-grapheme correspondence rules differentiate speech sounds from each other and designate them as independent entities by making them visible as letters. As the emergence of the ability toabstract is an important stage in the development of humanity, as a condition of the emergence of writing in the life of a child, the presence of the understanding of the sign function, the ability to abstract and the basics of metaphorical thinking are preconditions for learning to read. An essential indicator of this is the understanding that one thing can be a signifier of another thing.

Morphological Level

The perception and observation of morphemes strengthens the awareness that words are often made up of word elements; they can be put together, which leads to new meanings; and they can have affixes, through which their meaning changes. The understanding and development of the back-and-forth effect of the logical process of synthesis and analysis enable the formation of analogies, and reinforce already existing analogies. On the morphemic level, the knowledge of further concepts is established and becomes visible simultaneously in the course of learning about language and in the learning process of reading: the concepts of stem, compound, and affixes and their types: formative, marker, suffix.

Lexical Level

In reading fluently, the reader needs the automation of word recognition in addition to a good skill in letter recognition and reading letter combinations in order to learn the most frequently occurring words of everyday texts as sight words, and in order to avoid the segmentation of those words, i.e. decoding them serially while reading.

When learning to read, the spatial distances between words represent the units indicated by intervals in speech. The recognition of this also develops language awareness. Furthermore, words improve semantic

awareness, making one aware that, in language, individual things are signified by unique phoneme combinations, according to the given characteristics of the given language.

In the course of learning to read, the curriculum provides countless readings in belles letters that are the single source of the development of the passive vocabulary. We shall discuss these in the section about readings in more detail. For now we just note that this segment of vocabulary constitutes a layer of the Hungarian language word stock not accessible in any other way.

Syntactical Level

Sentences visually represent the units of utterances, assertions and conclusions which are expressed by intonation in speech. The written sentence enhances the independence of this linguistic unit and its being constructed from words through a visual channel. Doubtless, however, writing cannot display the speaker's intention in the same nuanced and sophisticated way as speech.

The differences in the use and in the rules of written and oral language appear most markedly at this level. In other words, this is where it can be seen most clearly that written language is not simply transcribed speech. Unfortunately, school-based instruction at present does not make students aware of this to the required degree. However, if children were appropriately aware of this, then their spelling would be better, their written composition skills would be much improved and their communicative competence would be at a higher level.

Level of Textology

Text is the highest level of language, as well as of reading comprehension and written composition. Naturally, the hierarchical organization also applies to reading, and this supports the assertion that in the organization of reading skills the successful acquisition of a given level is conditional upon the automation of the level immediately below it. At the textual level, written language presents the most important organizers: title, paragraphs, dialogue, headings and layout.

The role of Spelling

Spelling can be considered as the system of rules that defines the differences between the use of written and oral language. Knowledge and experience acquired in this area cannot be separated from the linguistic knowledge and awareness described as per the grammatical levels above, and is also promoted by reading (Józsa & Steklács, 2009). Seen in a wider context, the knowledge and awareness of written language as such develops and is mastered in parallel with the acquisition of reading, and this also strengthens the awareness of language use. The recognition of the logic of letter-sound correspondence rules is followed by the comprehension of grapheme-phoneme correspondence rules. To put it more simply, in the initial period, we recognise that speech sounds have written signs, and then, knowing the rules, we can transcribe speech accurately. This gives the illusion that we write everything as we pronounce it (Hungarian examples: 'agygy' for adj, 'felejcs' for felejts, 'egésség' for egészség, 'fijú' for fiú, 'mixát' for Mikszáth, etc.). However, since this is not true, through spelling we learn what the exceptions are, which cases differ from the above logic, and what the rules are that organize written language. The understanding of all these necessarily changes our notions of language, speech and writing, too.

In fact, two logics exist in parallel regarding the written version of any language: (1) we write it as we pronounce (say) it; (2) we do not write it as we pronounce (say) it. In order to understand how written language operates, first we have to understand the first logic. From a linguistic perspective, it must be noted here that when interpreted in the context of writing-speaking-language, the spelling principles taught in Hungarian schools, and the principles of word analysis, tradition and simplification belong to the category of "we do not write it as we say it", whereas the principle of pronunciation is naturally the equivalent of "we write it as we say it" logic. (In this regard various languages show great differences, mostly in the light of how shallow or deep the orthography of their system of writing is; see Lengyel, 1999.)

The rules system of spelling comprises all linguistic levels. We have already discussed phonetics above. At the level of morphemes the rules of the connection of word components and the logic of writing some-

thing as one word or dividing it into words gradually take shape for students learning to read, and the differentiation of affixes and postpositions could be counted also among these. (For example, the level of pseudo-lexemes, and the differences of verb prefixes, suffixes and post-positions: -ba, -be, ebbe, bele, etc. / in, into, in this, into this, etc.)

At the level of words, the most important spelling rules should be understood together with the semantic level, and here the word classes, and the established rules of their writing are at issue. An advanced level of systematizing ability is required for understanding the concepts of word classes (set formation, definition and categorisation, Nagy, 1990, 2003; Zentai, 2010). In Hungarian, there is only one element to mark word class in writing, i.e. the capitalised initial letter of proper nouns, but its accurate and correct use requires the knowledge of several components, rules and their hierarchy. (For example: Arany János-i, Közel-keleti, Dél Afrikai Köztársaság-béli, Dunán túl, Dunántúl, dunántúli, Dunántúli barátaim közül sokan eljöttek.)

At the sentence level, the rules of modality in written language, the function of punctuation marks and the capital letter (the latter being the elements indicating the separation of sentences from each other) must be understood, as well as their use. At the text level, the rules of arranging and editing, and the rules of text to be completed can be mentioned. The former qualify more as typographical rules, but their role and importance has significantly increased in everyday life with handwriting giving way to the use of the keyboard. The Hungarian educational system has not responded adequately to this shift with measures that reflect its importance yet,.

In summary, we can assert that the acquisition and understanding of reading and spelling occur together. It is not only rules that are learnt during the process, but ideas of the functionality of written language are also shaped. At best, all this also induces the understanding of the social role of writing, contributing to the development of language awareness. It should be noted here that unfortunately primary education devotes little attention to this, thus losing a great opportunity.

The interpretation of language awareness in a wider context enables the assertion that reading transmits and strengthens the knowledge of the rules and norms of adequate linguistic behaviour, in addition to the knowledge of language and grammar. This can be seen indirectly in the

norms of the author's and the reader's behaviours. More important are those contents that exemplify general and special rules of behaviour, and project thinking processes, in various text types and genres. Their representations can be basically connected to various types of texts, and genres of fiction and non-fiction.

Reading Comprehension and Readings

The Preconditions of Efficient Reading Comprehension

On the subject of reading instruction, the most widely published area of the literature concerns the examination of the efficiency of reading comprehension. Researchers investigate the factors affecting the understanding of texts and how reading comprehension can be taught most effectively from several aspects. The reason behind this may be sought mainly in the drastic decline many countries have shown in surveys of reading comprehension, which indicates various threats from a social aspect. As one study put it, teenagers enter the new millennium facing requirements in literacy never ever experienced before in history, while in the United States their reading ability is poorer than ever (Bean, Bean, & Bean, 1999).

A survey of the National Assessment of Educational Progress (NAEP, 1998. p. 9) summarizes the main characteristics of good readers as follows. They

(1) have positive attitudes to reading.

(2) are fluent enough to focus on the meaning of what they read.

(3) use what they know to understand what they read.

(4) form an understanding of what they read by extending, elaborating, and critically evaluating the meaning of the text.

(5) use a variety of effective strategies to enhance and monitor their understanding of text.

(6) can read a variety of texts and can read for a variety of purposes.

From this list perhaps the fifth point should be explained in more detail, since the use of reading strategies has received heightened emphasis in recent years with regard to text comprehension. This is discussed in several fora, and we shall touch upon this topic again later on.

A similar survey found that highly developed reading comprehension is based upon the following: (1) frequent contact with literacy, (2) highly developed oral skills and rich vocabulary, (3) self-efficacy and feeling successful (being competent) regarding texts during social interactions, (4) effective word recognition, and (5) the use of effective reading comprehension strategies. An important conclusion of this study is that the development of any of these has a positive effect on text comprehension skills (Pressley, 2000). The author also observes that motivation is a cardinal issue in the development of reading comprehension. In her overview of the literature, Szenczi (2010) emphasizes that children's reading motivation significantly promotes the development of their reading comprehension. At the same time, highly developed reading comprehension is not necessarily accompanied by strong reading motivation. Reading self-concept is one of the essential elements of academic self-concept, distinctly separate from other self-components (Szenczi, 2008). We shall return to reading motivation in detail in a later sub-section.

Block, Gambrell and Pressley point out in a summary of the research on factors of effective text comprehension in the second half of the nineties that good readers have the following characteristics: they (1) create connections between relevant previous knowledge and the text, (2) select a reasoning process or procedure, (3) create mental images, (4) ask questions, (5) make inferences, (6) summarize, (7) realize what they do and what they do not understand, (8) clarify any confusion. Evaluating the importance of all these and the significance of future research, the authors assert that the research and the instruction of reading comprehension should be a national priority (Block, Gambrell, & Pressley, 2002). A huge body of research findings came to light in this field. But we believe that those listed above illustrate appropriately the factors the importance of which is established in professional consensus in the past decade.

Roller (2002) raises the following dilemmas and questions regarding the development of reading skills:

- Development: How should an educational stage fit into the whole scope of the developmental process? Are there phases and stages in the development of reading?
- Motivation: What kind of educational methods can establish the required motivational basis in the stages of public education?

- Individual differences: How can instruction be adapted to the individual differences among students in public education? How can increasingly diverse student groups be taught?
- Problems of time: How can time limits and different learning time needs be managed in line with the framework of public education?

Readings

Several studies have yielded evidence that reading comprehension is closely related to the diversity of texts the reader encounters. Findings show that the smaller the variety in types of readings the students are exposed to, the worse their performance of reading comprehension (Guthrie & Davis, 2003). The reverse is also true: readings and the processing of various types of texts play a key role in the improvement of reading comprehension. Texts with a personal relevance and interesting texts had positive effects on performance in reading comprehension (Guthrie & Wigfield, 2000).

In accordance with the above, the success of reading instruction correlates with the diversity of texts intended for the classroom in syllabi. Discussing performances from between 1992–1998, the NAEP study found that 'good readers are able to read a variety of texts in order to achieve a variety of goals' (NAEP, 1998, p. 9). Today it is also becoming more and more evident that searching for and selecting texts suitable for a given reading purpose, as well as knowing how to obtain information from them also belong to the concept of reading, in addition to processing of the text itself.

The deficiency of poorly performing readers is not only seen in the problems of cognitive processes, but also in their lack of motivation, their lack of interest in reading, and the small amount of time they devote to reading. In addition to these latter characteristics these readers also read only a few text types and genres.

In line with the above, a remarkable finding of brain research in the nineties was that primarily it is not the type of text but the reading purpose which determines what parts of the brain have a greater preference in text processing. At the same time, there are significant individual dif-

ferences in cerebral activity in this regard (Shaywitz, Shaywitz, Pugh, & CAST Research Team, 1998).

Two main text types are usually distinguished regarding the purpose of the reader and of the text. These are texts offering (literary) experience and texts offering information. This typology gives a functional categorisation based on fundamental purposes of reading. In addition, these text types are also fundamental regarding theoretical considerations, curriculum development, and the planning of instruction. At the beginning of cognitive psychological research on reading Heath (1980) summarized that, from a functional point of view, text comprehension focuses on the purposes of reading, which are the gathering of information or entertainment that often includes image creation and other creative processes. In addition to these two types, in some cases the group of (functional) texts required for everyday problem solving also appears, such as figures, charts, timetables, etc. The latter are actually texts offering information, which are not organized and laid out traditionally but in other, most frequently graphic, ways. The same types of texts and categories appear in international studies of reading as well (PISA and PIRLS).

From another perspective, electronic and print texts can be distinguished which differ as to their typological and textological characteristics, and influence the process of reading accordingly (Józsa & Steklács, 2009). The ongoing development and expansion of information and communication technologies has also brought about new challenges for reading instruction. For present day readers, instructional methods based exclusively on books and print media are not sufficient anymore. The methods of reading instruction which proved to be the best to date also need to be revised in order for them to meet the new challenges. The developers of reading programmes and curricula should take into consideration that readers today mostly read electronic texts, especially on the Internet. However, they need different, new reading skills and strategies for this. Schools should undertake to help the readers of the future to develop these skills. However, this can happen only by the joint cooperation and collaboration of teachers, parents, teacher training institutions, school administrators, political decision-makers and educational researchers (IRA, 2002). The recognition of this necessity has initiated changes in several countries, such as Australia, Finland, Ireland, New Zealand, the United Kingdom and the United States. Hungarian experiences show that

reading skills can be developed effectively in a computer-supported educational environment (Molnár, É. & Józsa, 2006). Nevertheless, these tasks have yet to be performed.

Ediger (2001) proposes that, in reading curricula, the use of information and communication technologies should be highlighted when the individual needs, reading skills and motivation of students are considered. In an earlier study he also emphasises that computer technology harmonizes well with individual reading ambitions and education should rely on this to a greater extent (Ediger, 1996).

The dominance of works of belles lettres is overwhelming in Hungarian books for teaching reading skills and reading comprehension. A further special characteristic of these books is that the majority of these texts were written 70–100 years ago. The roots of the approach that identifies reading with the reading of belles lettres reach back to ancient times in Europe. Education in the Middle Ages strengthened this by allowing only texts canonized by the Church to be taught in schools to students learning to read. Since at that time only the clergy could read, this was not a problem, but today this approach raises serious issues, since the reading of various texts with different techniques is a basic condition of success in society. The dominance of literary texts in primer readers written about 100 years ago is not only to be found in Hungary, but also in the successor states of the Austro-Hungarian Monarchy, the Central and Eastern European countries. Moreover, this is not simply tradition, but curricular requirement in several cases. Exposure to such texts is, of course, not a problem. The problem is the consequence – that students are not exposed to many kinds of works and text types that play a role in their everyday life, and could satisfy their interest in their environment. Even contemporary works of juvenile literature written for them and about them also lose in this competition. Text ratios in textbooks also generate the problem that the reading methods of the new text types are underrepresented in reading instruction, because they necessitate different instructional forms, approaches and competences (Sulkunen, 2007).

The reading of various texts, raising several problems and presenting different solution methods, also brings about the development of thinking skills. In parallel, even the reading of different texts with different reading purposes has a developmental effect in itself. Evidence for this

also comes from studies revealing a close connection between mathematical and reading skills (Kupari, 2007).

Well-written textbook texts can be adequate sources in themselves for the processing of various contents as well as text types and structures. These texts are intended to be read anyway, and can be used effectively for the development of reading comprehension, too. This means that there is no need to include more designated lessons for the development of reading comprehension, because the intervention can be performed in the regular classroom (Nagy, 2010; Pap-Szigeti, Zentai, & Józsa, 2006). The methods of text processing ability development are effective in helping the development of both text comprehension and thinking skills (Józsa, 2005). However, effectiveness requires teachers of subjects other than Hungarian language and literature to gain sufficient practice (and professional openness) in the development of reading comprehension. In addition, it is essential that textbook texts be suitable for this purpose. Such textbook texts may also be used in assessing the advancement of reading comprehension.

The use of diverse texts in primer readers and among the readings of children may result in a general, positive effect for the entire teaching and learning process. The reason for this is twofold: further academic success may be the consequence of the cognitive processes and problem-solving models given and projected in readings (the experiences of the author) on the one hand, and the reasoning and emotional processes practised by the readers, coming from their own experiences on the other hand. The expansion of the scope of readings increases academic achievement even more effectively if it is supplemented with the reconsideration of the learning and reading environment, an encouraging atmosphere, the creation of a receptive mood and the application of new instructional measures (Lee, 2006).

Reading and the Knowledge of Belles Lettres

Seen as the curricular and disciplinary dimensions of reading, works of belles lettres belong to the category of readings mentioned above. But because of their importance they should be discussed in more detail, since belles lettres play a significant and traditional role in the Hungarian educational system.

The purpose of lexical knowledge communicated by literature is two-fold. On the one hand, it is to facilitate and to intensify the message of literary works and engagement in the process of reading. On the other hand, it is to deliver the cultural inheritance communicated by written language to the reader. Accordingly, the knowledge at issue would entail historical and theoretical knowledge related to literacy, writers, poets, periods, authors' intentions and devices, genres, works and the receptive processes of the reader – the latter usually only to a small degree in public education.

If the curricular and disciplinary dimension of reading is seen in a wider context, then texts to be learned by heart can be listed here as well, although these are more strongly attached to oral communication than to literacy. Still, they have a rich tradition in European educational systems as well as in oriental cultures. Curricula usually consistently prescribe knowledge, works and texts to be learnt by heart related to literature. Yet the most important issue here is what methods are more effective in delivering the knowledge communicated by literature.

As already mentioned in the introduction, the teaching of literature has been historically intertwined with the abilities of interpretation and comprehension of texts. The reason for this may be that it was the Church that organised and provided education in the Middle Ages, therefore the texts to be read were also closely tied to the Christian religion. Having acquired letter-sound correspondence rules, in most cases students immediately read legends and other works approved by the Church. Since the linguistic medium was Latin, a third element also appeared among the learning tasks in addition to reading and the readings, namely grammar (and the descriptive grammar of the Latin language, of course). The typical example here is the instructional method of scholasticism. This entailed reading a piece of text by analysing it sentence by sentence, from grammatical and then from semantic aspects, and then summarizing the meaning and the message of the text on the basis of Church approved textual interpretations (Manguel, 1998).

This approach constituted the system of relationships between literature, grammar and reading until the 20th century, when other paradigms and approaches appeared. Today, three methods of teaching literature have become widespread, i.e. the Cambridge, the London and the sociology-based approach, the latter mostly becoming popular in the French

educational system. The Cambridge method can be considered the embodiment of the classical, positivist approach. The author, the work and the stylistic period are in the centre, and the analysis is based on an authoritarian principle as the approach and thoughts of literary historians are taught to children, similarly to the method used during the period of scholasticism. The London method is the opposite, with the reader positioned in the centre, the central learning method is individual, text-based processing, which is organized in tasks, and is complemented by drama techniques. The development of communication skills is emphasized in contrast to the expansion of lexical knowledge. The third approach, the sociology-based method, is less well-known and seems less effective than the previous two. Here, literary texts are examined from the perspective of the reception paradigm of the given era. In other words, the question is how they were received by the readers in the period when they were written. In addition to the above three approaches, there is a fourth, that of the educational systems of dictatorships. Here literary pieces are taught and evaluated from the ideological perspective of the given regime. This can be regarded as a deformed version of the Cambridge method (Sipos, 1994).

Keeping the above in mind, it is easy to realize that the definitions of reading in the 21st century are closely related to those schools of literary interpretation and methodology that emphasize the reader in addition to the triad of text, era and author. This opposition also appears in the concepts of teaching literature and literary education. Literary education is more advantageous for the emergence of conscious reading behaviour, the understanding of the function of reading, making choices between options in interpretation and also for the development of the understanding of understanding (metacomprehension) (Steklács, 2002).

The schools of literary theory in the 20th century all had an effect on literature as a discipline, consequently, also on the practice of instruction, but neither could instigate a radical change or establish itself in public education. In contrast, it is more typical in the practice of instruction in literature that, instead of paradigms of literary theory, it is methodological approaches and principles that gain ground in the school (for example, Reader Response; RWCT, Reading and Writing for Critical Thinking). It is an unambiguous tendency in both international and Hungarian practice alike that beside the classical, rather authoritarian, author-

era-stylistic history approach, those methods gain ground in literature lessons in which the reader, the work and its possible interpretation are placed in the centre (Arató, 2006; Gordon Győri, 2006).

The instructional methods of literature can of course be evaluated from several points of view. One may examine which method results in a larger body of lexical knowledge later on, or which one provides a greater chance for the student to become a reader in adulthood. The authors of a study looking for answers to similar questions examined what effect different models of teaching literature have on the subsequent frequency of reading books among children in the Netherlands. Data were collected from 85 teachers of literature in primary schools about the models of instruction they used between 1975 and 1998. In parallel, nearly 700 persons were interviewed, all the former students of these teachers. One question targeted how frequently they read at the time of data collection. The analyses showed that, among the models of teaching literature, the student-centred models resulted in more frequent reading later on . Those who had studied under the conditions of a teacher-centred model read less in adulthood (Verboord, 2005). The student-centred method can be identified more or less as the London method introduced above as part of Lajos Sipos's classification. Thus the most general question of the teaching of literature surfaces once again, namely whether schools should be teaching literary history or whether they should motivate students and facilitate their love of reading. A few decades ago these two purposes were not differentiated from each other to the extent that they are today, since the reading of belles lettres was a more popular form of spending leisure time than it is nowadays. It should also be added that the role of belles letters in society, and in shaping society, has significantly decreased by today in Hungary.

A study by Applebee and Purves (1992) points out that students may become uncertain of, and shy about, their own reading and interpretation if the literary works are mostly analyzed by teachers in class. Hereby their motivation for reading belles lettres also decreases, naturally. The above study and several similar research findings suggest the conclusion that the student-centred teaching of literature and literary education results in better cognitive performance, more positive emotional attitudes and motivation towards reading, and results in wider and deeper knowledge (Tynjälä, 1999). Moreover, such processing of literary pieces sup-

ports more strongly the development of social sensitivity in children as well as their tolerance regarding others' opinions (Purves, 1973).

Readability

An important characteristic of texts intended for reading is how easily they can be read and the extent to which they are suitable for students of a certain age as regards the structure of the text and other characteristics. The readability index is a numeric value expressing how easy a piece of text is to read.

The first of these indices was developed in the seventies (Kincaid, Fishburne, Rogers, & Chissom, 1975). The Flesch-Kincaid indices were originally created to describe the difficulty of English texts, but today they have been adapted to more than a dozen languages. There are two such indices, the Flesch-Kincaid Reading Ease and the Flesch-Kincaid Grade Level.

The Flesch-Kincaid Reading Ease can be calculated from the length of words and sentences in the text. The easier the text, the higher the value of this number. The highest possible value of the index is about 120, which would be found for the easiest texts. The texts with a value of 90–100 can be recommended for 10–11-year-old children. Texts at the other end of the scale are characterized by values below 30 and are suitable for reading by university students. The Flesch-Kincaid Grade Level provides information about the grade from which students would understand the given piece of text, i.e. from which grade on it can be recommended for reading (Braby, Kincaid, Scott, & McDaniel 1982; Kincaid, Aagard, O'Hara, & Cottrell, 1981).

There are websites on the Internet where these indices are calculated for uploaded texts[1]. Other readability indices also exist, e.g., for Danish, French, Dutch, Spanish and Swedish texts. On-line text editors are also available which continuously show the readability indices of the text under composition[2].

At the same time, it is important to consider that these readability indices do not provide information about clarity, style and vocabulary.

1 See, e.g.: http://www.standards-schmandards.com/exhibits/rix/.
2 See, e.g.: http://www.editcentral.com/gwt1/EditCentral.html.

They take no account of the subject and content of the texts, for example. Nevertheless, they are important indices. It will represent a professional leap forward when readability indexes for Hungarian texts are constructed. The texts of Hungarian textbooks, educational materials and recommended readings, etc. will need to be evaluated along these indices.

The modification of the national textbook regulation in March 2006 brought about radical changes in the texts of Hungarian textbooks. The overview of the Ministry of Education [Oktatási Minisztérium] states that, "The market interests of primer readers often overcome the professional ones. Some of the present primer readers do not take account of the transformation of the environment and the skills of typically developing children" (Oktatási Minisztérium, 2006, p. 5). It points out that textbooks in circulation at the time "(1) Do not reflect the changes in societal needs. (2) Feature old-fashioned teaching and learning strategies. (3) Neglect the student's perspective. (4) Reflect a false image of the development of learning skills. (5) Are handbooks rather than textbooks. (6) Present too much lexical knowledge. (7) Their conceptual system and activity system is random. (8) Their language is difficult to understand and study. (9) The use of illustrations is not conscious and effective enough." (Oktatási Minisztérium, 2006, p.14).

The textbook regulation modified in 2006 required the examination of the language of textbooks. The regulation defined by grade the highest possible frequency of the occurrence of sentences longer than 150 characters. The ratio of such sentences cannot exceed 35 per cent even in the 12th grade. The frequency of technical terms is also maximized by grade. In addition, every textbook page has to feature at least one figure or picture on average. These images should provide substantial help for reading. The regulation also stipulates that a task or activity should be associated with at least one quarter of the pictorial elements. This latter criterion provides significant help for the development of reading skills regarding non-continuous texts.

Compulsory and recommended readings should also be analysed for readability. They should be examined to determine whether their language, sentence structure and vocabulary are appropriate for the age of the target audience and the developmental level of their reading skills. It would also be useful to examine to what extent the topics discussed, the images of life depicted, and the problems presented in the texts assigned

can raise the interest of students, and how much students can relate to them. To what extent do all of these together facilitate the development of motivation regarding reading and of text comprehension skills?

Reading Strategies, Metacognition and Knowledge Related to Reading

Effective reading requires the knowledge of multiple methods and strategies of reading. Reading strategies are defined as cognitive and metacognitive strategies, selected, evaluated and regulated by individuals to achieve the reading goals they aspire to. All these strategies are important for the success of reading, but also for that of learning. The knowledge of strategies entails declarative (responding to the question What?), procedural (How?) and conditional (Why? and When?) knowledge of the reading process. Good strategy users know and use several strategies, and vary them so as to be able to achieve the reading goal in the most appropriate way (Almasi, 2003).

The concept of metacognition was first defined by Flavell (1979) as knowledge pertaining to our own knowledge. With respect to reading, this means the knowledge of readers of their own reading processes and of their own ability of reading comprehension. It is the realization of their strengths and weaknesses. There is a large number of studies on inducing the development of metacognitive knowledge, for example in mathematics and reading (Csíkos & Steklács, 2006).

Comparing the characteristics of language awareness and metacognition, Adamikné (2006) found the greatest difference to be that language awareness is less conscious; it is a system less consciously operating and less consciously organized in comparison to metacognition. In reading, metacognitive knowledge can be developed along with the knowledge of reading strategies, with strategic reading and the ability of text comprehension. This knowledge as well as the knowledge and use of reading strategies require that children be aware of their key concepts in their learning activities and to apply and name them confidently. Good strategy users are characterized by extensive background knowledge, high motivation, knowledge of metacognitive factors, the use of several reading strategies, and the ability to analyze reading tasks, i.e. selecting the

best strategies for the given reading purpose (Pressley, Symons, Snyder, & Cariglia-Bull, 1989).

Block, Gambrell and Pressley's review (2002) found many qualitative and quantitative studies proving the success of teaching methods relying on reading strategies. Through their use, reading comprehension improves significantly. The review also highlighted the fact that reading motivation, as well as readiness for interaction grow in parallel with the acquisition of strategies. Moreover, so does children's intention to read increasingly difficult texts, respond to them, and express and analyze their meaning. A reverse effect can also be assumed. It is probable that individuals more motivated to read would put more effort into using the appropriate reading strategies. Thus the positive return of improving reading motivation may be the use of reading strategies.

So strategic reading results in more conscious reading, hence, in more effective reading comprehension. In order to achieve this, a knowledge of reading, reading methods, and one's own reading processes needs to emerge. The contribution of this knowledge has an increasing role in the development of text comprehension and interpretation abilities. Knowledge of reading can be categorised into two types. On the basis of Hungarian experiences, both can be taught and developed (Steklács, 2006; Steklács & Csíkos, 2009). One type includes knowledge about the reading process, reading comprehension, possibilities of interpretation, possible methods and strategies of reading as well as reading errors and their correction. This can be called cognitive reading strategy knowledge. The other type includes knowledge about one's own reading process, reading abilities, strengths and weaknesses. This is metacognitive knowledge about reading.

Reading strategies can be grouped according to several aspects. Typically strategies are distinguished by the process of reading, thus strategies before, during and after reading are specified. An example of such a typology is offered by Paris, Wasik and Turner (1991):

- Preparing to Read: (1) Is clear about the goals for reading, (2) Skims the text to get information about the length and structure of the text, (3) Activates prior knowledge.
- Constructing Meaning While Reading: (1) Reads selectively, reading irrelevant information quickly or rereading important, difficult or interesting texts, (2) Identifies main ideas, (3) Predicts, (4) Makes

inferences, (5) Interprets and evaluates, (6) Integrates ideas into a coherent representation of the text, (7) Monitors understanding.

- Reviewing and Reflecting on Reading: of the read material, responding to the text: (1) Reflects for understanding, (2) Invokes strategies to review the text and comprehension, (3) Summarizes

The question emerges of what the most effective strategies are from the perspective of the development of reading ability. Keene and Zimmermann (1997) found the following strategies the most effective: (1) activation of preliminary knowledge, (2) ranking of information, (3) asking about the text and the author, i.e. asking questions from the writer during reading with respect to the ideas in the text, (4) recalling different perceptual images, (5) drawing a conclusion, (6) re-telling or synthesizing, (7) applying correcting strategies, i.e. correcting our own mistakes, and hence knowing our abilities.

A good example and a research based method is the model of transactional strategy instruction. This holds that an important factor of effectiveness is the teacher naming reading strategies at first use and frequently afterwards as well. Children need to become aware of the strategies, they should recognize them in the course using them and they should name them, too. This method teaches several cognitive and metacognitive processes. Children learn these gradually, being taught only one or two new factors at a time (Pressley, El-Dinary, Gaskins, Schuder, Gergman, Almasi, & Brown, 1992).

The ability to use the knowledge and strategies of our own cognitive processes can also be discussed in relation to learning abilities. Ediger (2001) emphasizes the important role reflective thinking plays in reading. He claims students should be taught how to think during and after learning to read and how to examine the ideas generated.

The presence of metacognitive knowledge in Hungarian curricula is reviewed by Csíkos (2007). He proposed that metacognitive knowledge should be included to a greater degree in Hungarian curricula than it is at present. Also, the development of metacognitive elements should have a larger role is classroom instruction.

Summarising the requirements for the effective facilitation of reading ability, the following strategic elements need to be emphasized more in classroom practice: text analysis, scanning, predicting, comprehension, interpretation, repeated reading, summarising, drawing conclusions, cla-

rification, skimming, and the identification and elimination of factors that interfere with reading. Developmental programmes based on this approach have yielded numerous positive results in Hungary (Csíkos, 2007; Steklács, 2006; Steklács & Csíkos, 2009).

It is particularly important to emphasize that there are significant reserves in the practice of Hungarian reading instruction regarding reading comprehension. The teaching of reading strategies does not need to be started when children enter school. However, the approach and way of thinking may be introduced in the first grade or even in kindergarten which can make children's reading comprehension develop from grades 3 and 4 onwards spectacularly and more effectively compared to the current practice of reading instruction (Steklács, 2006).

If Hungarian reading education is considered in the light of what has been discussed above, it appears to represent a fifty year old approach, limiting the teaching of reading to the elementary grades. In contrast, we find it necessary to view reading instruction as a process spanning the whole of public education, from kindergarten to the end of compulsory schooling, with a focus on both reading ability and the academic contents conveyed. The phases of reading instruction are illustrated in Figure 3.1, synthesizing the results of one of the areas of the ADORE research project (Adolescent Struggling Readers in European Countries).

	Kinder-garten	1	2	3	4	5	6	7	8	9	10	11	12	13
Preparation of reading														
Learning the signal system of reading														
Fluent / independent reading														
Strategy-oriented reading														
Adaptive / critical reading														

Figure 3.1
School-Year-Related Overlaps Between Plateaus and Modes of Reading
(Garbe, Holle, Weinhold, Meyer-Hamme, & Barton, 2010, p. 44)

Compared to the Hungarian, and to the European approach generally, there are two new levels in lower and upper secondary education in Figure 3.1. It is easy to acknowledge that the Hungarian education system could meet social expectations more effectively with this approach, and it could integrate research findings into practice adequately. Compared to the current Hungarian system, the two major differences appearing in Figure 3.1 are the presence of the top two levels, strategy-oriented and adaptive/critical reading. By the introduction of these levels, the harmful view of relegating reading instruction to a task for elementary education and as the competence and responsibility of the teachers there could be abandoned.

Examining the relation between reading and learning, three forms appear. First, there is learning to read, where the goal is to acquire the skill of reading. Second, there is learning through reading, where reading is a tool. Third, (and this is a rather neglected area as yet) there is learning about reading, and the emphasis on this aspect can result in the development of the previous two processes as well. Interactions are present in the relations between these aspects, so that the development of either will positively impact the other two. The curricular and disciplinary dimension of reading can also be defined in all three areas (Steklács, 2011).

Reading Motivation

A student motivated to read reads frequently, is engaged, aims for comprehension when reading, applies reading strategies more frequently and with more ease, and is willing to participate in social interactions about the given topic during or after reading (Guthrie & Wigfield, 2000). Motivated reading with understanding facilitates the development of reading comprehension, therefore students who are strongly motivated to read are usually good readers as well. The PISA 2000 survey found that students strongly motivated to read were among the best readers, independent of their socio-economic status, whereas those showing little engagement in reading performed below the OECD average regardless of their family background (Kirsch, de Jong, Lafontaine, McQueen, Mendelovits, & Monseur, 2002). Studies on the relationship between reading motivation and reading ability showed that reading motivation is a good predictor of later reading performance.

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Research on early childhood literacy has made it clear that the evolution of reading motivation is strongly determined by the period before school age (Szenczi, 2010). The richness of stimuli in the linguistic and literary environment surrounding the child is important, as are the literacy-related attitudes and habits of the family, as well as what the educational institutes (the crèche and the kindergarten) are able add. The enjoyment of listening to books, tales and stories can strengthen the motivation towards mastery in reading (Józsa, 2007a). Thus, it is also important what tales and what storytellers children are exposed to prior to school age.

The experiences of learning to read in the first years of school have a particular significance. Not only do they have a major role in shaping attitudes to reading, but they are also definitive in the development of general motives related to school and learning. Chapman & Tunmer (2002) emphasize the role of early reading self-concept in the formation of academic self-concept. They found that the successes and failures experienced by children in the early phase of their learning to read have a central role in their academic self-concept, and that academic self-concept affects subsequent academic performance (Guay, Marsh, & Boivin, 2003; Van Damme, Opdenakker, de Fraine, & Mertens, 2004). Accordingly, early reading self-concept can determine academic success.

The development of reading ability in itself is not sufficient for developing reading motivation. In reading instruction, the facilitation of reading motives is essential in addition to ability development (Guthrie, Hoa, Wigfield, Tonks, Humenick, & Littles, 2006). Reading motivation is a complex system of several elements. Its components, on the one hand, are the reading-specific equivalents of motives described in the literature of learning motivation, such as reading self-efficacy, reading goals, perceived control in reading, interest in reading, and reading self-concept. On the other hand, the social motives of reading as a joint activity also belong here (Szenczi, 2010; Wigfield, Guthrie, Tonks, & Perencevich, 2004).

The school context and the classroom atmosphere bear on students' reading motivation, and thus on the success of acquiring reading ability (Kelly, 2003). The 2001 PIRLS survey listed the school factors affecting reading motivation and ability development: (1) school environment and resources of reading, (2) training characteristics and attitudes of teachers, (3) classroom environment and structure, (4) home/school connectedness,

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(5) instructional strategies and activities, (6) supplementary instructional materials, learning materials and technologies, (7) characteristics of evaluation (Kelly, 2003; Mullis, Kennedy, Martin, & Sainsbury, 2006).

Similarly to the family and the social context, the quantity and quality of the environment and the available resources at school also affect the reading habits, frequency and preferences of children (McQuillan & Au, 2001). Examining the school context of reading ability, the 2001 PIRLS survey also included questions about the number of books available for children in classrooms and in school libraries. In an international comparison, Hungary was at the lower end of the rank order in this respect. While there are more than 500 books in 96% of the classrooms in Iceland and in 76% in Sweden, this ratio in Hungary is but a fraction of the former (Mihály, 2003).

The emergence of engagement in reading in classroom environments is facilitated most by the following: setting appropriate learning objectives, more realistic tasks, supporting learner autonomy, teaching interesting texts and reading strategies, providing opportunities for cooperation, the appropriate degree of involvement by the teacher, the appropriate tools and methods of rewarding and evaluation, and establishing coherence among the strategies and methods applied (Mullis, Martin, Kennedy, Trong, & Sainsbury, 2009).

Regarding the development of reading motivation, the model of the PIRLS survey relies upon five basic motives. These are (1) mastery of goals of reading, (2) perceived control and autonomy in reading, (3) reading self-efficacy, (4) social motives for reading and (5) the intrinsic motivation of reading. The methods for developing motives are illustrated with the principles of the Concept Oriented Reading Instruction (CORI) program, based on the above model, from the works of Guthrie and Wigfield (2000), Guthrie and Cox (2001) as well as Guthrie, McRae and Klauda (2007).

If students' primary aspiration while reading is understanding, they mainly pursue mastery goals. Pursuing mastery goals usually results in higher achievement (Meece, Anderman, & Anderman, 2006; Meece & Miller, 2001). In the classroom, pursuing mastery goals is enabled by setting clear learning objectives and embedding reading development into curricular contents. Development embedded in curricular contents helps reading to become a tool in knowledge acquisition. Accordingly, reading

always serves the achievement of certain specific goals, which goals can be realized through the comprehension of texts, i.e. through reading.

Students' feeling of being in control of their behaviour and actions, i.e. their feeling of autonomy, also affects reading performance (Sweet, Guthrie, & Ng, 1998). Students' feeling of autonomy can be primarily enhanced by offering real opportunities for making choices and decisions. Several methods are available in the classroom to enhance student autonomy, such as a free choice of topics or texts, expressing opinions about texts, selecting the passages to be read, formulating questions, etc. (Assor, Kaplan, & Roth, 2002).

Turner (1995, 1997) distinguishes two types of reading tasks: open and closed ones. A characteristic of open tasks is that they are chosen by the students and require the use of different strategies. Another important characteristic of such texts is that children find them interesting. An open reading task is, for example, if students experience an interesting phenomenon, e.g., watch a video about the duckbilled platypus. They formulate their own questions about it. Then they can choose from different texts to answer the questions, and they have to find the answers in the texts using their own strategies.

In contrast, closed tasks are much more limited regarding what they require students to do. An example for a closed task is students reading a piece of text the topic and type of which have been selected by the teacher, and they answer the teacher's questions using the methods and strategies offered by the teacher (e.g., underline the adjectives in the text that describe the platypus.) Turner (1997) found that in classes where teachers gave more open reading tasks to students, children reported a higher level of motivation than in classes where closed tasks dominated. Experience shows that closed tasks are prevalent in the majority of Hungarian schools. An increase in reading motivation levels might be expected if the practice of Hungarian reading instruction incorporated more open tasks.

Reading self-efficacy refers to students' judgment of how well they would perform on a specific reading task, such as reading a word. Students with high self-efficacy find difficult reading tasks challenging and work hard on completing them (Schunk & Zimmerman, 1997). Their study also highlights that teachers' responses have a key role in the formation of self-efficacy. Regular and individualised feedback help students to see

their abilities realistically and set realistic goals. Teachers' evaluations and reinforcements should primarily be related to the effort and not to the actual performance. Experiences of success in reading also contribute to the development of self-efficacy. It is the teacher's task to create appropriate conditions for this to happen. In order to ensure that every student experiences success, students at different developmental levels of reading ability need to be given texts of different difficulties, but, if possible, on the same topic. This way, students can contribute equally to group work, while processing texts that are optimally challenging for them, and are close to their own development level. In addition to cooperation, the teaching of reading strategies also has a positive impact on self-efficacy, as detailed above.

The comprehensive study of Wigfield, Eccles and Rodrigues (1997) discussed the school factors influencing learning motives. Of these, the study mentions e.g., the atmosphere of the class and of the lessons, the characteristics of group dynamics in class as well as the composition of the group. The class as a group in the psychological sense impacts reading motivation through the social motives of reading. These social motives are related to sharing reading experiences with others (Wigfield, Guthrie, & McGough, 1996). The solution of reading tasks with the cooperation of students can generate productive social situations. When students have the opportunity to share their questions, points of interest from the text and newly acquired information with their classmates, this has a positive influence on their intrinsic motivation and self-efficacy as well (Gambrell, Mazzoni, & Almasi, 2000).

Intrinsic motivation is generated from the joy found in the activity itself, here in reading. There is a clear positive correlation between intrinsic motivation and the developmental level of reading ability (Wigfield & Guthrie, 1997). There are several ways a teacher can facilitate intrinsic motivation related to reading. One is evoking curiosity and supporting the emergence of interest. Embedding reading exercises in content offers an opportunity for associating the reading activity with other, interesting, realistic tasks or activities, such as acting out the readings. Most children enjoy animated and realistic activities. The initial interest thus created may easily mature into a relatively longer-term interest (Hidi & Renninger, 2006). Animated, realistic activities also provide a good opportunity for students to formulate their own questions, and to seek answers to

them through reading. For example, after a walk at the zoo, children may have many questions about the life, habits and biology of animals. They can find the answers to their questions through reading relevant and interesting texts. The genres of the texts may be various, ranging from children's encyclopaedias to books of poetry even. Knowledge gained from experience and from texts will thus complement each other and generate active learning.

This section has given a review of reading motives and the possible methods of their development. Strong reading motivation is not equal with the dominance of one motive. It is rather an optimally developed system of motives with multiple components, enabling adaptive adjustment to the environment, here the learning environment. Naturally, teachers have a key role in shaping reading motives (Józsa, 2007a).

The contents of Reading in Hungarian Curricula

The input of the contents education is regulated by curricula. Content aspects of assessment frameworks have to be in line with the curricula. Curricula have a key role in how reading is seen in schools, what texts students are exposed to, and what and how they are taught. In the past few decades, significant curricular changes have taken place in the public education of Hungary. In the following, curricular changes as regards reading are reviewed.

The 1978 Curriculum

The 1978 curriculum was the last prescriptive central curriculum, which, made an attempt to modernise the teaching and learning process through specifying the compulsory and supplementary contents, distinguishing optimum and minimum objectives as well as introducing elective subjects. The objectives and principles of this curriculum were partially defined as a result of political decisions.

This curriculum relegated the development of reading ability to the academic subject of Hungarian Grammar and Literature: "In grades 1 through 4, the objective of mother tongue instruction is to further de-

velop the linguistic knowledge of students, and to shape and enrich methodically their oral and written language use." (Művelődési Minisztérium, 1978, p. 159).

In reading instruction in primary education, the emphasis was on the acquisition of the technical skills of reading, primarily facilitated by global methodology (the whole word method) at the time. The objective of teaching literature in lower secondary education was specified as primarily aesthetic education. The curriculum treated reading ability as one of the elements of basic knowledge of the mother tongue. At the same time, it includes among the detailed objectives of teaching literature the development of reading aloud expressively and silent reading.

Assigned readings primarily included folklore, poetry, informative and journalistic texts, and of these, folklore, poetic and other literary pieces were emphasised in the detailed curriculum. The most important criterion for selecting compulsory readings was not the readability nor the difficulty of the texts, but their probable appropriateness with regard to topics which children find interesting, suitability for the given age group, and literary, aesthetic quality.

The 1978 curriculum designated the development of reading skills and abilities primarily to the academic subject Hungarian language and literature, but also sought possibilities of curricular concentration. Some examples for this can be seen in the sections for the integrated science subject (környezetismeret) and regular classes with the class teacher (osztályfőnöki óra). In the former, reading for information and library use were emphasised, whereas in the latter, the goal was to encourage the inclination to read.

The curriculum did not mention explicitly the roles of metacognition and reading strategies, as these were concepts still unfamiliar at that time. Nevertheless, the curriculum propagated techniques where comprehension is checked against a pre-determined and narrowed-down meaning (e.g., students respond to questions in the textbook or prepare outlines). The teaching of reading strategies and techniques such as scanning or skimming did not appear at the time.

The curriculum did not aim to develop reading motivation through the instructional methods of reading development nor through the texts assigned, but through explicit discussion and review, which it specified as one of the main goals of regular classes with the class teacher in every grade.

This is shown in the topics for these classes, which included such subjects as "we can learn through reading" or "the love of reading and books".

The National Core Curriculum

The National Core Curriculum (NCC, Nemzeti Alaptanterv) introduced in 1995 featured remarkable innovations compared to the 1978 central curriculum. In contrast to the genre of the prescriptive curriculum, this new curriculum was a core curriculum: "NCC establishes common educational objectives compulsory for grades 1–10 in every school in Hungary where compulsory public education consists of 10 grades." (Művelődési és Közoktatási Minisztérium, 1995, p. 7).

As a core curriculum, the 1995 NCC defined cultural domains, one of which is Hungarian Language and Literature. It extends mother tongue education, a part of which is reading education, to cover the whole of the educational system. It specified that mother tongue education is the task of each and every subject. The purpose of this was to provide "the basis for the native verbal culture and for literary education" (Művelődési és Közoktatási Minisztérium, p. 28). Its basic goal was "[to develop] sensible, expressive speaking, an ambitious use of reading and writing with the skills needed" (Művelődési és Közoktatási Minisztérium, p. 28). Accordingly, the 1995 NCC allowed reading development to be integrated into different academic subjects. At the same time, there were very few cases where objectives related to reading ability appeared among domain specific objectives.

Texts intended for the development of reading were more varied than in previous curricula. In addition to continuous texts, non-continuous text types also appeared in the curriculum with both literary and non-literary genres recommended. At the same time, the presence of the traditional approach was strong in the general developmental objectives, suggesting that the development of reading is to be achieved by reading literature, and within the academic subject of Hungarian language and literature. Regarding literary education, recommended literary pieces mostly belonged to Hungarian literature, and texts nearly a hundred years or even older were predominant among them. In this regard, relatively few new elements can be found compared to the 1978 curriculum.

Reading strategies appeared as developmental goals. Their teaching covered scanning, skimming and reading to locate information. The knowledge and use of some processes of text analysis that support learning and thinking abilities also appeared as objectives. Such processes include, e.g., locating specific information, identifying important points or recognizing cause and effect relations within a piece of text. The importance of the visual layout and environment of texts was also explicated. This also included the processing and understanding of pictorial and verbal information.

In the 1995 NCC, aspirations for the development of reading motivation was mostly limited to the development of attitudes towards belles lettres, and appeared among the objectives of literary education. The curriculum defined the essence of literary education in making the reading of literature attractive and evoking the inclination to read. Other motives of reading, such as reading self-concept or interest appeared content-specifically, in relation to literature, as "openness to literary language".

The 1995 National Core Curriculum was an advance in the development of reading. There was a tangible shift from reading as a conveyor of culture to reading as a tool for knowledge acquisition. In this document, reading was seen as a tool for learning, thinking and communication in addition to fostering aesthetic and moral development.

The 2007 NCC (Oktatási és Kulturális Minisztérium, 2007) was modified at several points compared to the previous core curriculum, but it essentially preserved the view on the role of the mother tongue. The 2007 NCC attributed a double function to literature, i.e. as one of the main vehicles of culture on the one hand, and as a medium to develop the abilities of reading comprehension and written composition. Therefore this document declared the unity of mother tongue and literary education. At the same time, it viewed reading development as a continuous process throughout the school-years and its aspects surfaced in several cultural domains as developmental tasks.

Regarding the texts to be read, the 2007 NCC recommended reading various text types and genres, similarly to the previous core curriculum; however, the criteria of complexity and the type of medium appeared as new elements in selecting texts. Improving the knowledge of genres can also be regarded as a new aspiration.

Reading strategies and methods of text analysis had considerable pres-

ence in the document, similarly to the previous core curriculum. Objectives related to metacognitive strategies were based on the assumption that strategies can be taught and learnt and do not necessarily appear without conscious developmental efforts.

Regarding reading motivation, the curriculum listed several activities that may facilitate the development of a reading motive (as well), i.e. reading together, discussing the text read, debates, reading situations requiring cooperation, experiencing the social motives of reading, independence, student autonomy and the joy of reading. These can all strengthen the mastery motive. Expressing the need for engagement in reading reflects the possibility of experiencing flow when reading.

Frame Curricula

From 2001 on, frame curricula have been functioning as intermediate regulators between the core curriculum and local curricula. Instead of cultural domains and educational phases, they define developmental tasks by academic subject and grade. The frame curriculum takes the integrated development of language abilities and reading literature as an axiom, and does not consider developmental efforts in reading outside the reading of literature. Accordingly, the texts to be read belong to folklore and poetry and are of high aesthetic value. This is particularly characteristic of the preparatory and initial phases of learning to read, i.e. grades 1 and 2. Functional genres and non-continuous texts appear among the readings from grade 3, although their frequency falls significantly behind literary texts (Oktatási Minisztérium, 2000).

In contrast to the 1978 curriculum, the framework curriculum put a great emphasis on syllabication in teaching the technical skills of reading; and students learn the technical skills of reading through the syllabication method (a version of phonics). The framework curricula define the development of reading skills, then reading ability, and reading comprehension as a priority task up to the end of grade 6 and recommend the reading of everyday as well as literary texts. From grade 7 on, the emphasis shifts from reading development to literary knowledge and to literary education, and the task of Hungarian language and literature classes is the transmission of lexical knowledge, culture and aesthetic

education. The shift in emphasis may have created the mistaken belief that developmental efforts targeting reading ability are completed in grade 6 and no further development is necessary.

The development of reading motivation in the framework curriculum is confined to subject-based contents. The framework curricula explicate only the motivation for reading literature, however, among learner activities they still list a few which strengthen certain content-independent motives. The education of readers aims to direct the natural curiosity of children towards reading and to give them self-confidence in reading.

This overview of curricular documents reveals that Hungarian national curricula have been advancing towards the contemporary paradigms of reading development, and they consider reading as instrumental knowledge necessary in learning, thinking, and everyday life.

Summary

Standardised evaluation tools did not receive significant roles in traditional reading instruction, which has dominate for decades. The evaluation of reading ability was largely limited to elementary education, attention being paid to reading aloud, syllabication, accentuation and the pace of reading. Teachers evaluated reading comprehension, either through out-loud or silent reading of textbook passages, primarily informed by their own experiences. In lower secondary education, the evaluation of reading no longer appeared independently, but was rather integrated into the academic subject of Hungarian language and literature, and the developmental level of reading comprehension was no longer evaluated separately in these grades. Basically, there were no standardized reading comprehension tests available in instructional practice up until the 1990s.

IEA surveys analyzed the reading comprehension of Hungarian students from the 1970s in an international comparison. In addition, the Hungarian national MONITOR surveys conducted in the eighties and nineties also provided a comprehensive evaluation. All these surveys had already covered different text types (Csíkos, 2006; Józsa, 2006). However, they had no noticeable impact on everyday instructional practice.

Nevertheless, significant changes have occurred in the reading assessment of schools in the past decade. These changes were substantially

inspired by the methods and findings of the PISA and the PIRLS international reading assessments. Based on these international surveys, Hungarian national Competence Assessments have been organized, assessing the reading comprehension of students annually since 2003. These assessments as output regulators have a tangible effect on the school-based practice of reading instruction. At the same time, no comprehensive assessment standards for reading are available as yet.

Reading frameworks must follow the developmental process of reading ability. They must include the most basic elements, such as phonemic awareness. They also must include the reading of words and sentences, as well as the comprehension and interpretation of texts. Nevertheless, the evaluation of reading cannot end with the assessment of the components of reading ability, because in addition to reading ability, good reading comprehension has further essential requirements, i.e. reading motivation and the use of reading strategies, and highly developed levels of both. Assessment frameworks may greatly facilitate that these factors receive the appropriate emphasis in instructional practice.

In the development of curricula and assessment frameworks, the use and processing of a much greater variety of text types should be considered than is done at present. With a broader spectrum, much more reading goals and methods have to, and could be, taught in instructional practice. Before reading, it is advisory for children to set their reading goal, to select the method and strategy appropriate for this goal, to monitor the process and the success of reading and to name the problems of the individual in reading skills and reading comprehension.

The interpretation of the paradigm of complex mother tongue education today suggests that theoretical knowledge of grammatical structures and levels on the one hand, and the learning of reading and writing on the other hand should rely upon each other to a greater degree than in current practice. Reading as the representation of written (visual) language, and grammar as a projection of language awareness can mutually complement each other. These should also be joined with the observation of the characteristics of language use in the spirit of the whole language approach, i.e. psycho- and sociolinguistic contents should receive more attention in education.

Reading skills and reading comprehension are the essential prerequisites of learning and social success. Their acquisition and development

are key elements in education. Their effective development can be considerably promoted by assessment frameworks as detailed descriptions of the content of teaching. Accordingly, there is an obvious need for developing comprehensive reading standards for the whole Hungarian school system.

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4

Diagnostic Assessment Frameworks for Reading: Theoretical Foundations and Practical Issues

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Introduction

This chapter serves the purpose of creating a link between the previous three theoretical chapters and the detailed content descriptions given in the next part of this volume. We further provide a characterisation of the genre of frameworks and discuss the factors justifying our choice of solutions.

Chapter 1 gave an overview of international research findings related to the cultivation of reading skills and to the role of literacy in general, approached mostly from the perspective of developmental and cognitive psychology. Chapter 2 looked at reading acquisition from a social and cultural point of view with the focus, once again, on international re-

search evidence. The traditions and curricular features of Hungarian public education appeared in Chapter 3, and a picture of the practices emerged to which the diagnostic programme would need to be tailored. All this information delineates the first problem to be solved: The achievements of the leading edge of scientific research must be adapted in such a way that they have the greatest educational effect both on students as individuals and on the public education system as a whole.

The diagnostic assessment system is developed in parallel for three main domains, each of which rests on the same set of principles.[1] The parallel treatment of reading, mathematics and science is justified by several principles of psychology and education science as well as by considerations of education organisation. On the one hand, an appropriate level of reading comprehension is essential for learning both mathematics and science and on the other hand, mathematics and science enhance reading and comprehension skills by offering texts that do not appear among literary styles. The logic of mathematics and that of language can mutually reinforce each other. Science is the best practice field for the application of relationships learnt in mathematics. Taking into account and making use of different types of relationship networks are especially important during the first stage of schooling, when students' intellectual development is very fast-paced and exceptionally sensitive to stimulating factors.

The parallel treatment of the three domains has the further advantage that they mutually fertilise one another; the ideas and formal solutions emerging in one can be used in the other two. The development of test items, measurement scales, data analysis methods and feedback systems also calls for the parallel treatment of the three domains and the sharing of certain principles. However, this parallel treatment also means, that certain compromises must be made: There is a limit to the extent to which the same principles can be adhered to in all three domains. In the interest of uniformity, the three-dimensional approach is preserved and uniformly applied, but the interpretation of each dimension takes into account the special features of individual assessment domains.

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1 This chapter also contains sections appearing in the corresponding chapters of the other two volumes.

Another benefit of parallel treatment may be a complementarity effect. The three domains are discussed in a total of nine theoretical chapters. We made no effort to create parallel chapter outlines. This made it possible to give in-depth coverage to one issue in one domain and to another issue in another domain. In the first chapter of the volume dedicated to the domain of reading, for instance, special emphasis is given to issues in developmental psychology and neuroscience, which also offer important insights for mathematics and to some extent for science education. Reasoning skills are discussed in greatest detail in the science volume but the same skills are also fostered in mathematics instruction. The second chapters of the volumes focus on the issue of knowledge application and each of them draws general conclusions that equally apply to the other two domains. The third chapters examine practical curricular issues sharing a commitment to the historical traditions and current principles of Hungarian public education. At the same time, the discussion of contents and disciplinary questions also reflects the need to follow progressive international trends and to make use of international achievements. In line with the above principles, we regard the nine theoretical chapters in combination as the theoretical foundations of the diagnostic assessment system. The background knowledge analysed in the theoretical chapters thus constitutes a common resource for each of the domains, without needing to detail the shared issues separately in the parallel chapters of the different volumes.

The first section of the present chapter reviews the main factors taken into consideration in developing the frameworks. First, the system used for the specification of the detailed frameworks is described and the subsequent sections show how these principles are used in the development of the reading framework.

The Development of the Frameworks
of Diagnostic Assessment

Taxonomies, Standards and Frameworks

Taxonomies

Efforts to define curricular goals in great detail first appeared in the 1950s. This was the time when, as a combined result of various processes, Bloom and his colleagues developed their taxonomic systems, which made a strong impact on defining educational objectives for the next few decades. One of the triggers prompting the development of the taxonomies was a general dissatisfaction with the vague characterisation of curricular goals, while the other driving force was the rise of the cybernetic approach to education. There appeared a need for controllability, which required feedback, which in turn presupposed the measurement of both intended targets and actual performance. By comparing targets with actual performance, weaknesses may be identified and interventions may be planned accordingly. During the same period, other processes led to a growing emphasis on educational assessment and the expansion of testing also created a need for a more precise characterisation of the object of measurement.

Taxonomy is essentially a structured frame providing a system of ordering, organising and classifying a set of objects, in our case, the body of knowledge to be acquired. It is like a chest of drawers with a label on each drawer showing what should be placed in it; or we can interpret a taxonomy as a data table with the headings indicating what can appear in its various rows and columns. Compared to previous general characterisations of goals, planning based on such a formalised system constituted a major step forward, and encouraged its developers to give careful thought to the descriptions contained in it.

The greatest impact was made by the first taxonomic system, one describing the cognitive domain (Bloom et al., 1956), which opened up a new path for curriculum and assessment theory. This taxonomic system characterised expected student behaviour in concrete, observable categories. The most obvious novelty was the system of six hierarchically or-

ganised frameworks, each of which was designed to apply uniformly to all areas of knowledge. Another significant improvement was the level of description that surpassed by far all previous efforts in detail, precision and specificity. As a further advantage, the same detailed description could be used to plan learning processes and to develop assessment tools. This is the origin of the name taxonomies of objectives and assessments, which refers to the two functions.

The Bloom taxonomies exerted a significant direct influence first in the United States, and later on this system provided the foundations for the first international IEA surveys. The empirical surveys, however, did not corroborate every aspect of the hierarchy of knowledge proposed by the taxonomic system. Also, the behaviourist approach to psychology underlying the Bloom taxonomy lost its dominant position in the interpretation of educational processes and was replaced by other paradigms, most importantly by cognitive psychology. The original cognitive taxonomies thus became less and less popular in practice. The corresponding taxonomies for the affective and the psychomotor domain were constructed at a later stage and did not make a wide-ranging impact similar to the cognitive taxonomy.

The taxonomies as organisational principles are 'blank systems', i.e., they do not specify content. References to specific contents only serve illustrative purposes in taxonomy handbooks. The six levels of Bloom's taxonomy, for instance, are knowledge, comprehension, application, analysis, synthesis and evaluation. When these were used to describe knowledge of a given domain, such as chemistry, they specified what exactly had to be learnt, understood, applied, etc.

The original taxonomies, their revisions or modernised versions gave rise, and continue to give rise, to new systems and handbooks guiding the definition of objectives in a similar spirit (Anderson & Krathwohl, 2001; Marzano & Kendall, 2007). A common feature of these initiatives is that despite the decreasing influence of behaviourism, they maintain the tradition Bloom established, the operationalisation of objectives and the decomposition of knowledge into empirically measurable basic elements. The methods emerging during the course of taxonomy development later became important methodological resources in the development of educational standards.

Standards

The development of learning standards gained new impetus in several countries in the 1990s. This process was especially spectacular in the English-speaking world, where previously there had been no normative documents regulating teaching content in public education. In some countries, for instance, with some exaggeration, every school taught whatever was locally decided upon. Under these conditions, education policy had a very restricted margin of movement and there was little opportunity to improve the performance of the education system. This situation then gave rise to various processes leading to a centrally defined set of educational goals at some level, whether state or national.

Learning standards essentially represent standardised educational targets. In contrast with taxonomies, as systems, standards always refer to specific instruction content. They are usually developed by special professional teams and may rely on several different methodological solutions depending on the properties of the various fields. Standards are often developed (or commissioned) by education authorities and tend to be descriptive, defining what a student should know in a given subject on completion of a given grade of school.

As the standards were being developed, they were also put into practice both in assessment and in instruction processes, similarly to the taxonomic systems. A multitude of handbooks were published discussing in great detail the methods of standards development and their applications. There are differences in emphasis, however, compared to the taxonomies. Standards have a direct effect first of all on the content of education (see e.g., Ainsworth, 2003; Marzano & Haystead, 2008), and the question of assessment based on them is of secondary importance (e.g., O'Neill & Stansbury, 2000; Ainsworth & Viegut, 2006). Standards-based education essentially means that there are certain, carefully specified, standardised education targets that students of a given age can be expected to attain.

The concept of standards and standards-based education is not entirely new to professionals working in the Hungarian or other strongly centralised education systems. In Hungary, before the 1990s, a single central curriculum specified all education content and a single textbook was published based on this curriculum. Every primary school student studied the same content and in theory everyone had to achieve the same

set of targets. The standardised subject curricula were polished through several decades of practical professional experience in some areas (mathematics, science), while other areas remained subject to the whims of political and ideological agenda. The processes taking off in the 1990s were greatly influenced by the former Anglo-American standards-based models, but curriculum regulation could not avoid the pendulum effect and has swung to the other extreme: The current Hungarian National Core Curriculum contains only a minimum of central specifications. This process took a course contrary to what was taking place in other countries. As a comparison, it is worth noting that the volume defining the American mathematics standards (National Council of Teachers of Mathematics, 2000) is alone longer than the entire first version of the Hungarian National Core Curriculum published in 1997. The National Core Curriculum has become even shorter since.

The appearance of learning standards and standards-based education is not, however, a simple matter of standardisation or centralisation but also introduces a professional and scientifically based method of organising education content. The development of standards embracing the new approach has become the dominant trend even in countries that had standardised curricula before (e.g., in Germany, see Klieme et al., 2003). The most important defining feature of standards is that they are scientifically based. The development of learning standards and standards-based education has launched extensive research and development activities throughout the world.

Frameworks

Both the theoretical foundations of standards-based education and the contents and structure of specific individual standards were important sources of information in the development of our frameworks of diagnostic assessment. The decision not to impose a uniform structural solution on the content specifications in reading, mathematics and science but, instead, to respect the special features of the different content and assessment domains also reflects the traditions of standard development. The frameworks developed here, however, differ from learning standards in that they do not define requirements or targets. They share other features though: the criteria of detailed, explicit and precise description and a firm scientific basis.

To mirror international practice, we use the term 'framework' for the detailed specifications we have developed. The frameworks of assessment are similar to standards in that they contain a detailed, structured description of knowledge. They differ from standards, on the other hand, in that standards approach education from the perspective of outcomes. In contrast to traditional curricula, frameworks do not specify what should be taught or learnt. They also do not set attainable targets although the content descriptions do convey implicitly what knowledge could or should be possessed at the highest possible level of achievement.

The most widely known examples of frameworks are the ones developed for international surveys. Self-evidently, in the case of assessment programmes covering several countries, learning standards or targets make little sense. These frameworks therefore characterise the knowledge that can be reasonably assessed. When defining content, a number of different considerations may be observed. In the first waves of the IEA survey, for instance, the starting points of assessment content were the curricula of participating countries, i.e., what was usually taught in a given domain. The frameworks of the PISA surveys characterise for each main assessment domain the applicable knowledge that fifteen year-olds living in our modern society need to possess. In the development of these frameworks a dominant role is played by the needs of modern societies and typical contexts of application, and the focus is of course on the application of the knowledge of given disciplines or school subjects.

A third approach to framework development is rooted in scientific research concerned with learning and knowledge, namely, in the achievements of developmental and cognitive psychology. These considerations also dominate in cross-curricular domains related to more than one (or just a few) school subjects. One example of this type of assessment is the fourth domain of the 2000 wave of the PISA survey, which focused on learning strategies and self-regulated learning. The frameworks of this domain were essentially shaped by psychological considerations and the results of learning research (Artelt, Baumert, Julius-Mc-Elvany, & Peschar, 2003). The insights of psychology also help characterise learner attitudes, which have been an object of assessment in almost every international survey, and played an especially important role in the PISA science survey of 2006 (OECD, 2006). Psychological studies have also mapped the

structure of problem solving processes, which was a special domain of assessment in PISA 2003 (OECD, 2004).

The frameworks developed for diagnostic assessments have drawn from the experiences of the frameworks of international surveys. They are similar to the PISA frameworks (e.g., OECD, 2006, 2009) in that they focus on three major assessment domains creating the foundations for the assessment of reading, mathematics and science. They differ, however, in that while PISA focuses on a single generation of students – 15 year olds – providing a cross-sectional view of student knowledge, our frameworks cover six school grades, apply to younger students and place special emphasis on the issue of student progress over time.

Each set of the PISA frameworks is developed for a specific assessment cycle. Although there is considerable overlap between individual assessment cycles, the content descriptions are renewed for each. The PISA frameworks cover the entire assessment process from the defining of the assessment domains through to the characterisation of the organising principles of the domain, the specification of reporting scales and the interpretation of results. The frameworks we have developed cover selected sections of the assessment process: a definition of the assessment domains, a description of the organising principles and a detailed specification of contents. While the major dimensions of assessment and the contents of measurement scales are defined, performance scale levels and quantitative issues related to scales are not discussed. Given the considerations of student progress, the construction of scales requires further theoretical research and access to the empirical data.

The Dimensions of the Diagnostic Assessment of Reading

The dominant force shaping the educational innovations of the past decade has been the integrative approach. The competencies receiving attention are themselves complex units of various knowledge components (and, according to some interpretations, also of affective components). Competency-based education, the project method, problem-based learning, content-embedded skill development, content-integrated language teaching and various other innovative teaching and learning methods

realise several different goals at the same time. They both transmit knowledge of a given subject or subjects and also foster the development of various general-purpose skills and competencies. The knowledge acquired through such integrative methods is presumably more readily transferable and can be applied in a broader range of contexts. Similar principles are likely to underlie summative outcome evaluations, and both the PISA surveys and the Hungarian competency surveys embrace this approach.

A different assessment approach is needed, however, when we wish to forestall problems in learning, to identify delays and deficiencies endangering future success and to support direct learning processes. In order to be able to use assessment results as a tool in devising the necessary interventions, the tests we administer should provide more than global indicators of student knowledge. We need to find out more than just whether a student can solve a complex task. We need to discover the causes of any failures, whether the problem lies in deficiencies in the student's knowledge of basic concepts or in inadequacies in the reasoning skills needed to organise knowledge into logical and coherent causal structures.

To be able to fulfil the above requirements, student knowledge must be described in great detail for diagnostic assessments. We therefore adopt an analytic approach as opposed to the integrative approach dominating teaching activities. An assessment programme intended to aid learning must, however, stay in tune with the various aspects of learning and knowledge application. In line with these criteria, a technology of diagnostic and formative assessment is being developed drawing on the experiences of large-scale summative evaluations but also contributing several new elements of assessment methodology (Black, Harrison, Lee, Marshall, & Wiliam, 2003; Leighton & Gierl, 2007).

The development of the frameworks of diagnostic assessment can draw on the experiences of previous projects, especially of the assessment methods used with young children (Snow & Van Hemel, 2008) and the formative techniques developed for the initial stage of schooling (Clarke, 2001). The most important of these experiences are the need for a multifaceted, analytic approach and a special emphasis on psychological and developmental principles. Previous formative and diagnostic systems, however, relied on paper and pencil testing, which heavily constrained

their possibilities. We replace this method with online computer-based testing, which allows more frequent and more detailed measurements and new task formats. That is, assessments can be of a higher resolution than before and the frameworks must be tailored to this new method.

Scales of Diagnostic Assessment, the Psychological, Applicational and Disciplinary Dimensions

Drawing on our experiences of previous empirical studies, the model we have developed is structured along three dimensions corresponding to the three main objectives of education which have accompanied the history of schooling (Csapó, 2004, 2006, 2010). The development of the frameworks of diagnostic assessment also moves along these three dimensions. This three-dimensional approach can be directly applied to the domains of mathematics and science and in a somewhat extended sense also to the domain of reading. Having a testing system developed with a uniform approach and according to a uniform interpretation framework for the domains of reading, mathematics and science alike facilitates the implementation of assessments and the utilization of the feedback information transmitted to the user. Psychological factors have priority in the cultivation of foundational skills and competencies, the goals and contexts of the use of knowledge need to be considered in the application of acquired knowledge, while teaching itself may start with the content knowledge to be transmitted, which requires tasks to be organised in curricula.

The cultivation of the intellect and the fostering of thinking skills are objectives that refer to personal attributes rather than invoking external contents. In modern terminology this may be called the psychological dimension. As was mentioned in the previous section, this dimension also appears in the PISA surveys, where problem-solving skills are assessed with this consideration in mind. We have also seen a number of assessment domains that interpret the contents of measurement in terms of psychological evidence. In the domain of reading, the function of this dimension of diagnostic assessment is to reveal whether the cognitive skills needed for literacy are sufficiently developed.

Another long-standing objective is that schooling should offer knowledge that can be used and applied outside the classroom. This consid-

eration is termed the social dimension and refers to the external usability and applicability of knowledge. The concept of knowledge application is related to the notion of transfer of learning, which is defined as the application of knowledge acquired in a given context in a different context. There are degrees of transfer defined by the transfer distance. In the domain of reading, the question to ask is whether the development of reading skills can adequately assist students in comprehending texts in other school subjects, in solving reading problems in real everyday life and in extracting and interpreting the information content of texts appearing in different formats.

The third major objective is the acquisition of knowledge accumulated by science and the arts. This goal is attained when students approach learning observing the principles and values of the given discipline or field of science. In the disciplinary dimension of our assessment programme, the acquisition of the subject matter is tested directly in a familiar school context and according to the principles of the given discipline. In recent years a number of educational initiatives have been launched in an effort to counterbalance the previous one-sided disciplinary approach. Competency-based education and performance assessment focusing on the issue of application have somewhat overshadowed disciplinary considerations. However, for a course of studies to constitute, in terms of a given discipline of science, a coherent and consistent system which can be reasonably understood, it is necessary to acquire those elements of knowledge that do not directly contribute to the development of thinking or application processes but are indispensable for the understanding of the basics of the discipline. That is, students must be familiar with the evidence supporting the validity of scientific claims and learn the precise definitions ensuring the logical connectedness of concepts in order to possess a system of knowledge that remains coherent in terms of the given scientific discipline. Since the instruction of reading and its place as a school subject differ from mathematics and science in that reading does not have direct disciplinary content similar to that of the other two domains, this dimension is interpreted in a slightly different way from its interpretation for mathematics and science.

The theoretical background to the three dimensions of assessment in the domain of reading is summarised in the first three chapters of the current volume. As was also apparent in the theoretical discussion, the

acquisition of reading is closely related to general cognitive development, and the three dimensions are not always separated by sharp boundaries, which is also indicated by the lesser or greater overlap between the chapters. Since text comprehension plays a decisive role in every other domain of learning, the level of reading skills is closely related to performance in other areas of knowledge. The assignment of a given task or of the comprehension of a given text to one or another of the psychological, applicational or disciplinary dimensions partly depends on the specific comprehension skill the task is designed to assess.

The Organisation of the Contents of Assessment

The contents of assessment are organised in terms of the three major perspectives previously discussed. Within this arrangement, a further level of classification is used taking students' ages and level of development into account. This system is schematised in Figure 4.1. The six grades of school are divided into three blocks of two years each, Grades 1-2, 3-4 and 5-6, in line with the usual grouping of curricular and learning standards. However, since the period spanning the six grades is treated as a continuous development process, the above grouping is simply a technical solution to the problem of content disposition. Given the large differences between individual students, the assignment of contents to different ages (grades) can in any case be no more than an approximation. A more precise grouping of test items into age groups can only be achieved on the basis of solid empirical evidence.

Figure 4.1
The dimensions of diagnostic assessment
and the focal points of instruction

For the diagnostic assessment of reading, the three dimensions have varying significance across the different age groups, as shown by the different shades of colour in the figure. At the first stage of schooling, the fostering of skills and the construction of firm foundations have special significance, which gives special emphasis to tasks incorporating psychological factors. A greater number of test items and more extensive coverage allow more frequent assessments. Application and the comprehension of different types of text are, in contrast, less important at this stage, and the test items discussed here are intended to test students who learnt to read earlier on, possibly before starting school. Tasks assessing the specific curricular targets of reading instruction have equal significance for all three age groups.

For the domains of mathematics and science, we can identify the content constituting the foundations of the given discipline which students need to acquire at school. In this respect reading occupies a special place among school subjects because it does not have core content that should be acquired. Nevertheless, we can identify a range of texts for every culture that has been shown to be suitable for learning reading techniques and can be a tool of reading instruction for a relatively long period of time. The assessment of the curricular dimension focuses on these familiar texts, which tend to be used in reading instruction allowing students to practise reading techniques.

A further explanation for the special role of reading assessment is that reading is a form of linguistic communication. As such, from Grade 5 onwards it is no longer a school subject in the sense that the other two domains are. In terms of disciplines or school subject structure, reading is replaced by Hungarian language and literature. The fostering of reading skills, however, cannot be equated with or mapped onto the school subjects of language and literature, which focus on the transmission of written cultural knowledge. Reading and text comprehension form the foundations of every school subject and are indispensable for social adjustment and success.

Since we are dealing with a linguistic activity or skill, the different levels of reading and text comprehension can be simply interpreted in terms of the structural levels of language. We can thus assess the phonological level through letter to sound mapping, the morphological level through syllabification, the lexical level through word recognition rou-

tines, the syntactic level through sentence reading and the textual level through text comprehension. Approaching the question from a different perspective, the syntactic, semantic and pragmatic levels of language may be interpreted in terms of the tripartite division into psychological, social and disciplinary dimensions. In this case, the knowledge dimension is closer to the three linguistic or communication dimensions applied to the domain of reading.

If we now want to find the analogues of the psychological, social and disciplinary dimensions defined for mathematics and science in the domain of reading, these three dimensions can be interpreted as follows.

The psychological dimension comprises the skills constituting the cognitive preconditions of reading acquisition: Phonological and phonemic awareness, speech sound (phoneme) processing, letter, word and sentence reading and inference which is needed for sentence and text comprehension. The latter appears among the cognitive operations discussed in the social dimension at a different level: Information retrieval, interpretation and critical evaluation, i.e., thinking processes underlying the comprehension of written texts. In brief, we place the components of reading as a mental structure in the psychological dimension.

Those aspects of knowledge that are pertinent to application can be classed with the social dimension. For reading, these include familiarity with the functions of various text formats and text types and their uses, and the texts and reading operations needed for further studies, everyday life and day-to-day coping. An indispensable precondition of success in these areas is the acquisition of habits and routines related to reading. The social dimension of reading has been thoroughly researched by the PISA surveys. This background knowledge provided a solid starting point for the development of our detailed frameworks.

The disciplinary (curricular) dimension encompasses the components of reading directly related to school subjects, covering the topics of reading in the first four grades and those of Hungarian language and literature in higher grades. Knowledge related to written text, a grammar topic, is included here. Another topic is familiarity with reading strategies that can be successfully fostered and assessed in the classroom. Further examples in this dimension are oral reading and its assessment, the use of reading skills to learn poems, rhymes, stories, fables and other literary works, indeed, any text that is worth reading because it has inherent sig-

nificance. The definition and organisation of texts of this type are, however, beyond the scope of the detailed framework described in the present volume. In addition to the above examples, texts read by students in other classes (e.g., history or mathematics) for study purposes can also be included here.

Keeping all these considerations in mind, we find that in the domain of reading, the skills dominating the development of the detailed framework are the reading skills belonging to the psychological dimension. The description of the framework accordingly starts with this dimension. Needless to say, the roles of the other two dimensions are also beyond doubt. We should remember, however, that the three dimensions are often difficult to isolate from one another in a given reading task, word, sentence or text in the description of the framework. In most cases, the three dimensions have equally important roles in reading or in the process of comprehension.

The Phases of the Acquisition of Reading Skills

Preparation, Sound, Letter, Word

Preparing children for reading has recently received an increasing amount of attention. In Hungary, the view emphasising the role and complexity of this process rose to the forefront in the nineties (Gósy, 1990, 1999). The recognition of the importance of pre-reading skills owes a great deal to psychology, special education theory and speech-language pathology and has by now become widely accepted throughout the Hungarian education system (Csépe, 2005; Nagy, 2002).

The length of the preparation phase and the nature of activities best suited to this goal may vary greatly across individuals. It is therefore crucial to establish differences between students and to have them to work in groups in the first grade. The areas of development during the preparation phase include thinking skills and linguistic abilities including linguistic awareness and knowledge related to language and reading. Other areas of special significance here are general cognitive processes such as attention, hearing and vision.

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Since the Hungarian language has a shallow orthography, the identification and distinguishing of individual speech sounds have a fundamental role in learning to read and write. Speech sound perception can be successfully cultivated even during the pre-school period (Fazekasné, 2000; Józsa & Zentai, 2007). For children who have suboptimal speech sound perception skills when they enter school, practice activities with sounds and speech sounds have a significant role in the reading preparation phase in Grade 1.

The successful recognition and identification of speech sounds is a prerequisite to the acquisition of letters (Nagy, 2006a). A number of different methods of teaching letters are used around the world and in Hungary, and the choice depends to a large extent on the properties of the given language and on its writing system. The timing of the introduction of letters and the order in which they are taught are determined by the method of reading instruction used. An especially wide range of methods is in use in Hungary relative to other countries. Most teaching materials and methods take into account the principle of homogeneity or Ranschburg inhibition effect, i.e., letters similar in shape are preferably not taught simultaneously. Confident letter recognition is next in line among the preconditions of good reading skills.

The same observation can be made of the availability of a sufficient number of word recognition routines. The acquisition of a sufficient number of word recognition routines is also required for fluent reading (Nagy, 2006a). In addition to the number of these routines, another crucial question is which words belong to this set for a particular child, i.e., which words he or she can recognise as a whole. For good performance in reading comprehension, there should be the greatest possible overlap between this set of words and the vocabulary used in schoolbooks or, at a later stage, the vocabulary used in everyday texts.

The framework introduced in this volume covers the assessment of both letter reading skills and word reading skills. A further ability discussed is syllabification. Syllabification has a long history in Hungarian reading instruction; the debate over its usefulness and importance was closed at the end of the past century, when its place in reading instruction was validated (Adamikné, 1993, 2001).

Sentence Comprehension

Another fundamental precondition of meaningful reading is the confident comprehension of sentences, which encompasses not only general linguistic factors but also knowledge of the rules of writing. The comprehension of a sentence also involves the identification of sentence modality (declarative, interrogative, etc. modes), which signals the intentions of the speaker in a written text. With respect to content, we have a more intricate picture since sentence-closing punctuation marks convey substantially less information than do intonation and other suprasegmental features of spoken language. For this reason, the recognition of the discrepancy between the speaker's intentions and the information conveyed by punctuation marks is a crucial component of text comprehension.

Research on the mechanisms and nature of sentence processing mostly focuses on spoken language; this is primarily an area of psycholinguistics (Pléh, 1998). Since sentence comprehension is analysed here in the context of diagnostic assessment, factors such as the identification, confident recognition and use of letters, words and various non-verbal elements (punctuation marks, text arrangement and typographical features) all need to be integrated.

Sentence comprehension is difficult to define in terms of the levels of language as it encompasses a large area both in speech and in writing ranging from one-word sentences, simple subject-predicate structures (i.e., sentences consisting of only a subject and a predicate) and expanded, modified versions of these structures at one end to long complex-compound sentences with multiple clauses that are similar to a simple text both in terms of formal and content properties at the other. A reasonable option is to analyse the microstructure of texts, namely paragraphs and linguistic units shorter than paragraphs, at the level of sentences. Our framework therefore classes short dialogues and brief texts containing just a couple of sentences with sentence comprehension.

Oral and Silent Reading, Fluency

With respect to oral and silent reading we must note that both are indispensable components of the cultivation of reading skills and each has its

special role in the process. It is difficult to give guidelines as to their relative weight in reading instruction as this is dependent on the children's age and the characteristics of their development.

Although the detailed framework described in the next chapter is dominated by tasks related to silent reading, we must not forget the significance of expressive oral reading. Oral reading is primarily used in the classroom to foster comprehension skills and at the same time to encourage expressive and meaningful reading. It is the acoustic channel of reading aloud that allows teachers to test and evaluate the strengths and weaknesses of children's reading techniques and their reading rates. Oral and silent reading skills tend to have similar structures and to be closely interconnected within an individual. In some cases, however, one or the other of these reading skills may be less developed than the other. Our framework treats the assessment of oral reading as having the closest relationship with the comprehension of sentences. The justification for this principle is that the combined use of expression, interpretation and vocal variation first appears at the level of sentences. Although the tasks refer to texts, students should be asked to read the individual sentences making up these texts in an expressive manner.

The relative weights of oral and silent reading change substantially over the first six grades of formal education. Initially, both classroom activities and everyday reading situations are dominated by oral reading, and at later stages silent reading takes precedence. By the time adulthood is reached, the significance of oral reading over silent reading is reduced to a minimum. During the years of schooling, however, it is useful to test students' oral reading occasionally in all grades. Enhanced attention to this skill is also warranted by empirical data indicating an increase in error rates in oral reading over the past decades (Adamikné, 2000; Molnár, 1993).

Reading Strategies, Texts, Text Comprehension

There are two areas showing salient deficiencies when the Hungarian system of reading instruction and classroom practices are compared to education systems producing outstanding outcomes as measured by international surveys (e.g., Finland and Norway). The first problem is that

the teaching of reading strategies is still not used widely enough in Hungarian schools. The second difference is that the schoolbooks used in the Hungarian system offer a less heterogeneous set of text types or genres and lack the varied text structures typical of everyday life. We may contend that devoting attention to these two factors could bring about substantial positive changes in Hungarian reading instruction and the cultivation of reading skills.

The acquisition of reading strategies is accompanied by enhanced motivation, text comprehension and metacognitive knowledge related to reading and to an individual's own reading processes. A number of methods have been developed for the instruction of these strategies. One of these, the transactional instruction of reading comprehension strategies, has offered several useful experiences. The method emerged in the early nineties and aptly illustrates the theoretical approach characteristic of the reading instruction efforts of the past two decades (Pressley, El-Dinary, Gaskins, Shuder, Gergman, Almasi, & Brown, 1992). Our detailed framework incorporates reading strategies from the first to the sixth grade. For higher grades, we recommend activities which involve practising and integrating the acquired strategies. The potential of strategy-based reading instruction has been demonstrated by a successful Hungarian teaching experiment involving fourth grade students (Csíkos & Steklács, 2010).

The potential for improvement regarding the issue of text variety mentioned above is closely related to the learning of strategies. Specifically, varied reading strategies must be used to understand varied text types. Lower primary school textbooks contained almost exclusively narrative and educational texts up until the first decade of the new Millennium. More recent books include more texts displaying a modern approach and a larger variety of genres and styles. The task remains, however, to choose reading texts matching the structures of texts students are likely to encounter during and after their school years and to use for their studies and to be successful in their everyday lives. This structural change would enable the Hungarian education system to achieve better performance in international surveys assessing system-wide text comprehension (PISA and PIRLS). The development of the detailed framework described in the next chapter was also guided by these considerations.

Frameworks of Reading Assessment:
International Practices

The assessment of reading skills, including reading as a tool, is a central issue in most international system-wide surveys. International comparative surveys are designed to obtain summative evaluations to be able to compare education systems and are not suitable for individual diagnostic assessment.

In recent decades there has been a substantial shift in the definition of reading skills in international surveys (Csíkos, 2006; D. Molnár, Molnár & Józsa, 2012). The selection of texts and tasks included in the assessment is strongly dependent on the definition and interpretation of reading skills. The PISA 2009 framework defined reading literacy as the ability to understand, use and reflect on written texts and to engage with written texts in order to achieve one's goals, to develop one's knowledge and potential and to participate in society. It also mentions the need to engage with reading, which refers to the motivation to read and encompasses a number of affective and behavioural characteristics. The PISA assessment framework therefore comprises the set of reading operations and in addition focuses on the motivation to read and on metacognitive processes and strategies related to reading (PISA 2009 Assessment Framework, 2009).

Since PISA is not concerned with the assessment of basic-level reading techniques, the following comprehension skills were tested in 2009: Retrieving information, forming a broad understanding, integrating, reflecting on and evaluating a text. It follows from the PISA definition of reading that these mental operations should be assessed on a variety of written text types. In terms of medium, printed and electronic texts are distinguished, and the latter type is grouped into authored and message-based texts. Authored texts are static, i.e., the reader cannot modify the text appearing on the screen. Message-based electronic materials, in contrast, can be modified, expanded or edited by the reader. In terms of text format, PISA distinguishes continuous versus non-continuous texts, and there are tasks based on mixed formats or on a set of different texts (OECD, 2009).

PIRLS (Progress in International Reading Literacy Study) also views reading as a means to an end. It defines reading as the ability to construct meaning from a variety of texts. In addition to comprehension, the study

also assesses reading behaviours and attitudes supporting lifelong reading. Similarly to the PISA surveys, PIRLS 2011 measures a variety of reading processes: The retrieval of information explicitly stated in the text, the making of straightforward inferences, interpretation and integration, and the examination and evaluation of the content and formal properties of the text (Mullis, Martin, Kennedy, Trong, & Sainsbury, 2009).

The PIRLS surveys originally targeted fourth grade students but in 2011 their coverage was extended. The PrePIRLS framework was introduced, which preserves the goals and principles of the original fourth grade assessment but comprises easier tasks to test students whose basic reading skills have not reached an advanced level (PrePIRLS Information Sheet, 2011). The test items are easier in the sense that they are based on shorter texts, a smaller vocabulary and simpler syntax and the focus is on lower level reading processes. PrePIRLS assessments, like PIRLS assessments, are concerned with reading comprehension and lack tasks testing decoding or word reading.

The NAEP (National Assessment of Educational Progress) framework was created to assess schools in the United States. Reading is one of its main domains. NAEP defines assessment criteria for the fourth, eighth and twelfth grades. The framework in use between 1992 and 2007 covered three main reading processes (Reading Framework for the 2007 National Assessment of Educational Progress, 2006). These are (1) forming a general understanding of the text and developing an interpretation (e.g., Describe what the text is about.); (2) making connections between the text and the reader's background knowledge (e.g., What can the frog eat other than what is listed in the text?); (3) examining content and structure (e.g., Compare the two texts.). In 2009 there was a major shift in the conception of reading assessment: The measurement of vocabulary was added to the skills under assessment, the former three text types (literary, informational and functional) were replaced by only two types (literary and informational), and the PISA 2009 scheme of testing cognitive processes was adopted. The NAEP framework makes measurements relative to benchmarks. Three achievement levels are defined, each of which is linked to a set of standards. NAEP views reading as a complex process in which various cognitive skills interact. This assessment method cannot, however, be used for individual diagnostic purposes because it does not separate the various factors influencing performance.

CBAL (Cognitively Based Assessment of, for and as Learning) is an innovative research-based approach to reading assessment, which undertakes to develop methods of measuring reading skills providing both formative and summative assessments. Both reading ability itself and the cognitive skills involved in reading are assessed. The framework relies on a competency model, which defines three components of reading competency: A prerequisite reading skill, which is the acquisition of the technique of reading, a mental model building skill, which refers to the construction of meaning, and the skill of application, which is the ability to make use of the text. The model includes three categories of reading strategies as its core component: Pre-reading strategies, model building strategies and strategies for going beyond the text (O'Reilly & Sheehan, 2009).

In contrast to the above assessment frameworks focusing on text comprehension, The Abecedarian Reading Assessment targets the initial phase of reading acquisition, and, consequently, basic-level reading skills. The system is suitable for diagnostic assessment. Six basic skills are distinguished: letter recognition, phonological and phonemic awareness, the alphabetic principle, vocabulary and decoding. Various tasks are provided for the assessment of the different components, e.g., finding synonyms and antonyms to test vocabulary size, letter reading to test letter recognition, etc. The six components are assessed through six subtests. Students' performance in the tests can be used to make recommendations on further learning. It is proposed that children should be able to complete the first three subtests with no more than two errors before the start of the first grade and the remaining subtests should be completed with at most two mistakes before the student enters the second grade (Wren & Watts, 2002).

In the United States the Goals 2000: Educate America (1994) and the No Child Left Behind (in effect since 2001) Acts have required every state to develop an unambiguous and transparent framework defining the knowledge targets students must achieve by the end of their public education. The states' learning standards therefore define targets for the 12 grades of schooling focusing on two domains: English language and mathematics. The standards of two states of the US are described in some detail below as an illustration.

The Nevada English Language Arts Standards (2007) describe achievement indicators starting with the kindergarten year. The indicators de-

scribe the content standards related to individual reading skills and specify minimum expectations. The standards are organised by school grade but the framework treats the period from the kindergarten year to Grade 4, the period of Grades 5-8 and the period of Grades 9-12 as single developmental units. The standards are defined for three major areas: (1) word analysis, which involves prerequisite skills and basic-level reading skills; (2) reading strategies and (3) the comprehension of different types of text (literary and non-literary). The framework is intended for teachers, parents and students alike, and provides guidelines for the development of assessment principles and test items.

The Wisconsin Knowledge and Concepts Examinations (WKCE) Reading Assessment Framework is a system of standards relying on educational content targets and it is designed primarily for assessment. The framework uses a criterion-referenced assessment system and describes the principles and standards related to the development of reading skills from Grade 3 to Grade 10. It uses three types of text: literary texts, informational texts and everyday texts. The latter category includes texts such as application forms, product labels and schedules. The reading skills assessed are word reading/word comprehension, text comprehension and text analysis and evaluation (Wisconsin Student Assessment Framework Criterion-Referenced Test Framework, 2005).

The international frameworks described above cover the three dimensions defined in our framework in different contexts. The synthesis of their results and their adaptation to the diagnostic assessment of reading and text comprehension therefore requires further work. Nevertheless, the international models are a useful starting point for the development of the Hungarian framework. The process of adapting the international principles must take into account the characteristics of the Hungarian language and culture.

Reference Points for Assessment Scales

Traditionally, two methods of rating are used in performance assessment: norm-referenced assessment and criterion-referenced assessment. In norm-referenced assessment students' level of achievement is rated relative to the mean score of the population sample and the focus is on

performance differences. The norm-referenced approach is used by the PISA programme and the Hungarian competency assessments, for instance (Balázsi, Ostorics, Szalay, & Szepesi, 2010; D. Molnár, Molnár & Józsa, 2011; *Vári*, 1999, 2003). In the PISA system, the evaluation of students based on their relative performance, i.e., the norm-referenced method, is supplemented by an achievement standard scale: The scores are standardised such that the mean performance of the OECD countries is set at 500 points with a standard deviation of 100 points characterising the scale of differences between the students (OECD, 2000). These scores are used to define the boundaries of good and less good reading comprehension skills. The same method of standardisation with a mean of 500 and a standard deviation of 100 is in the Hungarian national assessment of reading competency (Balázsi, Rábainé, Szabó & Szepesi, 2005). In these systems, therefore, a good reader is one who displays substantially better reading performance than his or her peers, i.e., who performs better than average.

Criterion-referenced assessment compares test results to an external target and each student's performance is evaluated relative to that target (Csapó, 1987; Nagy, 2010). When skills and abilities are assessed, criterion-referenced testing can be used only if all components of the given skill are known. Criterion-referenced tests are well suited to diagnostic purposes because they reveal the level reached by a student in the acquisition of a particular skill.

Some components of reading competency may be evaluated through criterion-referenced testing. The Hungarian DIFER diagnostic assessment package, for instance, is a system which relies on this method (Nagy, Józsa, Vidákovich & Fazekasné, 2004a, 2004b). The package is widely used by Hungarian kindergartens and primary schools. DIFER comprises criterion-referenced diagnostic tests for the measurement of seven foundational skills. One of these is speech sound processing, which plays an essential role in reading acquisition. The test covers the system of Hungarian speech sounds and the results help to reveal which sounds cause difficulties thus hampering the development of reading.

Knowledge of the letters of the alphabet is another critical precondition of reading. Letter recognition (the recognition of lower and uppercase printed and handwritten letters) can also be measured through criterion-referenced tests. Criterion-referenced diagnostic assessments allow

teachers to find out whether a student has learnt every letter covered in class.

For the assessment of word reading, Hungarian criterion-referenced tests were developed by Nagy (2006b), which test the knowledge of the the 5000 most frequent Hungarian words. This set of words is character-ised as the critical vocabulary of an optimal level of word reading com-petency. The words are arranged into 20 interchangeable tests, each of which is divided into four subtests: Headwords, morphologically complex words, synonyms and word meanings. The analysis of the tests uses two empirical indicators: Vocabulary and fluency. Vocabulary is measured by the percentage of correct answers, with a performance of 90% or more satisfying the achievement target of the criterion-referenced test. The fluency indicator measures reading rate. The target level is determined with reference to teachers' performance, i.e., students' reading rates are compared to the average reading rate of teachers. The measurements re-lying on these criterion-referenced tests reveal whether reading these words is an automated routine process for a student.

Criterion-referenced tests are also found among tests linked to reading standards in other countries. One example is the *Wisconsin Assessment Framework for Reading* described above, which defines content and as-sessment programmes for Grades 3-8 and Grade 10. The framework uses criterion-referenced tests, which define five proficiency levels. Reading comprehension is a complex skill and several cognitive abilities contribute to its development. For this reason, there may be considerable perform-ance differences between children even within a school grade. The com-plexity of the skill calls for the use of both norm-referenced and criterion-referenced tests in the assessment of the components of reading compe-tency.

Summary and Further Tasks

The reading framework constitutes a starting point for the development of the diagnostic assessment system. The content of measurement as it is described in this volume is not considered to be complete; further work is needed for the construction of a model that maintains lasting validity but can at the same time be straightforwardly updated at any time. There

are several sources that can contribute to the enhancement of the theoretical background and the assessment framework.

The limited time frame of development did not allow the organisation of an external professional debate. Now that the content frameworks are published in these volumes in both Hungarian and English, they will become accessible to a broader academic and professional audience. The feedback we receive from this audience will be the main source of the first cycle of refinements.

A second, essentially constant source of improvements is the flow of new research evidence that can be incorporated in the system. Some areas develop at an especially rapid rate, such as the study of learning and cognitive development in early childhood. Several research projects are concerned with the analysis and operationalisation of knowledge, skills and competencies. Issues in formative and diagnostic assessment constitute a similarly dynamic research area. The results of these projects can be used to revise the theoretical background and to refine the detailed content specifications.

The most important source of improving the content frameworks will be their use in practice. The diagnostic system will be constantly generating data, which may also be used to test and rethink the theoretical frameworks. The system offered here is based on the current state of our knowledge. The organisation of the contents and their assignment to different age groups rely not on facts but on what science views as a hypothesis. The measurement data will provide empirical evidence on what students know at a given age. This information and the results of further experiments will be needed to find an answer to the question of how much further students can progress if their learning environment is organised more effectively.

An analysis of the relationships among the various tasks reveals correlations between the scales characterising development. In the short term, we can identify the test items bearing on the nature of one scale or another and those affecting more than one dimension of assessment. The real benefit of the data, however, lies in the linked data points allowing the longitudinal analysis of the results of successive diagnostic assessments. In the long term, this makes it possible to determine the diagnostic power of the various test items and to identify the areas the results of which can predict later student performance.

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5

Detailed Framework for Diagnostic Assessment of Reading

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The detailed frameworks for reading are structured in line with the theoretical background discussed in the introductory chapters. The present chapter is therefore divided into three main sections detailing in turn the frameworks for the psychological, application and disciplinary dimensions.

The first section of this chapter describes the frameworks and test items for the diagnostic assessment of the psychological components of reading. The prominent first position of the psychological dimension in the chapter highlights the view that learning to read fosters the development and alignment of several cognitive factors, which enables students to use their reading skills to achieve personal and social goals and, within that, to place these skills in the service of school learning. Psychological factors play a crucial role especially at the earliest stage of education.

The next section deals with and unfolds the application of reading and text comprehension and describes test questions assessing the interpretation of texts in various contexts. As maintained by the now dominant literacy approach introduced as a result of international system-wide surveys, the application of the knowledge attained at school in different contexts both ensures the applicability of that knowledge and assesses the range of experiences students bring from their environment outside of the classroom and how these experiences are blended with school knowledge. The question of application, the comprehension and analysis of various types of texts and the ability to extract relevant information from those texts receive an increasingly important role in the later stages of learning to read.

Section 5.3 describes the frameworks for the disciplinary dimension of reading. Compared to the disciplinary frameworks for mathematics and science, the domain of reading (which constitutes the foundations of the acquisition of the subject matter of all school subjects through the comprehension of written texts) is not so self-evidently a "domain of science." In other words, reading presents such a direct route of application in other content domains that it is difficult to view it as content to be acquired in its own right. Nevertheless, three areas are discussed here that remain within the internal system of knowledge of reading and do not point to other domains: sentence comprehension, the reading of textbook texts and the world of reading strategies.

The detailed frameworks are also structured at a subsidiary level, that of school grades. Each of the three sections is divided into three age groups: Grades 1–2, 3–4 and 5–6. In the domain of reading, there are especially noticeable changes even within a school grade. The two-year periods allow us, however, to offer a broader perspective for the teaching and fostering of reading skills. At a time when we can often witness a race measured in months or weeks in the instruction of decoding skills in Grade 1, it is important to highlight that there are task types (in both the applicational and the disciplinary dimensions) that are just as pertinent in Grades 1−2 as they are in Grades 5−6. Undeniably, there are significant differences in the range of experiences (background knowledge), in the development of automated skills and in the range of familiar reading strategies but the various areas of application of reading and text comprehension in and outside the classroom must be shown right from the beginning of reading instruction.

The Diagnostic Assessment of the Psychological Dimension of Reading

The acquisition of the skill of meaningful reading presupposes an adequate level of development of several skills and competencies. This section offers guidelines primarily for the diagnosis of the development of phonological decoding and text comprehension skills and of the cognitive operations and aspects of reading. The section follows the skills and operations of key significance for meaningful reading as discussed in the theoretical background chapters, and points out opportunities for fostering these skills. Although the different skills and operations are discussed in separate sections, this does not mean that they are independent from one another. On the contrary, their individual elements are closely related to one another and there is interdependence among them.

As the tasks described here follow the developmental curve of phonological awareness and the taxonomy of reading operations, they can be classified from different points of view and according to different criteria. There may be overlaps between the tasks in the sense that a task designated to measure the developmental status of a particular skill may also be suitable for measuring other skills or operations and some of the

skills and operations can be assigned to more than one task. The test items assessing the development of letter and speech sound processing, for instance, contain elements that are also suitable for the measurement of phonological processing. While the test items discussed in this section can also be used in computer-based assessment programmes, it should be noted that the final format of the items should be adapted to the paper or electronic medium used, all items should be pre-tested and the media-effect should be controlled. The tasks measuring phonological awareness have been developed relying on international comprehensive studies and assessment instruments concerned with the nature and progress of such awareness.

The Assessment of the Psychological Dimension of Reading in Grades 1–2

In shallow and transparent orthographies, including that of the Hungarian language, decoding skills develop at a very fast pace in the first phase of formal education. By the end of Grade 1, students can read with only a few errors; that is, the majority of children taught with the right methods make few mistakes reading both known and unknown words and non-words. Consequently, during the first and second grades measurements should focus on students' decoding performance. In the first year of formal education, the assessment of reading skills should cover letter recognition, decoding, the accuracy and fluency of word reading and the reading of words and nonwords. In Grade 2, students' actual word recognition skills are characterised by accuracy and fluency measurements, where word frequency and word length are included as variables.

Phonological Awareness
Phonological awareness, i.e., conscious accessing of the internal structure of words and the ability to separate words into units of different sizes, plays a key role in decoding. The different test items measuring phonological awareness have to be applied to the appropriate stages of learning to read by adapting word frequency, students' vocabulary and the developmental curve of phonological awareness of the actual state of students' reading development. The development of phonological aware-

ness can be divided into the following major stages or skills: (1) syllable segmentation and blending, (2) rhyme detection, (3) syllable manipulation, (4) phoneme isolation, (5) phoneme segmentation and blending and (6) phoneme manipulation. The description of the test items follows this division. Although the above skills are acquired at different points in time, they develop in parallel to some extent. As phonological awareness progresses, the phonological units to be manipulated become increasingly more elaborate while the complexity of access increases. Since phonological awareness is the most important of the factors determining speed and accuracy, the diagnosis of bottlenecks in this area and early intervention are prerequisites to future good reading skills.

Phonological Awareness of Syllables

Syllable structure awareness emerges at an early stage of the development of phonological awareness. The syllable manipulation component of phonological awareness assessed through tasks requiring the manipulation of the syllable structures of words and nonwords tends to be highly developed by the age of five and to show a ceiling effect in Grade 2. Syllable manipulation emerges as a result of maturation and development but its spontaneous development can be encouraged through various tasks in the first years of schooling and it can be used as a major building block in preparing students for reading. The initial progress of reading skills can be accelerated and reinforced by tasks involving syllable manipulation such as the relatively simple operation of syllable segmentation (*Tasks P1* and *P2*), the somewhat more complicated operation of syllable deletion (*Tasks P3* and *P4*) and the blending of syllables into words (*Task P5*) and, at a later stage, the reading of syllables to form words. Since the tasks used to measure phonological processing do not presuppose letter recognition, the words to be manipulated or processed are presented orally by the teacher.

Task P1

How many times do you clap for the word?

| nursery | tunnel | cherry | jacket |
| sport | holiday | beach | helicopter |

Task P2

Name the things you see in the pictures. How many times do you clap?
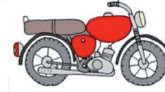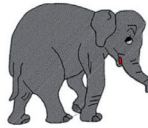
Task P3

TEACHER:	Say the word. **carpet**
	Now leave out [pet]. What word do you get?
STUDENT:	**car**

Task P4

TEACHER:	Say the word. **panther**
	Now leave out the last syllable. What word do you get?
STUDENT:	**pan**

Task P5

Teacher pronounces 2-4 syllable words chunk by chunk.
Say the word you've heard.

tur-key	pre-tty	build-ing	te-le-phone
ma-gi-cian	wa-ter-me-lon	af-ter-noon	bi-noc-u-lars

For children with sufficiently developed language skills, the ability to manipulate rhymes emerges spontaneously at an early stage of phonological awareness. The tasks assessing this component of syllable structure awareness rely on the phonological similarity between syllables and do not presuppose letter recognition. Rhyme manipulation can be assessed with tasks involving the detection of rhyme in word pairs (*Task P6*), the detection of a rhyming word (*Task P7*) and the recognition and identification of rhymes (*Task P8*). Teachers first provide some examples for rhyming word pairs to make sure that students can understand the task, and the assessment can use spoken words or pictures (*Tasks P9* and *P10*). The manipulation of rhyming pairs can be grouped by phonemic and/or semantic similarity.

Task P6

After practising rhymes, the teacher pronounces a list of words of two or more syllables.

TEACHER: Which of the words rhyme?

Say the words.

house   pierce   mouse

Further lists: surprise − comprise – computer; glitter − bitter − button

STUDENT: house   mouse

Task P7

The students select the word that sounds like the word shown or pronounced by the teacher.

Which word sounds most like **blood**?

mould   flood   pun

Task P8

Which two words rhyme?

cape – car   rattle – clatter   rehearse – converse

Task P9

What can you see in the pictures? Say the word. Which of the words doesn't rhyme with the others?

Task P10

Students say one and two-syllable words based on a set of picture cards. They select three words that rhyme.
Say what the pictures show. Which of the words rhyme?
Put the cards that go with the rhyming words in the box.

Phonemic Awareness

While conscious recognition of syllables precedes the ability to read and write, phonemic awareness, i.e., the ability to access individual speech sounds, emerges with literacy. Phonemic awareness constitutes a more complex operational level of phonological awareness and enables students to manipulate phonemes by segmenting words into speech sounds (*Tasks P11* and *P12*), blending phonemes into words (*Tasks P13* and *P14*), isolating phonemes and identifying their positions (*Task P15*), deleting a given phoneme (*Tasks P16* and *P17*) and substituting given sounds or reversing the order of a sound string (*Tasks P18* and *P19*).

The difficulty of operations progresses from the isolation of the word initial and word final sounds through the manipulation of word medial sounds to phonemic segmentation and the blending of sounds to form words. The task becomes more difficult when the operation acts on a member of a consonant cluster (e.g., bend), especially if the cluster is word initial (e.g., street). A further important factor to consider in constructing test items assessing phoneme manipulation is the dependence of the articulation and perceptibility of a sound on speech sound processing. Vowels (especially tense or long vowels) are easier for students to recognise and isolate than are consonants. Students show better performance in tasks testing nasals and continuants than those involving oral stops. It is therefore best to start practice activities with sounds other than oral stops. Taking into consideration the discrepancy between the acoustic properties of isolated sounds and those of continuous speech, sound segmentation and blending exercises should avoid words where a phonological process (such as partial or complete assimilation) takes place.

In sound segmentation and phoneme counting tasks (*Tasks P11, P22– P24*), students are asked to segment a spoken work into speech sounds and at the same time tap or count the sounds.

Based on the tasks shown below, test items can be constructed to assess students' level of phonemic awareness and identify the areas where improvements should be made. It is important to emphasise that phonemic awareness should not be taught in isolation but must be practised together with letter and sound correspondences (e.g., *Tasks P12* and *P14*). Since the main purpose of developing phonemic awareness is to help students with learning to read, the success of teaching efforts can be

further increased by explicitly drawing students' attention to the metalinguistic function of phonemic awareness.

Task P11

TEACHER: How many sounds can you hear in the following word?
man

STUDENT: [m] [a] [n]. I can hear three sounds.

Combining the task with letter recognition helps to reinforce and improve the operation or could also be used as a corrective measure (*Task P12*).

Task P12

TEACHER: Let's write the sounds of the word **man** on the board.
[m] written as **m**   [a] written as **a**   [n] written as **n**

STUDENT: (Writes the word **man** on the board.)
Let's read the word on the board   **man**

Task P13

The task involves the blending of isolated sounds to form a word. Students listen to the phonemes of a given word uttered isolated from one other.

TEACHER: Which word is this: [r]   [u]   [n],   [s]   [i]   [t] ?

STUDENT: [r]   [u]   [n] is **run**, [s]   [i]   [t] is **sit**.

If a student cannot complete *Task P12* or makes a mistake, these skills can be practised with exercises similar to *Task P13*.

Task P14

TEACHER: Let's write the sounds in **run/sit** on the board.
[r] - **r**   [u] - **u**   [n] - **n** ,   [s] - **s**   [i] - **i**   [t] - **t**.

STUDENT: (Writes the word **run/sit** on the board.)
Let's read the word on the board: **run/sit**.

Task P15

Where do you hear the sound [v] in the following words?

van   seven   velvet

Task P16

In phoneme deletion, students have to identify the word they get by deleting a phoneme in another word.

TEACHER: Say the word **boat** without the first sound.

Other examples: beach, fill, border

STUDENT: **Boat** without the [b] is **oat**.

Task P17

TEACHER: Say the word **wind** without the last sound

Other examples: peak, poster, paint

STUDENT: **Wind** without the [d] is **win**.

Task P18

Students create a new word by substituting a phoneme.

TEACHER: Say the word **house**.

TEACHER: Now say it again but replace the [h] with the sound [m].

What word did you get?

Other examples: cat – hat, sick – sack, weather – feather

STUDENT: **Mouse.**

Task P19

Students create a new word by transposing phonemes.

TEACHER: What word do you get if you swap the first and

the last sounds in the word **pan**?

Other examples: pit – tip,   raw – war,   deal – lead

STUDENTS: The new word is **nap**.

In phoneme identification (*Task P20*), students are asked to identify a given sound in three or more different words. Task difficulty can be varied through the number of words, the length of the words and the position of the phoneme to be identified. If students need to remember more than three spoken words, the capacity of their short-term memory may have an effect on their performance.

Task P20

TEACHER: Which sound can you hear in all of the words?

nap   night   number

STUDENT: The common sound is [n].

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Phonemic awareness can be measured and practised in a playful way through "spoonerisms" (*Task P21*), where the initial sounds of a pair of words are transposed resulting in two different words.

Task P21
Create two real words by swapping the first sounds of the pairs of words below.

take − shower   do − chores

The measurement and also the fostering of phonemic awareness both need to face the obstacle that sounds are difficult to capture. The following phonemic segmentation tasks (*Tasks P22* and *P23*) may help both measurement and the completion of practice exercises by providing tangible support (e.g., buttons, pebbles, cards, illustrations of lip movements when uttering the sounds, etc.) for students. Teaching efficiency may be increased by writing the grapheme corresponding to the given phoneme on the cards.

Task P22
Break the following words into sounds.
How many sounds do you hear?
Point at the sack that shows the number matching the number of sounds.

it   tap   crown   parrot   mean   number

Task P23
Break the following words into sounds.
How many sounds do you hear?
Put down as many buttons as there are sounds!

Example: nut
row
puppy
master
dream
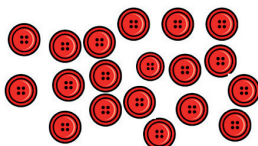
The measurement of phonemic awareness through phoneme counting can be made more varied and easier for the children by using visual aids representing the words (*Tasks P22–P27*). The visual aids (e.g., pictures) can be shown in synchrony with saying the words or could even replace the spoken words. When selecting pictures, we should ensure that they are unambiguous and clearly identifiable for the students.

Task P24
Say the names of the objects shown in the pictures. How many sounds are there in the words? Match the picture cards with the string with the same number of beads.
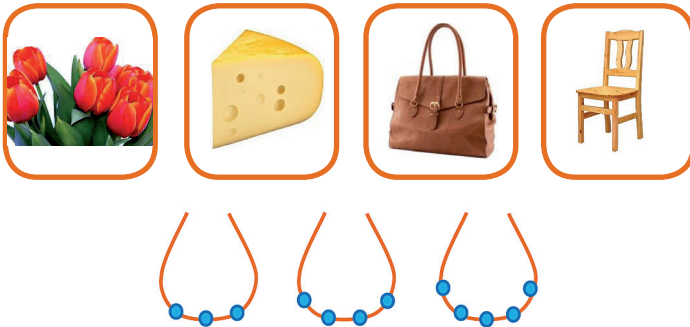
Task P25
What can you see in the pictures? Say the words. Put the pictures in the right basket based on the first sounds of the words.

Task P26

What can you see in the pictures? Say the words. Put the pictures in the right basket based on the last sounds of the words.

Task P27

Students complete the task one picture at a time. For each picture, there are four questions to answer.

TEACHER: What can you see in the picture? Say the word.
STUDENT: **camel**
TEACHER: What sound can you hear at the beginning of the word?
STUDENT: **[c]**
TEACHER: Say one by one the sounds of the thing shown in the picture.
STUDENT: [c] [a] [m] [e] [l]
TEACHER: Say the third sound!
STUDENT: camel – [m]
TEACHER: Choose the thing that has the sound [i] in its name!
STUDENT: **tulip**

The development of a link between phonemic awareness and speech sound to grapheme correspondences can be assisted by word initial and word final sound identification tasks where the letter (grapheme) representing the sound (phoneme) is shown. In this case it is best to practise

just one phoneme at a time with its corresponding grapheme, such as [t] – **t** in tow, tall, tense, tiger. Students whose phonemic awareness is fostered not only through spoken exercises but also with tasks involving letter recognition show better performance both in reading and in spelling.

The diagnosis of deficits in phoneme manipulation skills is of crucial importance, as an optimal level of competency in operations involving the sounds of words is a prerequisite to learning to match sounds with letters and letters with sounds during reading or writing.

Letter and Speech Sound Processing
Transparent orthographies easily lend themselves to the learning of sound to letter correspondences and words can be decoded without errors after only a relatively short period of literacy instruction. Research evidence indicates that for languages with either deep or with shallow orthographies (such as Hungarian and Finnish), letter recognition skills and the ability to store and retrieve letter to sound correspondences are just as crucial as phonological processing skills. In Hungarian literacy instruction, phonemic awareness tasks may be combined with letter to speech sound correspondence tasks since in this language the first major step in literacy skills is the acquisition of correspondences between letters and speech sounds. Students' success in sound to letter and letter to sound decoding (*Tasks P28–P30*) constitutes the foundation of fluent reading.

Task P28
Combine the letters to spell the names of the things in the pictures.
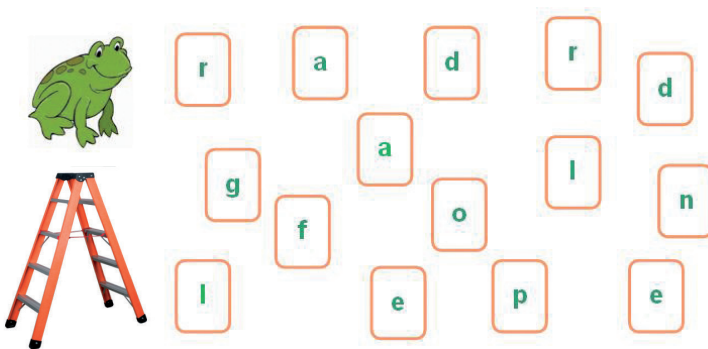
Task P29

Which is the first sound in the names of the objects in the pictures? Point at the correct basket.

Task P30

Which is the last sound in the names of the objects below? Point at the correct basket.

Tasks P30–P35 are suitable for detecting deficiencies in speech sound identification: They reveal problems with distinguishing vowels and consonants of short versus long duration, difficulties with telling apart voiced and voiceless sounds or with the place or manner of articulation of consonants, provided that students' phonemic awareness skills have reached the level required for the tasks. Deficits in speech sound differentiation have a negative effect on the ability to transform individual speech sounds into graphemes, which is the basis of reading and writing. *Tasks P30–P35* can be used to reveal if a student has difficulty with distinguishing [d] from [b], for instance, long vowels from short vowels of the same quality (marked by diacritics in Hungarian orthography) or short consonants from geminate consonants (marked by grapheme doubling).

Task P31

Which sound can you hear in the names of the objects?

l   r   b   v   th   f   j   ch

Task P32

Which sound can you hear in the names of the objects?

k   g   k   g   k   g   k   g

Task P33

Which word in the pair of words goes with the picture?

tree   free   ill   hill   cups   cubs   show   sew

Task P34

Where can you hear the sound [t] in the names of the objects below? Write the letter in the corresponding box.

t

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Task P35

Where in the name of the object can you hear the sound corresponding to the framed letter? Write the letter in the corresponding box.

u	i	e	o

Phonological awareness, the accurate and rapid recognition and naming of lower and upper case letters (i.e., fluency), a rich vocabulary and advanced text comprehension are all components of the development of meaningful reading. Letter recognition is a good predictor of future reading performance. *Task P36* is an example for an exercise in letter naming fluency.

Task P36

This letter naming fluency task lists 100 letters with the complete set of letters of the Hungarian alphabet appearing in random order both in lower and upper case versions. Letter naming fluency is measured as the number of letters correctly named in one minute.

Read the letters from left to right.

c	c	N	u	Q	M	u	h	S	i
n	b	e	N	F	f	o	a	ú	K
g	p	k	p	a	H	C	e	G	D
ű	w	F	í	h	Ő	x	j	l	Ly
ü	t	Y	q	Ty	dz	f	T	gy	v
Sz	V	R	ó	zs	P	J	t	B	á
Z	v	U	P	R	Dzs	V	ö	I	W
R	ny	m	O	z	D	G	y	U	Y
Z	y	A	m	X	z	H	S	M	E
q	n	j	s	W	r	d	s	B	I
r	A	E	L	c	c	N	u	Q	M

RAN: Rapid Automatized Naming

One of the main causes of developmental dyslexia is an impairment of the phonological processing of speech sounds. A second, less well-known factor is the speed of processing. A RAN task measures how quickly an individual can name objects, colours, digits or letters. The speed of naming pictures and letters at the early stages of literacy development is a reliable predictor of future reading performance. It should be noted that while the letter naming fluency task (*Task P36*) has a time limit, a RAN task (*Task P37*) does not set such limits. In a rapid automatized naming task students are shown five frequent lower case letters in random order in a 5 by 10 tabular arrangement. The time taken by a student to read the letters aloud accurately is measured. RAN results cannot, however, be equated with processing speed. It is worth remembering that while this method of measurement provides an adequate assessment of the momentary letter naming fluency of a student, the skill itself is very difficult to foster.

Task P37
Read aloud the letters on the card starting on top and reading from left to right.

o	a	s	d	p	a	o	s	p	d
s	d	a	p	d	o	a	p	s	o
a	o	s	a	s	d	p	o	d	a
d	s	p	o	d	s	a	s	o	p
s	a	d	p	a	p	o	a	p	s

The Assessment of the Psychological Dimension of Reading in Grades 3–4

The development of a functional word-form lexicon takes several years. In Grades 3−4 of primary education, the measurement of the development of reading skills should focus on word reading performance building mostly upon the skills fostered in the first two grades. In Grade 3, the

main focus is on measurements of accuracy and, more importantly, fluency, letter-sound integration and vocabulary size. In Grade 4, decoding skills are assessed by measurements of accuracy and fluency, letter-sound integration, the reading of canonical sentences (basic sentence types characteristic of the target language) and the comprehension of texts.

All measurements aiming to follow the development of reading skills between Grades 2 and 4 must take into consideration the complex relationship and interactions between phonological components, vocabulary, reading speed and accuracy. During this period, reading instruction continues the fostering of the reading skills introduced during the first two grades. At this stage students can be expected to be able to manipulate the syllable structures of words and nonwords, to perform operations with phonemes, to have a firm knowledge of letters and to be able to link letters with phonemes. If these skills are not sufficiently developed, they can be practised and measured using more difficult adaptations of the tasks used in the first two grades (e.g., with less frequent and longer words). For transparent orthographies, fast and accurate reading emerges between the ages of 7 and 9 years.

At this stage, literacy instruction can begin to improve students' text reading fluency and to encourage the functional dimension of reading. That is, in addition to the reinforcement of the skills discussed above, routines should be encouraged, the process of automatization should be assisted and text reading strategies should be shown to students. These strategies will be discussed in more detail in the section on the disciplinary dimension.

Reading Aloud, Fluency

Novice readers tend to read very slowly while practised readers read much faster. The development of reading skills is therefore signalled by the increase in reading speed. Reading speed varies greatly, even across practised readers. One of the reasons behind this phenomenon is that reading speed depends on the technique and purpose of reading. Three radically different reading techniques can be distinguished: sublexical reading, fluent reading and skimming. Reading instruction does not endeavour to increase reading speed directly but rather to foster the development of these three methods of reading. Nevertheless, reading instruction must undertake to improve reading rate as much as the students'

abilities allow. Skimming (which is also known as speed reading) involves searching the text for new information or information pertinent to the reader's purposes, and extracting and processing the main points and information structure of the text. In order to fulfil this function, it is not necessary to read every sentence from the beginning to the end of the text. Fluent reading, in contrast, involves reading every sentence moving forward in the text (although uninteresting or boring sections may be skipped). Sublexical reading enables readers to process any unknown word of their language that they have never encountered before.

There are a number of methods for assessing students' text reading fluency. One of these is to ask students to read a continuous text aloud and teachers evaluate reading performance relying on their past experiences. It is worth using some point of reference in this case. For instance, reading rate must be faster than 90 words per minute, the text must be read with expression or text comprehension is tested during or after the text is read aloud. A second method of assessment involves the monitoring of the student's reading of a continuous text within a certain time limit. Text reading fluency is measured by the number of words read accurately in one minute. Students' progress may be followed by giving them the same text to read at a later time. Benchmarks may be set with the help of research evidence in this area. Current evidence shows that the average text reading fluency is 60 words per minute at the end of Grade 1, 90–100 words per minute in Grade 2 and by the end of Grade 3 students can accurately read 114 words per minute on average. Fluency varies as a function of the amount of reading practice and of text type.

A third method of measuring reading fluency is having students read word lists aloud (the number of words read in a minute, for instance, or the number of words read accurately in a minute, etc.). A necessary but not sufficient condition of fluent reading is the effortless recognition of isolated words. Since word reading fluency does not transfer to text reading, word reading performance is not necessarily indicative of the fluency of text reading.

Task P38 measures word reading fluency and can be used for all three age groups with the frequency and length of the words included as variables. Words that are frequently encountered either in textbooks or in everyday reading situations are read faster and more accurately. Shorter words also tend to be recognised more quickly although (inflectional and

derivational) suffixes repeatedly appearing at the ends of Hungarian words facilitate faster reading.

Task P38

Read the words below aloud.

Read out loud the words in the table below moving from top to bottom.

Grades 1−2

Number of syllables		
ONE syllable	*TWO syllables*	*THREE syllables*
one	father	company
not	mother	butterfly
know	sister	factory
sun	reply	departure
word	brother	operate
lot	study	already
nice	evening	understand
there	woman	suddenly
good	bitter	difficult
stand	city	afternoon
sit	garden	remember
girl	depart	general

Grades 3−4

Number of syllables		
ONE syllable	*TWO syllables*	*THREE syllables*
face	tiger	history
give	select	volcano
year	autumn	memorise
head	sentence	performance
hear	object	library
house	teacher	imagine
write	office	assistant
here	person	important
wind	adult	eleven
bad	planet	happily
bank	morning	obvious
hold	snowflake	multiply

Grades 5−6

Number of syllables		
ONE syllable	*TWO syllables*	*THREE syllables*
tight	concrete	calendar
pick	complete	umbrella
bake	lawyer	accident
fly	nothing	discussion
put	relax	underline
bench	careful	require
arm	exit	distinguish
may	wander	scientist
fact	many	advertise
knee	progress	provision
hare	lazy	overcome
think	control	exercise

Nonword Reading

Nonword reading tests can also be used to assess students' decoding (or recoding) performance (*Task P39*), as these tasks preclude both frequency and familiarity effects. For languages with shallow orthographies, in nonword tests there is a reduced likelihood of items having letter combinations familiar to the reader. Nevertheless, letter combinations conforming to the phonotactic rules of the given language are recognised faster and with less effort. If we wish to place a time limit on a nonword reading task, we should remember that nonword reading times are longer than the reading times of real words of equivalent lengths as measured by the number of letters.

> *Task P39*
> Read the words below aloud.
> cardonite   kaphridge   concenated   ipsidom   petrang   phoncher
> freggy   salder   quarn

Morphological Awareness

Morphological awareness, i.e., knowledge of grammatical structures, also plays a major role in the development of reading comprehension. Research studies conclude that schoolchildren capable of performing higher-level morphological operations (e.g., decomposition into morphemes, combination of morphemes) show better performance in both

word reading and text comprehension. High morphological awareness at the initial stage of primary education is associated with a larger vocabulary, better text comprehension and higher reading fluency. This relationship is most clearly observed in Grades 8−9. The advantage of morphological awareness in lexical processing, vocabulary building and text comprehension is especially noticeable when reading unknown compound, derived or inflected words.

The Assessment of the Psychological Dimension of Reading in Grades 5–6

Reflecting the observation that for transparent orthographies word reading becomes fast and accurate between the ages of 7 and 9 years, a reading target of the Hungarian National Core Curriculum is that by the end of Grade 4 students should be capable of error free decoding allowing the reading of canonical – typical Hungarian – sentence types and the comprehension of texts. The two main processes involved in reading comprehension, decoding and meaningful reading make up a whole and are inseparable from each other. Therefore, even at the early stages of formal education, literacy instruction can, or in fact should, involve explicit instructions to foster cognitive operations needed for text comprehension and diagnostic assessments of these operations as appropriate for the students' stage of development.

Our discussion of the measurement of the operations required for text comprehension relies in part on the leading theoretical chapter of this volume and, to allow the ideas to be interpreted in a broader context, in part on the structure of international and Hungarian large-scale cross-sectional measurements and on the reading operations defined in our frameworks. Meaningful reading, which is defined as the comprehension and use of the content conveyed by a written text, and the ability to reflect on that content, reaches beyond the decoding of words and the literal interpretation of texts.

In Grades 5−6, students are expected to comprehend the text, interpret it and reflect on its content and format in the context of their experiences and background knowledge, and to take a stance with regard to what they have read. In order to achieve these targets, certain reading or cog-

nitive operations must be activated during reading, such as information retrieval, interpretation, critical evaluation and with a prominent role within these, making inferences. As these operations do not form a hierarchical arrangement, here we start with information retrieval requiring simple cognitive and textual processing and move towards levels of analysis requiring deeper understanding of the text. Text comprehension skills can be measured using a variety of text formats (continuous, non-continuous or mixed) and text types (narrative, science writing, etc.). When the tasks are defined it is important to remember that the variables mentioned above can have a major effect on student performance.

Information Retrieval

For information retrieval, students must access content relevant to the question or task and locate one or more pieces of information embedded in the text. Simple information retrieval tasks test a student's ability to recover literal content, while more complex versions also require a minimum degree of reasoning (*Task P40*).

> *Task P40*
>
> Read the text and answer the questions.
>
> > Petra and Mike were going to study for the test but the computer was not working because of the power cut. Mike went fishing instead at a nearby pond with a friend of his but they did not catch anything. Mike's mum was angry that her son went fishing instead of studying but he claimed that he had learnt before what he had to know.
>
> Whose computer did not work?
>
> Did Mike prepare for the test?

Interpretation

Interpretation tasks measure a student's ability to navigate in the internal structure of texts. In order to complete these tasks, students must perform cognitive operations involving some degree of reasoning. These include the identification of the basic idea or main theme of the text, or the computation of the context-dependent meaning of an expression. Crucially, students must make inferences, i.e., link pieces of interconnected information that are separated from each other in the text. Infer-

ence is one instance of processes that help to construct mental representations and "read between the lines" relying on pieces of information extracted from different sections of the text and on the reader's background knowledge.

When deciding how much time to allocate for measurement, it is important to keep in mind that young and less experienced readers are less likely to perform well under time pressure. Student performance on tasks involving reasoning skills are also influenced by factors such as the physical distance between interrelated contents and the issue of the components of working memory. To help select texts and develop tasks for the measurement of inference skills, the text below illustrates the variety of inference processes.

> "Many small companies were prospering making personal computers. Then ABD entered the market with a massive advertising campaign and most of them went bankrupt. However, numerous other small companies then arose making equipment compatible with ABD's personal computer."

"A good reader can make the following inferences when reading this extract:

(1) *Them* is ananaphoric reference to *small companies,*
(2) ABD's entry into the market *caused* the small companies to go bankrupt,
(3) The losing companies took the *action* of filing in court for bankruptcy,
(4) A *state* now holds such that their former workers are unemployed,
(5) ABD's *goal* in entering the market is to get its share of profit,
(6) ABD's *plan* to attain the goal [in (5)] involves an advertising campaign,
(7) The *instrument* used to make this entry is a product, namely, a personal computer, and
(8) The thematic inferences that ABD and the original small companies were in competition, but that ABD and the new small companies cooperated to divide up the market". (*Seifert,* 1990, p. 104)[1]

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1 Seifert, C. M. (1990). Content-based inferences in text. In A. C. Graesser, & G. H. Bower, (Eds.): Inferences and text comprehension. San Diego: Academic Press.

One way of measuring reasoning skills is the question and answer method. A student's knowledge-based reasoning skills can be assessed, for instance, by asking WHY? HOW? and WHAT HAPPENED THEN? while they are reading or when they have finished reading. Students can also be asked to give a title to the text they have read, to put the events of a story in order, to identify the main dimensions of a diagram, to describe the main character or to explain, for instance, how to use a map (*Tasks P41* and *P42*).

Task P41

In which of the national parks do we not find a White-tailed Eagle nest?
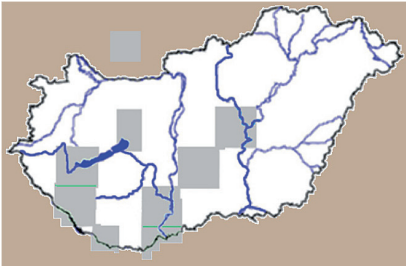
Nesting areas
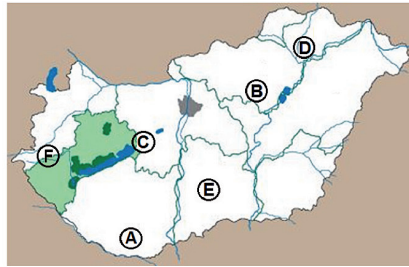
A) Duna–Dráva NP
B) Bükki NP
C) Balaton-felvidéki NP
D) Aggteleki NP
E) Kiskunsági NP
F) Őrségi NP

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Task P42

Summarise in one or two sentences how the Devil's dyke was made according to the story.

Devil's dyke

There is a long ditch running along the Szekely land. It is called the Devil's dyke.

I'll tell you the story of this ditch, listen carefully.

Many hundreds of years ago two brothers got together and gathered a great many stones: They wanted to build a castle.

When the castle was almost finished, they ran out of stones and they ran out of lime. Despair came over the two young men and they didn't know what to do next because they'd greatly tired of all the building work.

One of them said, "I would give up my soul to whoever brought enough stones and lime to complete this castle."

He hadn't even finished talking when out of nowhere the devil appeared in front of them.

He thus spoke to the men, "I've heard your words. I'll bring stones and lime aplenty if you both give me your souls."

The brothers were taken aback by this. But the devil kept talking and promising that not only would he bring stones and lime but also finish the castle and build it such that not even God could destroy it, until the brothers agreed.

"All right, you can have our souls, just build that castle," they said.

They drew up the contract there and then, the brothers signed and the devil signed. When the devil had the contract in his hands, he built the castle but didn't let the brothers in. He hitched a plough to the brothers and chased them all across the whole of the Szekely land and thus made them carve a ditch of great depth.

This ditch has since filled up with earth and stones but there is still a trace of it. It is said that several hundred years ago the devil's plough was found in the ditch. This plough was so big that there was enough iron to reinforce ninety-nine wagons and there was still some left for an axe.

(After the collection of Elek Benedek)

Task P43

Put the events that happened to Siegfried in chronological order.

He is given a shield and a horse.
He meets the dragon.
He learns smithery.
He bathes in dragon fat.

How did Siegfried defeat the dragon?

He was still only a child when Prince Siegfried decided to bring glory to himself one day: He would kill the dreaded monsters that were harassing peaceful people.

He was barely nine years old when, on one of his excursions in the country, he joined a blacksmith as an apprentice to learn his trade. The blacksmith put the heaviest hammer in the boy's hands but the child hit the iron with such force that even the anvil* broke into two. The blacksmith was frightened by the magical strength of the youth and sent him on to the charcoal burner's in the woods. The evil blacksmith knew that a horrible dragon lived in the woods and was hoping that it would slay Siegfried.

When he reached the woods, Siegfried found himself face to face with the dragon. As he did not have any weapons, he used a log to chase the monster back into its lair. He then built an enormous fire by the entrance of the cave and the toxic smoke of the fire drove the dragon out of its hiding place. No matter how hard it tried, however, it could not escape from the fire. The flames melted the dragon's fat, which turned into a little stream on the ground. Siegfried dipped his finger in the stream and was surprised to find that the dragon fat formed hard armour around it. He bathed his whole body in the dragon fat and after that no sword or lance could pierce his skin any more. While Siegfried was bathing in the dragon fat, a leaf fell on his shoulder – the magic protection could not reach this part of this body and this spot was thus left unprotected. (...)

Siegfried returned to the blacksmith's with anger. By way of apology, the blacksmith presented him with a shield and a horse, and the young prince set off on his heroic adventures. (…)

Source: Tarkabarka schoolchildren's magazine; NOVUM

* anvil: A block of iron shaped like a boat on which hot iron is hammered.

Critical Evaluation

For this type of operation, students need to rely on their knowledge, value systems and opinions independently from the text. When readers

evaluate a text, they compare what they have read with their personal experiences or with information obtained from other texts, and form an opinion on the contents or format of the text (*Task P44*). In order to achieve this, readers must understand and identify the meaning and intentions of the text and use their background knowledge related to the structuring, style and genre of texts.

Task P44

White-tailed Eagle – Population data	
Time of observation (year):	2003
Size of nesting population:	118–130 nesting pairs
Protection status in Hungary:	highly protected
Monetary value (HUF):	1,000,000
Conservation status in Europe:	rare species
Period of occurrence in Hungary:	throughout the year
Occurrence status in Hungary:	regular nester
Winter habitat:	habitats in Hungary
Body length (cm):	70–90
Wingspan (cm):	200–240
Mass of male (g):	3075–5430
Mass of female (g):	4080–6920

White-tailed Eagle – Nesting	
Nesting place:	floodplain forests, waterside forests, always near water, forest lake areas
Nest placement:	in trees
Type of nest:	twig nest
Nesting type:	lone nester, (territorial)
Number of young:	1–3
Hatching time (days):	38–40
Time of nest leaving (days):	80–90
Development of young:	nest dwellers
Annual number of hatching:	1
Life style; feeding:	predator; birds (water fowl, wild geese), fish, mammals (rabbits, innards of large animals, carcasses)
Enemies, competitors:	Saker Falcon; tries to occupy its nest

Which ending completes the sentence below to make a true statement?

There are two tables about the White-tailed Eagle so that they can...

    A) distinguish the eagle's enemies and pests.

    B) separate population data from nesting properties.

    C) characterise the life style and hatching habits of the bird.

    D) display the bird population data for 2003.

Working Memory Reading Span Test

Coherent text is usually comprehended by processing individual global units. As a consequence, readers must often memorise a unit of thought composed of several sentences in order to be able to extract the main message of the text. Working memory capacity can be tested with reading span tests such as the one developed by Mihály Racsmány and Dezső Németh (*Task P45*). The teacher reads the sentences of the chosen series and students have to recall the last word of each sentence.

Task P45

Series	Sentences	Words to be recalled
2-word series	1. The oil spilt on the table and the book caught fire straight away and then burst into flames like dry twigs. 2. As we were walking up the footpath with our rucksacks on our backs, the day slowly turned into dusk.	TWIGS, DUSK
3-word series	1. They waited all day for the message but it was only the next afternoon that they heard the phone. 2. The wardrobe suddenly toppled over and there was a raucous crash as the fall shattered the glass. 3. The monk made a funny face when he realised that the church tower no longer had the bell.	PHONE, GLASS, BELL
4-word series	1. The burglar quietly entered the dark room and his heart missed a beat when someone turned on the light. 2. Because of the great number of predators, after a few years no-one was left on the small isle. 3. Almost everyone made a donation to the church so that they could finally have the new tower. 4. The entire leadership argued all week long but they still could not decide who should be the new boss.	LIGHT, ISLE, TOWER, BOSS

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The Diagnostic Assessment of the Applicational Dimension of Reading

In the diagnostic assessment of reading, the measurement of the aspects of reading characterising the competency that we can call reading literacy has a tradition going back a few decades. Reading literacy goes beyond the traditional sense of text comprehension in that special emphasis is given to the comprehension of everyday texts that are of practical use for the individual or the society. In this sense, reading as a complex skill or system of skills is seen as a means of achieving social and individual goals and as an important domain of the application of knowledge acquired inside and outside the classroom. Clearly, the comprehension of everyday written texts requires a certain level of confidence in the reading components discussed in the previous section in connection with the psychological dimension of diagnostic assessment. For the purposes of the diagnostic assessment of the applicational dimension of reading, reading comprehension as a construct is defined in line with the conception of the PISA framework as follows: The ability to understand and use the content of written texts and to reflect on the content and format of written texts in order to achieve one's personal goals and to become an efficient participant in society and everyday life. In the present section, the measurement of reading comprehension follows the aspects displayed in Table 5.1 covering text parameters, formal and genre characteristics and the cognitive skills needed for text comprehension.

The test items discussed below can be used in paper and pencil tests or in a computerised format. However, to be able to measure electronic reading, the construct will need to be expanded and the system of aspects will need to be revised, both of which will be implemented in the framework of a new project. Digitised assessment involves the transfer of the texts used in paper and pencil testing into a computer readable format. The assessment of electronic reading, in contrast, focuses on the possibilities provided by the Internet and on Web 2.0 applications. The test items of electronic reading are web pages with hyperlinks, where the pages are connected by menus and links of various types.

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Table 5.1 Categories of texts and test items

Medium	Paper	
	Computer	Digitised
		Electronic
Text format	Continuous	
	Non-continuous	
	Mixed	
Text type	Description	
	Narration	
	Exposition	
	Argumentation	
	Instruction	
Reading situation	Public	
	Personal	
Cognitive operation	Information retrieval and access	
	Interpretation and inference	
	Reflection	

Unlike in paper-based tests, in electronic reading tasks usually only part of the document can be seen on the screen at any one time. Decisions are made using various navigation tools and visual tools with hyperlinks, which may guide the order in which different parts of the document are viewed and the choice of which sections to view. For members of Generation Y, the visual tools of a computer monitor are natural helpers in the comprehension of texts appearing on the screen.

There are various ways of categorising the texts intended for the assessment of reading literacy: According to their format, their type, or the context of reading. With respect to format, a text may be continuous, non-continuous or mixed. Continuous texts are composed of a coherent sequence of sentences arranged in paragraphs. The processing of the text is assisted by cohesive devices (grammatical devices, pronominal agreement, repetition, anaphoric and cataphoric reference). Non-continuous texts were previously known as documents and were essentially defined by a list of text types belonging to this category. These include tables,

maps, user guides, posters, i.e., every text that is structured differently from "traditional" texts typical of school reading materials and that is crucial for text comprehension skills. Readers must approach these texts in a different way to be able to interpret their typographic features (spacing, character size, font, and typefaces), fragmented sentences or even the absence of sentences. The comprehension of this class of text typically requires constructively responsive reading, i.e., the reader must be actively participating in interpreting the text with the help of his or her prior knowledge, expectations and goals. Non-continuous texts (documents) are represented in a high proportion among the texts constituting everyday challenges compared to their appearance among schoolbook reading materials. A computer screen, a school timetable, the posters in the streets all belong to this category. The written content of mixed texts is composed of a combination of continuous and non-continuous texts.

The diagnostic assessment of applicable reading skills can also look at different text types. In this respect texts are classified according to their rhetorical goals into narration, description, exposition, argumentation and instruction. The storylines of narrative texts allow readers to recall and use the narrative schemas that have developed in their minds through their experiences of stories they heard as young children or read in their reading classes in school.

The first attribute used to classify the texts shown below is therefore text format, i.e., whether they are continuous, non-continuous or mixed. Since the theoretical chapter of this volume places special emphasis on the dependence of text comprehension on the processing and integration of information conveyed by graphics, the pictures accompanying the texts have different roles. For some texts, the text and the picture form an integrated unit, where the graphical element substantially facilitates (or at times hinders) the comprehension of the text. In other cases the text does not include any pictorial elements or else the picture is a simple illustration not expected to influence the comprehension of the text. The role of graphics may be related to the format of the text. Graphics carrying significant information typically go with non-continuous texts while their role is reduced in continuous texts. The relationship can also be approached from the opposite direction: the non-continuity of non-continuous texts often follows from the fact that pictorial elements play an important role in carrying the information content of the text.

The third attribute used for the classification of texts is reading situation, which is defined in the PISA surveys according to the purpose for which the texts to be comprehended are intended. The PISA framework distinguishes personal, public, educational and occupational reading situations. Applying the PISA typology to reading comprehension tasks for students in Grades 1–6, texts intended for personal and public situations are included in our framework. Educational texts are discussed later, in the section on the disciplinary dimension of the assessment framework while occupational texts have no relevance for this age group. We should note that the distinction between personal and public reading situations goes back to the IEA reading assessments, where individual and social effects of reading were used in the definition of reading competency.

The texts to which the assessment questions can refer are classified according to the three attributes discussed above. For each text, several questions can be constructed, varying in difficulty and representing different levels of text comprehension. As discussed in the theoretical chapter, there are different levels of text comprehension (we shall call these operations for simplicity). At the simplest level of text comprehension, answering the question involves no more than the simple retrieval of information from the text. Questions requiring the reader to make inferences and those that even involve the use of prior knowledge for successful inference represent a higher level. The third level of reading comprehension involves, in PISA terminology, reflection on the text.

Our sample test items use different types of texts and comprehension questions related to them. There are both closed and open-ended questions, and in some cases possible solutions are shown and scoring issues are discussed.

The choice of text and the development of test items are further assisted by Table 5.2, which was constructed based on research by *József Nagy* and the regulations of the Act on the accreditation of Hungarian schoolbooks.

Table 5.2 Choice of texts for different school grades

Factors	Grades 1–2	Grades 3–4	Grades 5–6
Text difficulty	Texts **relatively easy** to read: about one in twenty words can be difficult for the reader	**Challenging** but readable texts: about one in ten words can be difficult for the reader	**Difficult texts:** more than one in ten words can be difficult for the reader
Word frequency	The 5000 most frequent words		Any appropriate for this age group
Percentage of sentences longer than 150 characters*	5	10	20
Recommended text format	Continuous Mixed	Continuous Mixed Non-continuous (simple tables)	Continuous Mixed Non-continuous (charts, maps tables)

Including spaces.

The Assessment of the Applicational Dimension of Reading in Grades 1–2

The period of the first to the second grade of schooling is of crucial importance for the development of the components of reading comprehension skills. The components discussed in the theoretical chapter include both automated processes and conscious strategies. Recent, mostly overseas, studies emphasise that the development of the automated aspects of reading is not followed but accompanied by or, in several cases even preceded by, the emergence of reading strategies. This explains why the six components of reading comprehension listed in the theoretical chapter (letter identification, word recognition, sentence parsing, topic identification, mental model construction, awareness of text genre and author's intentions) are not ordered by age or level of development but appear as interconnected, mutually supportive components. Even so, the first of the six components, letter identification and phonological decoding, can be considered to constitute the foundations for the development of the others.

For second grade students, knowledge of this component is measured by their performance in reading letters, syllables and words. With respect to everyday applications, this component of reading comprehension ensures that by the end of Grade 2 relatively long and completely unfamiliar words can be decoded using letter reading and multiple fixations.

Questions related to the structure of the text can be asked as early as in Grades 1–2: Students are aware of the significance of titles and of the role of punctuation in marking dialogues. Research evidence suggests that second grade students show similar knowledge to sixth graders with respect to the relationship between comprehension and the following strategic properties: The relationship between the length of the text and the difficulty of recall, the facilitating effect of prior knowledge and interest in the topic of the text. Students in Grade 2, however, fall behind in knowledge of several other strategies, such as understanding the role of the first sentences of paragraphs (the thesis).

Text A1 is a continuous narrative text intended for personal use and containing a pictorial component. The picture in this case carries important information. Whether the pictorial information needs to be integrated with the verbal information in order to complete the task depends on the nature of the question. A graphical element is often present to complement a continuous text. The example that follows shows different questions determining whether the pictorial information needs to be integrated with the verbal information or whether the picture can simply remain an illustration or something to attract attention. *Item 1* measures information retrieval. *Item 2a* assesses inference with integrated pictorial information, and *Item 2b* requires more complex reading processes and interpretation.

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Text A1

The Two Fairies

Once upon a time there were two fairies. Lilly, the oldest, was a sensible and wise fairy while her little sister, Annie had an adventurous nature. Lilly often warned her, "Don't wander off after dark. There are all sorts of dangers in the woods. A fox may be sneaking under the bushes or an owl may be hiding in the tree tops."

One day, however, Annie ignored her sister's advice and slipped out into the woods at night. She had never felt so happy before. She jumped about in the silky grass and enjoyed the darkness since it prevented everyone from seeing her.

She suddenly looked up at the sky and she became rooted to the spot. High above her head there appeared a round, shiny thing giving out light. She was terrified. She ran all the way home as fast as her legs would take her. She then told her sister what she had seen.

"You silly girl," laughed Lilly. "What you saw was just the full moon in the sky!"

1. Why shouldn't the little fairy wander off after dark?
   a) Because she may get lost in the deep woods.
   b) Because there are a lot of dangers in the woods.
   c) Because she may get caught in a trap.
2. Are the following statements true or false?
   a) Lilly has blond hair.
   b) Foxes are dangerous to fairies.

Text 2 is a continuous text intended to be read in a public situation. The first two questions assess simple information retrieval. The answers to questions 3 and 4, however, cannot be found directly in the text. These questions require a higher level of processing and text interpretation.

Text A2

Build a model of the oldest bridge in Budapest out of pasta and beads
31.10 – 30.04.2010

The Hungarian Museum of Technology and Transport is holding a family activity event. Participants can make a copy of the Chain Bridge using pasta and beads, answer questions about the history of the bridge and even colour in pictures depicting the lions on the bridge and a section of the Buda landscape.

Those answering the questions correctly receive a memory game as a present.

The event is held between 11 a.m. and 1 p.m. every Sunday.

Source: Adapted from http://www.mininews.hu/news.php?id=3186

1. What can participants build?
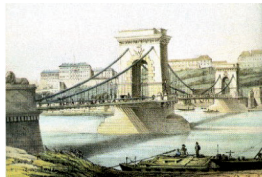
2. What can participants use for building?

3. What exhibits can you see in this museum?

statues   animals   vehicles

4. What's the aim of the text?
   It invites people to an event about the history of Chain Bridge.
   It invites people to a crafts event.
   It invites people to an exhibition on transport.

Students' reading skills can also be assessed through mixed texts even in this age group. The poster advertising a musical play shown in *Text A3*

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is an example of mixed text. In order to complete the tasks, students must understand both continuous and non-continuous sections of the text. Question 1 measures information retrieval, Question 2 measures interpretation and Question 3 requires reflection and evaluation using students' background knowledge and experiences.

Sunday 12th June, 2005, At 10 a.m.

Levente Juhász – Tibor Sipos

THE DONKEY

MUSICAL PLAY IN TWO PARTS
based on the story by the Brothers Grimm,
performed by the Jókai Theatre Company

CAST

Charlie, the young king ....Attila Ács
Queen, his mother ....Judit Vári
Philip X..Imre Szilágyi
Holly, Philip's daughter...................Kata Lengyel
Lute artist ....Kornél Fekete
Gatekeeper ....Ferenc Márton
Servant...László Kartár

Directed by **János Kelemen**

Stage Design:	Costume:	Choreoraphy:
Ágnes Joób	**Éva Erdős**	**Jenő Hajzner**

Jókai Theatre of Bekes County
1 Andrássy Road, 5600 Békéscsaba.

Ticket office opening hours:

Weekdays: 9 a.m. to 7 p.m.
Weekends: 10 a.m. to 6 p.m.

Summary of the musical play

Once upon a time there were a king and a queen, who had no children for a long time. Finally, Charlie was born, who, to the sorrow of his mother, came into the world as a donkey. His mother wanted to destroy him but the king would not let her. The little donkey lived the carefree life of a child and even learnt to play the lute. One day, however, he saw his reflection in a well and he went out into the wide world. The king of Nowhereland, Philip X, took a liking to the donkey's music and invited him to stay in his palace. The young donkey wore his donkey's skin only during the day and turned into a man for the night leaving the donkey's skin on his bed. Charlie fell in love with the king's daughter but he also felt more and more homesick. To persuade him to stay, the king gave him his daugher in marriage. One day Philip discovered Charlie's secret and burnt the donkey's skin. The Donkey thus became a handsome youth and was even given half of the kingdom.

Text A3
1. Which character does Ferenc Márton play?
2. How many intermissions are there?
3. Which saying best expresses the message of the story?
   They that sow the wind, shall reap the whirlwind.
   All's well that ends well.
   Curiosity killed the cat.

The Assessment of the Applicational Dimension of Reading in Grades 3–4

The higher level of reading competency reached by Grades 3–4 allows an increasing number of students to allocate a greater share of the finite amount of cognitive resources available for reading processes to conscious strategic decisions and enjoyable, meaningful reading. From among the higher-level components of text comprehension, the accessibility of text-anticipating strategies creates the foundations of the comprehension of everyday texts. Questions such as "Why should I read it?" and "What would I like to learn from the text?" help students to choose the right strategies. At the same time, comprehension processes related to information retrieval and inference remain crucial and continue to develop.

It has been repeatedly observed that students who, so to speak, dislike reading tend to excel at using strategies during the reading process when they are intent on understanding texts that are important for them and relevant to their purposes (such as web pages or colourful children's magazines). *Text A4* is a continuous text for personal use. The first question and *Items 2a* and *2b* involve information retrieval while *2c* requires interpretation and simple inference.

Text A4

The Rosehip

The dog rose flowers from May until July. Its valuable fruit, the rosehip, develops after the flowering period. Rosehips are used to make several herbal products (tea, syrup and jam). It is recommended for the prevention and treatment of chills and colds.

Rosehip tea: Pick a lot of fresh fruit and let the hips dry slightly. After few days the hips are ready to be cooked to make a tasty, vitamin-rich drink. Pour some boiling water over the rosehips and let them soak overnight. The next day the filtered tea is ready to be consumed. You can add some honey and lemon juice for flavour.

Source: http://www.dunaujvaros.com/vitalis

1. What do you need to make rosehip tea? Draw a circle around the letter of the correct answer. Cross out the letter of the wrong answers.

a)   b)   c)   d)

2. Write the letter T in front of the true statements and the letter F in front of the false ones.
   a) .... The dog rose flowers in spring and in summer.
   b) .... The tea can be drunk straight after soaking.
   c) .... Products made from rosehips are healthy.

Texts where the strategy of reading from the top left to the bottom right is impractical come in several different topics and arrangements. *Text A5* is a non-continuous text for a public reading situation. The following sentence completion task (*Task 1*) requires information retrieval, *Item 2a* assesses interpretation and *Item 2b* tests reflection. Reflecting on the text involves the comparison of the reading content with personal experiences and the critical evaluation of the text. The two processes are not independent of each other as can be seen in *Item 2b*, for instance. Students are expected to evaluate the text based on their everyday experiences. There are no right or wrong answers to this question. If a student is able to describe and justify his or her opinion, the answer should be accepted.

Text A5

SCHOOL LIBRARY OPENING HOURS

	WEEK A	WEEK B
MONDAY	1.00–2.30 PM	1.00–2.30 PM
WEDNESDAY	12.00–2.30 PM	12.00–2.30 PM
FRIDAY	12.00–1.00 PM	1.00–2.00 PM

Library Services
Individual and group use of library items within the library premises
Classes and group project meetings held in the library
Information, compiling of bibliographies
Lending service and advance booking

Borrowing
Registration and borrowing are recorded by a computer system.
Registration and the use of services are free.

Number of items that can be borrowed
Grades 1–2, 1 item
Grades 3–4, 2 items
Grades 5–8, 3 items
(in addition to long-term schoolbooks)

Source: http://www.veresfabalap.hu/content/konyvtar

1 Complete the sentences
On Wednesdays the library opens at .... o'clock. On the Friday of Week B, it closes at .... o'clock. Registration is .... A second grade student can borrow .... book(s) at a time. Information is one of the library's ....

2 Answer the questions.
a) Who is the text intended for?
b) Can you find all the important information about the library's services in the text? Justify your answer.

Examples for non-continuous texts read in a public context include user guides and the rules of games. The rules of a game appropriate for the target age group are given in *Text A6* below. *Task 1* can be completed at the level of information retrieval while *Task 2* involves reflecting on the text.

Text A6

Dominoes

Rules: Every player draws seven domino tiles at random from the set (if there are tiles left in the set, they make up the stock). The first player places a domino on the table with the spots up. Then the players take turns placing one domino at a time at any end of the line of tiles but the adjacent halves of touching tiles must have the same number of spots on them.

If a player does not have a tile that could be added to the line, he or she must draw a tile from the stock.

The winner is the player who plays his or her last tile before any of the other players. The winner scores points equal to the sum of the remaining points of his or her opponents (the sum of the points of the dominoes remaining in their hands).

Educational recommendation: Excellent for fostering logical skills even in very young children.

Type: Board game

Players: 2–3

Ages: Any

Playing time: Any

Equipment: Domino set (a set of dominoes with 0 to 8 spots has 45 tiles, a set with 0 to 9 spots has 55 tiles)

Source: http://jatek.gyujtemeny.com/jatek-tipus/gondolkodtato.php

1. Underline the correct answer in the text.
   a) How many tiles are there in a set of dominoes with 0 to 8 spots?
   b) Who is the winner?
   c) Who can play dominoes?
   d) How many tiles does each player draw in the first round?

2. Do you find the game useful based on the description? Justify your answer.

The following call for participation in *Text A7* is intended for public use and the picture has a purely illustrative function. Once again, a range of tasks can be given to assess the various levels of comprehension. The example shown here is a question making use of the public reading situation and assessing students' ability to reflect on the text.

Text A7

Call for Children

Would you like to contribute to the preservation of our Earth? Do you like making things, drawing or painting? This is your chance to express your opinion. Join our lantern action and "Vote for the Earth."

Make a lantern to show the world how much you care about the protection of our Earth. This year, decision makers from all over the world are coming together to meet in Copenhagen for talks on problems related to climate change. Help them to make decisions and show them how much you care about the planet where we live. Your lantern will be your message to them, which we shall deliver to Copenhagen.

The maker of the most creative lantern will receive a book prize.

Source: http://wwf.hu/archivum/2009ev/4/felhivas-gyerekeknek

To whom would you pass on the text of this call? Justify your answer.

For some of the texts, the graphical elements are not simply important but downright crucial for understanding the message of the text. This category includes caricatures, jokes or comic strips with speech bubbles (*Text A8*) for instance. The tasks accompanying the text assess interpretation (*Item 1*), information retrieval (*Item 2*) and interpretation (*Items 3* and *4*).

Text A8

Polite service

I'm terribly sorry but we can't send you the
pizza as an e-mail attachment.

1. To whom is the man in the picture talking?
   A friend.
   A relative.
   A colleague.
   A customer.

2. Write the letter T in front of the true statements and the letter F in front of
   the false statements.
   a) .... The cook is asking for the caller's e-mail address.
   b) .... The cook is apologising to the caller.
   c) .... The caller would like to receive the pizza by e-mail.

3. How can we tell that the man in the picture is a cook?

4. Is the cook being polite with the caller? Justify your answer.

The Assessment of the Applicational Dimension of Reading in Grades 5–6

In Grades 5–6, among the interrelated and interdependent processes of reading comprehension the knowledge components related to inferential processes undergo intensive development. This developmental period is highly sensitive to inductive and deductive reasoning and to combinatorial and organisational skills, for instance. The inferential processes building upon the level of information retrieval can now make active use of story schemas (through inductive reasoning) while the comprehension of non-continuous texts crucially involves deductive reasoning and there is evidence for increasingly sophisticated reading strategies in the processing of any type of text. Reflective statements related to the purpose or genre of a text also show an increasingly rich vocabulary at higher levels of text comprehension.

Relative to lower school grades, the changes in the framework for Grades 5–6 can be summarised as follows:
  – The texts are chosen to suit the interests of young teenagers;
  – The texts to which the test items of diagnostic assessment refer increase in length;
  – Although simple information retrieval questions continue to be included, there is an increased proportion of questions targeting inferences and reflective comprehension.

In addition to information retrieval (*Item 1*) and interpretation (*Item 2*) questions, the comprehension of the continuous text for personal use shown in *Text A9* is also assessed through a question measuring reflective text comprehension (*Item 3*).

Text A9

Magda Szabó: Masquerade
Chapter One

Kirsty is going to a fancy-dress party. Everything is shrouded in secrecy. Grandma is behaving strangely but that is understandable since she is getting married next week.

Grandma was busy sewing.

She sometimes held the gipsy skirt away from her eyes and sometimes held it to Kirsty's waist for a moment, gathering the enormous cashmere shawl, which under normal circumstances covered the piano. Kirsty was loitering about watching her forever-working bony hands. Grandma did not have feminine hands with small, delicate fingers but broad hands, worn from work. She was going to have a beautiful costume even though it was only made at home. Well, she was lucky of course, Grandma used to be a seamstress when she was young. "We must not rent the costume from a fancy dress shop", the teacher said. Anne, though, got a wonderful dress from one – that was just like Anne. She always carried around not one but two mirrors.

It was four o'clock. It would start at five. Becky was going to be a chimney sweep, Bobbie an elephant and Robin a bird, with a beak and wings. Robin bird. She did not tell anyone what she was going to be. Nobody at all. It was a secret.

Last year it was unthinkable that she should go to a party. Not that Grandma would not let her – it was she who did not want to go. But this year was a whole new year. Nowadays the sun did not seem to set in the evening, everything was bright even at night, and one just kept listening and listening for the sound of the approaching steps of that wonderful, that marvellous thing that one was hoping for.

What a year!

She could have dressed up as a photo-journalist with a camera across her shoulder, wearing boys' clothes – but she would have been recognised straight away because she was the only one in the class with a photographer father. "You could be a soldier," Bobbie had said with twinkling eyes. Bobbie was not angry with her any more. A soldier! Oh, that class with the peace meeting!

No, not a photographer, nor a soldier, nor anything that was connected to her person. The best thing about a fancy dress party was that you could shed your skin and become somebody different, completely different from your real self. She turned on her heels and waved her arms. It would be good to dance, wonderfully good, even with boys, if they were brave enough to ask her, although it was not the best with them. When you were dancing with a boy, you needed to be careful about everything, your hair, your feet, your laugh, everything, while when you were just turning about with a girl from the class it didn't not matter if you took the wrong step or kicked someone in the ankle, it was not such a big deal, and you did not even have to be so beautiful at all costs. Dancing was of

course not the best thing in a fancy dress party. The best thing was that for a few hours you could imagine you were different, as if you had been magically turned into someone alien and a stranger all of a sudden...

http://dia.pool.pim.hu/xhtml/szabo_magda/Szabo_Magda-Alarcosbal.xhtml

1. What is Bobbie going to be at the masquerade?
2. Are the following statements true or false?
   Anne is a very vain girl.
   The text reveals Kirsty's internal thoughts about the fancy dress party.
3. Why are the first three lines of the text in italic typeface?

Text A10 is another continuous narrative text for personal reading, the comprehension of which is assessed by three tasks testing the three reading operations (*Item 1*: information retrieval, *Item 2*: interpretation, *Item 3*: reflection).

Text A10

No other astronomical event has as strong a psychological effect on people as does a total or almost total solar eclipse. In this respect not even comets can compete with it. The waning or disappearance of the Sun, in people's minds the source and sustainer of life, and daytime darkness gave rise to unconquerable dread and panic in the days when neither the time nor the cause or nature of this phenomenon was known to observers. The one-time inhabitants of the Far East pictured a giant dragon in the sky that devoured the Sun. The natives of the New World believed that mice were nibbling on waning celestial bodies. People in every part of the world would make a racket and play loud music to try to drive away the imaginary evil creatures or spirits threatening the important celestial bodies. Even the Romans reacted to eclipses by making a lot of noise. Christians tolled their bells to exorcise the evil spirits. The peoples of Medieval Europe were worried about poisons coming from the skies and covered their wells and hid in their cellars. This reaction still occurred occasionally in the past century. The causes of solar eclipses and the fact that eclipses did not have any consequences were only known to the priests of Mesopotamia who practised science, and in Europe to the Ancient Greeks. The public's fear, however, did not abate for a long time.

www.termeszetvilaga.hu/tv99
www.otrolahatra.virtus.hu

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1. Is the following statement true?
   The Ancient Greeks knew the causes of solar eclipses.
2. Did it make sense to shout, play loud music and toll the bells at the time of a solar eclipse? Justify your answer.
3. Which would be the best title for the text?
   Medieval Beliefs
   Darkness and Light
   Solar Eclipses and History

The next example (*Text A11*) represents a text type that has been used in international system-wide surveys for more than two decades. It is a non-continuous text used in a public context, with questions assessing the various levels of comprehension. It is worth analysing the skills assessed by these tasks to see to what extent they measure mathematical knowledge, text comprehension and prior knowledge. Since the information must be retrieved from a written text, the test items certainly measure text comprehension. The assessment of the applicational dimension, however, necessarily involves tasks where students' prior knowledge, everyday experiences and knowledge and skills related to other school subjects also contribute to the finding of the solution.

Question 1 measures information retrieval, while *Question 2* can only be answered with the help of linguistic and logical inferences and elements of organisational and combinatory skills. *Question 3* combines items requiring inferences with items testing reflection. *Task 4* measures students' ability to reflect on the text, and therefore in grading the response, the justification should receive special attention.

Text A11

Boat schedule   Prices are valid from 1st July, 2009.

Km-range	One-way			Return		
	Full price ticket	Half-price ticket	Student ticket	Full price ticket	Half-price ticket	Student ticket
1-10	1 040	520	780	1 880	940	1 410
11-20	1 360	680	1 020	2 600	1 300	1 950
21-70	1 560	780	1 170	2 800	1 400	2 100

Approximate distances (km)	Bada-csony	Balaton-akali	Balaton-almádi	Balaton-boglár	Balaton-földvár	Balaton-füred	Balaton-györök	Balaton-kenese
Badacsony	–							
Balatonakali	21	–						
Balatonalmádi	50	31	–					
Balatonboglár	13	13	45	–				
Balatonföldvár	30	11	23	22	–			
Balatonfüred	41	20	14	32	11	–		
Balatongyörök	12	36	63	22	43	51	–	
Balatonkenese	55	35	7	46	27	19	68	–

Source: http://www.veledutaztam.hu/hajo/balatoni_menetrend

1. How much is …?
   a) a full-price ticket for 11 km?
   b) a half-price return ticket for 1–10 km?
   c) a one-way student ticket for 70 km?
   d) a full-price return ticket for 21–70 km?

2. Where can you travel with a student ticket worth 1020 Ft?
   a) Balatongyörök – Badacsony
   b) Balatonkenese – Balatonfüred
   c) Balatonalmádi – Balatonboglár
   d) Balatonföldvár – Balatonakali

3. Write the letter T in front of the true statement and the letter F in front of the false statement.
   a) ...... A return ticket is cheaper than a one-way ticket there and a one-way ticket back.
   b) ...... The price of the ticket only depends on the travel distance.

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4. Answer the questions:
  a) Does the text tell us everything we need to know to buy a ticket? Justify your answer.
  b) Why are the data organised in two separate tables?
  c) What do you think about the connection between the title and the content of the text? Justify your answer.

With respect to the comprehension of messages conveyed by graphics and texts, by the end of the sixth grade students are expected to approach the level of performance described in the PISA framework. The PISA definition of reading literacy includes a component stating that through the comprehension of written texts students should be able to participate efficiently in society and to develop their knowledge and potential. Both criteria require the comprehension of the integrated system of graphical and textual sources since students must be able to interpret pictograms and various graphical elements accompanying texts or appearing on their own in everyday situations and to be familiar with a wide range of information sources used for independent studying and information collection.

The publicly available test items used in Hungarian and international system-wide surveys can serve as examples for the sorts of reading comprehension tasks incorporating graphical elements that can be used in assessments of practical application skills. Keeping the requirement of practical application in mind can help us realise that in contrast to the "usual" classroom reading comprehension tasks, tasks combining texts with graphical elements may presuppose knowledge of some elements of other school subjects. Unlike the "Answer the question based on the text only" type questions, these tasks specifically encourage rather than prohibit the active use of knowledge and cognitive skills previously acquired.

A frequent criticism of tasks of this type is that they assess chart reading or data table analysis rather than text comprehension. Some text comprehension tasks may, however, involve elements of knowledge related to mathematical or scientific literacy just as written tasks of mathematics or science unavoidably involve the processing and use of texts. The experiences of international surveys have made clear that there is a close and two-way relationship between reading performance and performance in other areas of knowledge.

Text A12 is non-continuous, provides information and is used in a public context, with tasks assessing interpretation.

Text A12

1. Entrance	27. Wild boar
2. Ticket office/cafe	28. Aquatic birds
3. Management	29. Raccoon
4. Washrooms	30. Lynx
5. Playground	31. Bear and wolf
6. Exhibition area	32. Hyenas
7. ZOO-corner	33. Lion
8. Terrarium	34. Boa house
9. Squirrel monkeys	35. Monkeys
10-13. Aviaries	36. Garpike
14. African aviary	37. Mini-golf
15. Ring-tailed lemur	38. Bird preservation area
16. Japanese macaque	39. Picnic area
17. Ring-tailed coati	40. Burrowing parrots
18. Red-necked wallaby	41. Sustainability track
19. Emu	42. Jungle cat
20. Mangalitsa	43. New world monkeys
21. Isolation area	44. Gibbons
22. Horse	45. Finches
23. Petting zoo	46. Meerkats
24. Llama	47. Forestry track
25. Aviaries	48. Otter
26. Red deer	

http://www.jaszberenyzoo.hu/?q=category/rovatok/
tervezze-meg-l%C3%A1togat%C3%A1s%C3%A1t

1. Underline the name of the animal that has the larger enclosure in the zoo:

lynx − hyena

ring-tailed lemur − ring-tailed coati

2. What's the purpose of the map?

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It would be fully justified to include *Text A13* in the diagnostic assessment of statistical knowledge in the framework for mathematics in Grades 5–6. Trying to define how the format and the wording of the questions would differ in a test in mathematics, we find the following differences:

- *Items 1a* and *1b* are trivial in a mathematical sense; the solution is equivalent to understanding the text. For the same reason, the items are important in a text comprehension test.
- *Item 1c* involves the reading of a minimum value in a mathematical sense, which would be a simple warm-up question in a mathematics test.
- *Item 1d* would be appropriate in a test measuring correlational reasoning skills.
- The wording of *Item 1e* is unusual for mathematics, which signals that mathematical knowledge or simple information retrieval are not being tested here but rather the reflective level of text comprehension.
- *Tasks 2* and *3* could be included in a mathematics test in with virtually no change.
- *Task 4* also typically assesses the reflective level of text comprehension and although it is unlikely to occur in a mathematics test in this form, students may well work on tasks of this sort – possibly in a mathematics class – in connection with the instruction of mathematics as a key competency.

Text A13

Percentage of Internet users by education (%)
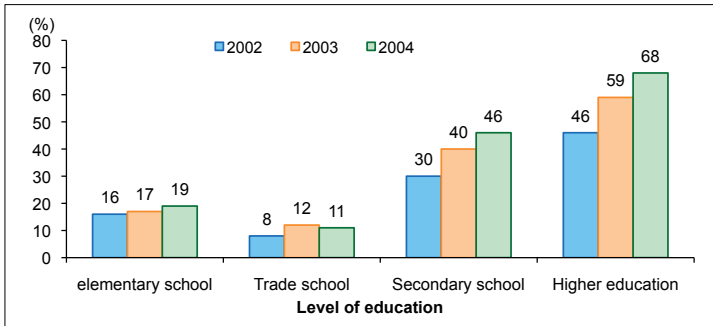
1. Answer the questions.
   a) How many years are covered by the data in the chart?
   b) How many groups' Internet use is shown in the chart?
   c) Which group is the least likely to use the Internet?
   d) Does the chart show a relationship between Internet use and education? Justify your answer.
   e) Does the chart show the data for people attending primary school? Justify your answer.

2. Draw a circle around the letters of any true statements and cross out the letters of any false statements.
   a) The chart shows data for three consecutive years.
   b) The percentage of Internet users grew every year in every group.
   c) In 2003 more than half of people with higher education used the Internet.
   d) Between 2002–2004, the greatest increase was observed among people with secondary education.
   e) People with primary education or lower are the least likely to use the Internet.

3. There are two columns of equal height in the chart. Complete the table with their precise details.

Year	Group	%
a)	b)	e)
c)	d)	

   f) Describe what you have learnt from these two data rows.

4. In what way did the designer of the diagram help readers to understand the information in the chart?

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Text A14 is a mixed text. *Task 1* involves information retrieval while *Task 2* assesses text evaluation.

Text A14

Doughnuts

Ingredients:

For the dough: 350 g flour, 200 g sugar, 15 ml plain yoghurt or milk, 2 large eggs, 60 g soft margarine, 1 teaspoon vanilla flavouring, 2 teaspoons baking powder, 1 teaspoon salt. For frying: oil. For the vanilla icing: 150 g icing sugar, 2 tablespoons milk, 1 teaspoon vanilla flavouring. For the chocolate icing: 150 g icing sugar, 3 tablespoons milk, 1 heaped tablespoon cocoa powder.

Preparation:

1. Blend half of the flour with the remaining dough ingredients. Mix into a smooth paste with an electric mixer and then mix in the other half of the flour. Cover the dough and leave to stand in the refrigerator for a few hours. 2. Roll out the dough on a floured surface to about two cm thickness and cut out pieces of about 7.5 cm in diameter with a round biscuit cutter. Make a hole in the middle of every circle with a 2.5 cm biscuit cutter. 3. Fry the doughnuts in medium hot oil for 5-6 minutes turning them over halfway through. 4. Remove the doughnuts with a slotted spoon and drain them on some kitchen paper. 5. The doughnuts may be coated in icing. To do this, mix the ingredients and spread the icing over the doughnuts.

http://www.recept1x1.hu/component/k2/item/990-amerikai-f%C3%A1nk

1. Write the letter of the ingredients in the right place.
 a) cocoa powder   b) milk   c) margarine   d) icing sugar   e) baking powder
   For the dough only: ...
   For the chocolate icing only: ...
   For the vanilla icing only: ...
   For the dough, the chocolate icing and the vanilla icing: ...

2. Would you recommend this cake to someone on a diet? Justify your answer.

Text A15 also carries content often used in everyday life. It is a user guide and its format in non-continuous. An important component of the comprehension of this document is the parallel interpretation of the pictorial and verbal information. *Item 2e* assesses interpretation while the remaining items measure information retrieval.

Text A15

How to use hair dryer

I. Main parts

1 Removable nozzle

2 Hook

3 Removable grid

4 Cool button

5 Heat switch

   – to control temperature

6 On/off switch

   – to turn appliance on/off

   – to control high/medium air flow
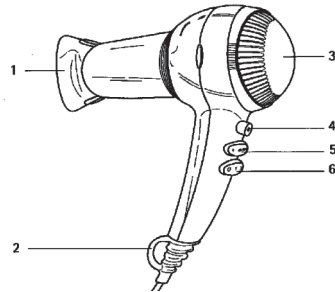
II. Drying instructions

The hair dryer has two switches. Lower switch (6)

0 = OFF   1 = medium air flow   2 = high air flow

Upper switch (5)

= low temperature   ## ## = medium temperature

= high temperature

Removable nozzle (1) The nozzle can be attached to the hair dryer in any position. It can be turned to any angle allowing the air flow to be directed at any lock of hair. **Hook** (2) The hook allows the hair dryer to be stored in an economical and easily accessible way. **Cool button** (4) If you use this button while drying your hair, the hairstyle will be better and will last longer as the air blown on the hair is cooled. **Removable grid** (3) To allow cleaning, the grid can be easily removed from the appliance by turning it to the left. The lint screen can be removed from the grid and cleaned with a small brush.

Do not replace the lint screen in the hair dryer while damp.

Regular cleaning of the grid and the lint screen prolongs the lifetime of the appliance.

Source: http://www.hasznalatiutmutato.hu

1. In which part of the user guide can we find the following information? Write the letters in the appropriate cell of the table.

   a. Long-lasting styling

   b. The picture of the appliance

   c. Safety advice

   d. Legend

   e. Prolonging lifetime

Part 1	Part 2

2. Draw a circle around the letters of any correct statements and cross out the letters of any incorrect statements.
   a) The hair dryer can be operated at two temperature levels.
   b) There is a separate button to control air flow.
   c) The adjustable nozzle helps to style hair.
   d) The grid cannot be removed.
   e) The lint screen must be dried after cleaning.

The Diagnostic Assessment of the Disciplinary Dimension of Reading

The theoretical chapter on the disciplinary dimension of reading discussed several issues. Three of these are especially important for the present section and will be used as the starting points for the development of this part of the framework. The cultivation of the knowledge components of this area is mostly the responsibility of Hungarian language and literature education and within that, especially of the school subject of Grammar. The disciplinary dimension of reading involves metalinguistic knowledge of language and reading on the one hand, and text processing skills associated with school learning on the other. The various components of reading have mainly been discussed in connection with the psychological foundations of literacy. This section starts with an important skill needed for the comprehension of texts: sentence comprehension. This is followed by the issue of reading textbook texts, which requires the integration of different levels of reading comprehension processes. The third main area covered in this section is the assessment of reading strategies, which develop and can be fostered in parallel with the development of the other components of reading competency.

The Assessment of the Disciplinary Dimension of Reading in Grades 1–2

A considerable share of the reading framework for Grades 1–2 was discussed in connection with the psychological foundations of reading skills. With respect to curricular goals, from among these components explicit knowledge of letters, sounds, syllables and words also pertain to

the disciplinary dimension. Most of the metalinguistic knowledge taught at school is related to processes taking place at sentence level, which is why sentence comprehension occupies a central place.

Sentence Comprehension
The comprehension of sentences in written texts relies on the psychological processes previously discussed. In what follows, we look at the metalinguistic aspects of sentence comprehension.
    Sentence-level knowledge pertinent to reading comprehension:
- Initial letters;
- Labelling of linguistic units;
- Use of punctuation marks.

    The sentence-level knowledge components of written text processing are discussed here. First- and second-grade students need to acquire the basics of this knowledge. These include the arrangement and function of texts, sentences and smaller linguistic units, such as the title, paragraphs and punctuation marks, and the rules governing the use of these units. Children's familiarity with these devices varies greatly at the time of starting school. The target of instruction is confident recognition and use. Instruction and assessment progress gradually from smaller to larger units and more complex communicative functions. The tasks below can be used to assess the identification of sentence initial letters (*Task D1*) and linguistic units (*Task D2*) and the recognition of punctuation marks (*Task D3*).

    Task D1
Complete the sentence.
    Sentences always start with a .... letter.

Task D2
Complete the sentences with the correct letter labels.

A) words   B) sentences   C) letters   D) punctuation marks

Words are composed of ....

Sentences are composed of ....

Paragraphs are composed of ....

Task D3
Draw a circle around the punctuation marks that can make the sentence true and cross out the ones that cannot.

A sentence's final punctuation mark may be ....

.   ,   ?   ;   !

Sentence comprehension in expressive oral reading

Besides silent reading, oral reading also plays an important role in sentence comprehension. There are contradictory research results on the relationship between the practice times dedicated to silent versus oral reading and reading comprehension performance. For individuals with learning difficulties, the amount of oral reading is the better predictor of reading performance while for more advanced students, the time spent in silent reading is more informative. Oral reading always plays an important role in the development of sentence comprehension and interpretation and in the emergence of accurate and precise reading with appropriate articulation and intonation. Oral reading is also the simplest method of assessing a student's progress. Students can be given some preparation time before oral reading or can be asked to read a text aloud without preparation (*Task D4*).

The test sentences should be chosen keeping various factors in mind such as vocabulary size, sentence length, complexity and modality, all of which should be suited to the student's age and background knowledge. The assessment of oral reading covers reading rate, articulation, fluency and the number and type of self-corrected and uncorrected errors.

Task D4

THE TIT

Tits build their nests in the spring, mostly in tree hollows. They pad the nest with moss, fur and down.

Two weeks after laying the eggs, ten to fourteen hungry young birds shuffle in the nest. The parents feed caterpillars to them.

During the winter, tits eat all kinds of seeds and they are also frequent visitors to bird feeders. They stay for the winter, and do not migrate to warmer lands.

Source: Milena Lukesová and Bohumil Riha:
The Great Animal Picture Book.
Prague, 1981.

The comprehension of the passage read out loud can also be reliably tested (*Tasks D5, D6* and *D7*). The questions may be given in writing or orally but students should be informed before they start reading that there will be comprehension questions. In the first grade, especially in the first few months, oral questions are of course more common.

Task D5
Answer the questions.

When does the tit build its nest? ....

What does it use to pad the nest? ....

How many birds hatch from the eggs? ....

Who feeds caterpillars to the young birds? ....

Where do tits get food during the winter? ....

Task D6

THE HOOPOE

The hoopoe spends the winter in the tropics. It lives in sparse forests or in waterside grasslands.

It builds its nest, which gives out a penetrating smell, in a tree hollow. The young birds defend themselves by spraying a foul smelling liquid towards their enemies.

The song of the hoopoe sounds like "oop-oop-oop," hence its English name.

Answer the questions.

Where does the hoopoe live? ....

Where does the hoopoe build its nest? ....

When does it return from its winter location? ....

What kind of liquid do the young spray? ....

Where does the hoopoe spend the winter? ....

Task D7

The reckless fox

One morning the rabbit left his house and saw that the lake was frozen over. He was overjoyed when he saw the thick layer of ice. He immediately rushed to the squirrel's. "Come, let's go ice skating," he shouted.

It didn't take long to talk his friend into the plan. They put on plenty of warm clothes and were soon sliding about on the ice over the lake.

The fox happened to walk that way. He wanted to join the others.

"Be careful," the squirrel warned him." "You're heavier than us. The ice may break under you."

"Don't worry," said the fox heedlessly and stepped on the ice. He moved only a few meters when the thin ice broke under his body and the reckless fox found himself in the cold water.

"Quick, let's get a strong tree branch," shouted the rabbit. They ran as fast as their legs would take them. Standing on the shore, they reached out with a long tree branch and pulled the soaking wet fox out of the lake. They gave him some hot tea and scolded him thoroughly for his recklessness.

When the fox had dried and warmed up, he thanked his two friends for their help and vowed never to do such a silly thing again.

"I'll roller skate from now on," he said between two sneezes. "At least the ground will not collapse under me."

Source: Tappancs (children's magazine) January, 2004

Answer the questions.

What did the rabbit see was frozen? ....

Who did he run to see with joy? ....

Where did the two friends go? ....

Who wanted to play with them? ....

What did the squirrel warn the fox about? ....

What did they use to pull the fox out? ....

What did they give the fox? ....

Why did they scold the fox? ....

In the first and second grades, comprehension may be assessed by asking students to tell the story from the point of view of a character other than the original narrator or in a different time setting (*Task D8*). In the first grade we should rely on sentences as units while in the second grade the passage may play an increasingly greater role.

Task D8
Retell the story imagining that you are …

a) the fox.
b) the rabbit.
c) the squirrel.

Reading Textbook Texts

The Act currently in effect on textbook accreditation pays special attention to first grade reading books. The requirements described in the Act should also be taken into consideration for the diagnostic assessment of reading. Of these requirements, the following are of special significance here: The vocabulary and complexity of sentences should be matched to the students' age and level of development; the frequency of text types should be balanced; the letters should have a consistent shape and the character size should initially be fairly large and then gradually decrease (the actual character sizes and fonts are not specified). A further requirement is that the books used in the first two grades should contain no more than 5% of sentences longer than 150 characters. The frequency of special words in books for Grades 1–4 is limited to 33%, i.e., approximately one in every three sentences.

There is no all-purpose character size and type that suits every individual and every situation and could be regarded as the standard for textbooks. On the other hand, the customisability of the electronic textbooks of the not-too-distant future will eliminate the need to find the best character type.

The extract below is taken from a textbook of environmental studies for second grade students. It displays textbook characteristics intended to facilitate learning from written texts: an eye-catching pictogram and bold typeface.

> **Our environment has a varied surface. Higher elevations are called mountains and lower elevations are hills. Low-lying level surfaces are plains. A landscape is made even more varied by rivers, streams and lakes.**

Written assessments of the comprehension of textbook passages tend to focus on the measurement of simple information recall and retrieval. We can, however, include tasks testing deeper levels of comprehension going beyond information recall and retrieval: the appropriate use of inferential processes. With reference to the above textbook passage, students' ability to infer information can be assessed with *Task D9,* for instance.

Task D9

How many types of surface are mentioned in the text?

By the end of Grade 2, students have developed expectations about school texts based on the observation that the different books of a given series of textbooks tend to have similar structures: The use of bold typeface to emphasise information has a long tradition, for instance.

Reading Strategies

The reading strategy assessment instruments best suited to classroom testing are the ones revealing whether students are familiar with the nature of a given strategy, are able to use that strategy and know the contexts in which the strategy is effective. The most important and most effective strategies worth teaching and testing during the first six grades are listed below in order of appearance. Only a few new strategies are introduced every year, allowing students to develop a deep understanding and to have sufficient practice using them and enabling teachers to assess the effectiveness of their use (see Table 5.3).

*Table 5.3 The teaching and assessment of reading strategies
by grade cluster*

Strategies	Grades		
	1−2	3−4	5−6
1. Create mental images	×	×	×
2. Use a graphic organiser	×	×	×
3. Preview the text	×	×	×
4. Summarise	×	×	×
5. Scan the text		×	×
6. Activate background knowledge		×	×
7. Predict, anticipate		×	×
8. Set a purpose and method of reading		×	×
9. IEPC: Imagine, Elaborate, Predict and Confirm		×	×
10. Monitor comprehension			×
11. Error correction strategies			×
12. Synthesising			×
13. Selective reading			×

Although the literature on reading education does not exclude the introduction of explicit reading strategies for comprehension during the very first year of reading instruction, the teaching of reading strategies tends to be successful from the third grade onwards. The main reason is that it is at that time that the reading of sub-textual linguistic elements (letters, words and sentences) reaches a level allowing the reader to devote sufficient attention to the meaning of the text. Another reason for the age constraint is that the number of routinely processed words and the level of decoding skills and metacognitive abilities required for the acquisition of strategies are achieved at this age for most children. This does not mean, however, that first and second grade students' should not be prepared for the introduction of reading strategies. There are processes, methods and exercises that may be regarded as reading strategies and are suitable for students of this age. These include pre- or post-read-

ing activities that can enhance the effectiveness of comprehension and also increase motivation to a substantial extent.

As there is a consensus in the literature that reading strategies are taught most effectively from Grades 3–4, the introduction of the strategies presupposing firm decoding skills and the ability to process a sufficient number of words without effort are recommended for this period. The instruction of reading comprehension should be continued in Grades 5–6, when the most difficult strategies and those requiring the most prior knowledge and skills can be introduced.

The Creation of Mental Images

The goal of this strategy is to enable students to create mental images of the content of the text using as many of their senses as possible before, during and after reading (*Task D10*). Empirical evidence suggests that this process is especially important for dyslexic children struggling with reading but the use of this strategy has also proved to be successful for average or good readers. The richness of the mental images of the text content in part depends on children's pre-literate experiences of listening to stories.

Characteristics of advanced users of the strategy:
- Images are created with ease and this is a joyful experience.
- All senses are involved in image creation.
- Rich and colourful imagination.
- The images are detailed and the student can describe them accurately.

Task D10

What can you do to help you picture and understand what is written in the text?
Close your eyes. How do you imagine in your mind the ….
a) character?
b) setting?
c) scene?

The Use of Graphic Organisers

Graphic organisers are useful aids allowing the structuring of the meaning of the text, the highlighting of important elements and the development of the concept of an outline, all of which can efficiently enhance text comprehension. Some simple graphic organisers assisting not only comprehension but also the exploration of the organising principles and logic of the text are an outline wheel, a chain of events and a sketch of the setting.

Students should become familiar with several different graphic organisers and should learn the purpose of each. Students need to complete the diagrams with more or less missing information depending on age; at the next stage they should be able to fill in a blank diagram and finally to create a diagram choosing an appropriate graphic organiser for the text themselves (e.g., *Task D11*).

Characteristics of advanced users of the strategy:
• They know and use several graphic organisers.
• They can complete blank graphic organisers based on their reading by themselves.
• Relying on their reading of the text, they can select one of a set of familiar graphic organisers that assists the comprehension of the text.

Task D11

What kind of diagram can help to understand what you are reading?
Complete the diagrams based on the text.

A) Outline wheel:
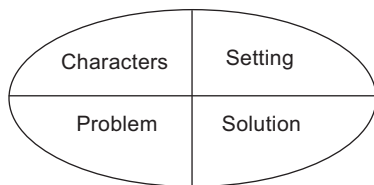
B) Chain of events:

Preview of the Text

Previewing the text involves looking through the text for salient features, the title and pictures (*Task D12*). This process does not involve reading in the traditional sense but the reader can form an initial impression of the cont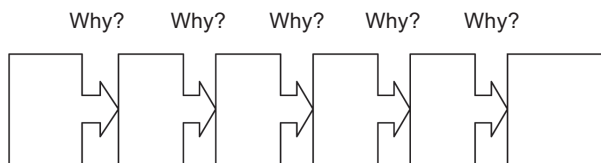ent of the text allowing him or her to predict the possible course of the narrative and the outcome of the passage. In order to raise expectations and prompt further predictions, students may be asked to read a randomly selected, short section of the text comprising just one or two sentences. Previewing a passage is an efficient method of assisting higher-level reading comprehension. The aim is to capture the gist of the passage.

Characteristics of advanced users of the strategy:
• They familiarise themselves with the text before reading.
• They look at the title.
• They look at the pictures.
• They observe the length and sectioning of the text.

Task D12

Look at the text. What can you say about it, what have you observed?

Summarising

Summarising, the best known and most widely used reading strategy, involves the integration and condensation of the ideas expressed in the text and the extraction of its essence. An important goal of summarisation is to enable the reader to evaluate and form an opinion of the text, of the reading process, its success and efficiency and of the reader's own interpretation, and to justify this opinion on the basis of the text (*Task D13*). Summarising includes the drawing of conclusions and the identification of the most important ideas and message of literary texts. As students get older, they are also expected to learn to identify implicit meaning not directly expressed in the text.

Characteristics of advanced users of the strategy:
• After reading the text, they attempt to identify and organise the most important ideas and message of the text.

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- They can compare and rank the pieces of information expressed by the text.
- They can infer the level of comprehension and the quality of the text. Older children at a more advanced level:
  - They can describe and evaluate the characteristics and quality of the text.
  - They can form an opinion about how the author achieved his or her purposes.

Task D13
Summarise the text.
What are the most important things you have learnt?
Was the text easy or difficult to read? Why?
Complete the table below.

Summary		
I knew this before reading:	I've learnt these things:	I would like to find out these things:
The most important thing I've learnt:		
The most interesting thing I've learnt:		
I didn't understand this:		
I discovered its meaning this way:		

The Assessment of the Disciplinary Dimension of Reading in Grades 3–4

The instruction standards specified in the Hungarian National Core Curriculum define targets for Grades 1–4. The Hungarian traditions of reading instruction and the psychological principles of reading acquisition are combined to define the processes that can be characterised for Grades 3–4 by (1) the automation of reading skills and partly owing to this (2) the enrichment of the knowledge and procedures related to reading strategies.

Sentence Comprehension
Knowledge related to sentences and pertinent to reading comprehension:
• Use of sentence medial and sentence final punctuation marks;
• Use of punctuation marks in short dialogues;
• Expression of modality reflecting the speaker's intentions.

By the end of the fourth grade, students must have applicable knowledge of the characteristics of written texts applying to sentences. Reading comprehension may be measured by asking students to supply missing sentence final punctuation. To be able to complete the task, students must understand not only the words but also the speech context and pragmatic meaning. By the end of the fourth grade, students should be able to infer and supply with confidence the commas omitted from longer sentences containing modifiers and the missing punctuation marks at the ends of sentences. Students' knowledge of the rules of written sentences relevant to reading comprehension can be assessed in this age group through *Task D14,* for instance.

Task D14
Supply the missing final punctuation.

Why can't we leave ☐

Watch out ☐

Big snowflakes were drifting outside the window and we could hear the children's merry laughter from the garden ☐

Dialogues often feature in young schoolchildren's readers since narrative texts (stories and novellas) play an important role at this age. The representation of dialogues is a lot more complicated in written texts than in continuous narratives. To be able to understand this, students must be familiar with several rules – of structuring and punctuation – applying to written texts. Dialogues often contain interrogative, exclamatory and imperative sentences. Colons as punctuation marks appear substantially more frequently than before and children usually see quotation marks here for the first time. Comprehension requires knowledge of the rules of dialogue marking in written texts *(Task D15)*. The main purpose of teaching these rules is to make sure that children's comprehension of texts and enjoyment of stories are not hindered by the appearance of new punctuation marks and by the positioning of sentences in a different arrangement from the one used in continuous texts.

Task D15
Supply the missing punctuation marks.
"Please show me your book ☐ " Judith asked her friend ☐
"No problem ☐ " Agnes replied, "but which one ☐ "

With regard to the marking of modality, students are expected – in connection with the goals defined in the first task – to recognise the intentions of the speaker and to mark these using punctuation marks. Recognising the intentions of the speaker is an essential precondition of comprehension. In Grades 3–4, students should be familiar with basic rules of modality, i.e., they should confidently identify situations where the grammatical modality (as signalled by punctuation) matches the actual intentions of the speaker (*Task D16*).

Task D16
Supply the missing punctuation marks as suggested by the statements in brackets.

Did you buy a car ☐ (you are curious to know)

You bought a car ☐ (you are stating a fact)

You bought a car ☐ (you are expressing surprise)

The Assessment of Sentence Comprehension Through Expressive Oral Reading
At the end of the fourth grade, students are expected to be able to read correctly and expressively simple and compound sentences consisting of more than seven words in which the grammatical modality matches the speaker's intentions of modality (including negated sentences).

Test items involving oral reading assess the ability to read aloud fluently and expressively. Students reach the target when, following a brief preview, they can accurately read out loud compound sentences with relatively simple structures. The test sentences may be connected, constituting a short coherent story or description. Students are expected to produce the correct intonation patterns associated with the three sentence final punctuation marks but in Grades 3–4 the test is limited to sentences where the grammatical modality matches the speaker intentions. The measurement of oral reading covers reading rate, articulation, fluency and the number and type of self-corrected and uncorrected errors (*Task D17*).

Task D17

Where are you, David?

(extracts)

Sometime between six and seven in the evening David disappeared from his room while his parents were at home, the TV was blaring the evening news and outside, in the dark city of Budapest the cool November wind was chasing the dry leaves.

Only his glasses remained by the open book on the bed; the slender fair-haired little boy was nowhere to be seen.

He could not have walked out of the door. His parents would have seen him.

He could not have escaped through the window, either. David and his family lived on the fifth floor of a tower block.

But then how...? Where did he go? What happened? [...]

The book was open at a page with a drawing of the little prince with his cloak and sword.

Hold on... There was not one but two little princes in the picture. Wearing two identical cloaks and two identical swords. And one of the little princes looked a little bit like... Yes, he looked like, he looked just like David.

Mother waved silently, father looked at the drawing and turned very pale. How...?! How could the child have got into the book? This... This is impossible! There is no such thing!

Or is there?...

They called the psychologist straight away. What should they do? The psychologist did not know. They called the police straight away. What should

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they do? The police did not know. They called the stern grandmother. What should they do? Grandmother knew.

"Don't you understand?" she asked. "Can't you even understand this? Little David has read himself into the book. He read it and read it again and again until he was part of the story. Do you want to have your son back from the book? You'll have to read him out of it. Keep reading it, reading it aloud until he comes back and you find him."

Source: Kincskereső (Literary magazine for teenagers) November, 2008
Gábor Nógrádi, Dióhéjban [In a Nutshell]

Students' comprehension of the text read aloud can be assessed with open-ended questions, which can be given either orally or in writing (*Task D18*). Both the text to read and the questions should of course be more difficult than they are for first and second grade students. Text difficulty can be increased by including less frequent words and by increasing sentence length and the length of the whole passage. The questions can be made more difficult by reducing the proportion of questions that can be answered through simple information retrieval and increasing the proportion of those requiring logical reasoning and reflection on the text.

Task D18
Answer the questions.

When did David disappear?..

What did the little boy look like?...

Where did David and his family live?..

Who did the drawing in the book depict?...

Who turned very pale at the sight of the picture? ....

Who did the parents call for help?...

Who knew what to do? ....

What was the solution? ....

Reading Textbook Texts
For Grades 3–4, the regulations on schoolbook texts increase the previous 5% limit of sentences longer than 150 characters to 10%. The sen-

tence length of 150 characters constitutes a milestone even for a mature reader; above this length, memory constraints pose a serious obstacle to comprehension.

The excerpt in *Task D19* was taken from a textbook of environmental studies for third grade students. (We use environmental studies books for our sample questions because they are well suited to illustrating the integrated comprehension of a considerable amount of expository text and the related graphical material.)

Task D19

Plain: A lowland plain is relatively flat land situated at a surface height of between 0 and 200 m. Lowland plains are coloured **green** on the map.

Uneven landscapes with a height of 200–500 m are **uplands**. The hills of uplands are broken up by valleys. Uplands are coloured **light brown** on maps.

Find a valley in the picture.

The excerpt uses varied typographic devices to assist the comprehension of the text. The phrases in bold typeface also encourage the development of organisational skills highlighting two attributes: names and colours. Let us consider what difference the following two methods of questioning can make in the process of finding answers:

What is a lowland plain?...
Complete the sentence!
    On the map lowland plains are ....

The excerpt from a fourth grade textbook shows a summary section assisting the learning of the text.

Task D20

Its surface is covered in a thick layer of sand. Sand is easily transported by the wind. The sand carried by the wind is called **shifting sand**. The wind can occasionally build 10–15 m high **dunes** of the sand. Dunes can be moved by the wind.

The sand of the Kiskunsag region in Eastern Hungary was brought here by the wind as sediment tens of thousands of years ago. Later on the **wind** separated the loose sand form the **sediment** and spread it in the area between the Danube and the River Tisza. The wind transformed this region into a gently undulating land with sand dunes.

What stops the sand from spreading?

At the end of the textbook lesson, we find a short outline and a set of questions assisting the comprehension and analysis of the text. This section is highlighted using typographical devices, exploiting the knowledge organisational power of graphical knowledge components.

Kiskunsag is situated in the area between the Danube and the River Tisza.
Sediment of the Danube → sand → wind → shifting sand.
Stopping the shifting sand: cultivation of fruit and vegetables.

In which part of Hungary is Kiskunsag situated? How did the layer of sand get here? What built the sand dunes? What is the surface of this region like today? What did the people of Kiskunsag used to do? How did they stop the shifting sand? What natural resources make it possible to grow fruit and vegetables? List the most frequent fruits. List the vegetables cultivated here. What is used to cultivate early vegetables? What is made out of them?

Reading Strategies

As the encouragement of reading strategies continues in Grades 3–4, the strategies acquired in lower grades are revised and practised again and again as needed either using the tools of differentiated instruction or by involving the whole class in revision exercises. This is warranted in part by the interdependence of reading strategies and the coherent operation of the system as a whole, but the importance of constant revision is also highlighted by the typical decline in reading performance over the summer break, which especially affects students from disadvantaged backgrounds. Continuing the discussion of reading strategies started in connection with the youngest age group, we now move on to the fifth strategy listed in Table 5.3 above: scanning.

Scanning

Scanning is not unknown in traditional Hungarian reading instruction; it was used previously under a different name. This technique is classed as a pre-reading strategy although some accounts contend that a good reader characteristically scans the text again after carefully reading it.

Scanning involves looking through the text starting with the top left corner and progressing towards the bottom right devoting about 4–5 seconds to each page. This process is not reading in the strictest sense of the word as our eyes briefly linger over only a few features, pictures, phrases or words (*Task D21*). Scanning, just like the activation of background knowledge and other pre-reading strategies, has special significance in the comprehension and interpretation of texts. This may to a large extent be due to an increase in motivation.

Characteristics of advanced users of the strategy:
- They scan the text as a routine procedure before reading.
- While scanning the text, they note a few features of content and format.
- They infer the content and genre of the text during and after scanning.

Task D21
Scan the text.
What caught your eyes while scanning?
What characteristics did you note?

The Activation of Background Knowledge

The activation of background knowledge (schemas) consists in the activation of those semantic fields in the reader's mental lexicon and semantic universe that are relevant to the content of the text. This process can be encouraged through various activities such as discussing, drawing or acting out a scene. Research evidence suggests that the activation of background knowledge will be most effective if the students' prior knowledge of the subject, their impressions and their experiences are brought to the surface (*Task D22*). The effectiveness of the strategy can be enhanced by discussing topics of the same semantic category as the topic of the text (e.g., talking about tigers before reading a text on lions) or topics constituting a superset of the concepts in the text (e.g., talking about predators in the above context).

Another method of activating background knowledge is the introduction of new, possibly unfamiliar, concepts, words or phrases appearing in the text. (These are the preorganisers.) If this method is chosen, it is worth remembering that although it can encourage the activation of students' prior knowledge, it will at the same time deprive them of the opportunity to infer the meanings of these possibly unfamiliar words from the context.

Characteristics of advanced users of the strategy:
- They activate and recall prior knowledge, experiences and memories pertinent to the content of the text while formulating expectations.
- They activate their prior knowledge before reading any text.
- They constantly compare their background knowledge with the information contained in the text while they are reading.

Task D22

Note the topic of the passage by looking at the title and summarise what you know about this topic.

Discuss your experiences and memories related to .... .

Prediction and Anticipation

Making predictions and anticipating outcomes contribute a great deal to successful text comprehension. This strategy builds upon the preview of the title, text and pictures (*Task D23*). Of the various pre-reading and reading strategies, prediction is particularly suitable for raising and maintaining students' interest and for enhancing motivation.

Characteristics of advanced users of the strategy:
• They perform this activity with motivation and enjoyment.
• Their predictions logically follow from observed pieces of the text.
• The predictions rely on a range of sensory experiences.

Task D23

What do you think the text is about?
What characters are there in it?
How do you think the story continues and ends?

Setting a Purpose and Method of Reading

Text comprehension can also be improved if, as the final pre-reading strategy, we establish the goal of reading the text and choose the reading method and reading strategies best suited to this goal. The goal should be defined as simply and clearly as possible.

Texts of different genres are read to achieve different goals. Sometimes the goal is to obtain information and sometimes we read for entertainment and aesthetic pleasure. Alternatively we may scan a text just to find a specific piece of information. Different genres are therefore associated with different reading purposes, reading methods or strategies. Students must be able to establish the goal of reading as precisely as possible and then choose the most suitable reading method (*Task D24*).

Characteristics of advanced users of this strategy:
- They establish the purpose of reading every time they prepare to read a text.
- They assign a reading method and a set of reading strategies to the purpose.
- They select reading goals, methods and strategies appropriate for the text.
- They review their choice of goal and method after reading.

Task D24
What is the purpose of reading this text?
How should we read the text, what reading method (strategies) should we use?

IEPC
The acronym IEPC stands for Imagine, Elaborate, Predict, Confirm (*Task D25*), and refers to the performing of these activities in the specified order. During reading, students should first imagine what they have read so far. The next main component of the strategy is to describe and represent this image through a variety of channels. This stage is followed by the prediction phase, when students try to predict the continuation of the passage, what they expect to happen next. Students then read further and check whether their predictions are borne out, whether their expectations are fulfilled. Based on their reading, students can confirm or reject their hypotheses and then the process starts over again. The IEPC strategy can be combined with the method of process reading, whereby students stop at certain points of the text, summarise what they have read thus far and then restart the IEPC process.

Characteristics of advanced users of the strategy:
- The images formed on the basis of the text are colourful, rich, use various types of sensory information, are accurate and pertinent to the content.
- The predictions match the content and format of the text; the settings, characters and events are appropriate.
- Students are motivated to use the strategy and can use it independently.

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Task D25

Imagine.
Elaborate.
Predict.
Confirm or reject your predictions.

The Assessment of the Disciplinary Dimension of Reading in Grades 5–6

Grades 5 and 6 mark a special stage of reading development. Students no longer have a school subject dedicated to reading instruction but every subject contributes to the enhancement of reading performance. The cultivation of sentence comprehension is most likely to be taken up by the school subject of Grammar since this knowledge component is primarily related to metalinguistic skills. The considerable room for improvement in the reading of textbook materials and the use of reading strategies, however, presents an opportunity for potential instruction for virtually every school subject. Our examples are mostly taken from those subjects which rely most heavily on written information transmission but this decision does not imply that the textbooks of those subjects are necessarily those which are best suited to the assessment of students' performance in textbook reading comprehension.

Sentence Comprehension
The measurement of knowledge related to sentences and pertinent to reading comprehension
The speaker's intentions may not match the grammatical modality of the sentence. Sentences of this type are mostly likely to occur in literary text styles and their identification is important for the comprehension of subtle meanings. Students' awareness of this phenomenon can be raised through the analysis of sentences and texts and the collection or production of sentences of this type. Students' understanding of the context of the sentence can also be tested by asking them to supply sentence final punctuation marks and identify the speaker's intentions (*Task D26*).

This comprehension mechanism is the basis of the higher-level text comprehension processes needed for the comprehension of literary texts and the identification of the author's intentions and secondary meanings.

Task D26

Complete the table based on the example given.

declarative (statement, information)   *exclamatory* (interjection, emotional content)

interrogative (inquiry, question)   *imperative* (instruction, command)

subjunctive (wish, possibility)

Sentence	Sentence type	Speaker's intentions
How many times have I told you not to step in the mud?	Interrogative	Emotional content
Everyone has opened their book, is sitting quietly and listening to me.		
I've heard you got a beautiful and fashionable dress for your birthday party!		
Isn't it wonderful to go skiing in the tall, snow-covered mountains?		

Sentence comprehension through expressive oral reading

In Grades 5–6 and especially at the end of this period, students are expected to be able to read aloud passages with a vocabulary and complexity appropriate to their age (*Task D27*). A basic component of this skill is the expressive oral reading of individual sentences. This ability can constitute one of the pillars supporting successful, independent, self-regulating studying in higher grades. Confident expressive oral reading is evidence for the presence of fluent, automated reading skills but these are not directly related to comprehension performance. For this age group, the texts to be read may contain unknown words, dialogues, compound sentences consisting of several clauses and sentences where there is a mismatch between the grammatical modality and the intentions of the speaker. The measurement and evaluation of oral reading covers reading rate, articulation, fluency and the number and type of self-corrected and uncorrected errors.

Task D27

Ottó Herman,
In Lillafüred

How lushly the ferns grow, how sweetly the forget-me-nots wink at you from the banks of the brook – just like the blue eyes of an innocent child.

The young pines stretch magnificently towards the sky, the tips of some get caught in the overhanging branch of the ancient apple tree and they remain in conflict until some gardening settles the dispute.

Then there are the winged inhabitants of that little garden, oh, how lovely they are!

Almost all were born there. The little White Wagtail, which walks so gracefully, would not spread its wings when meeting someone, just runs and runs. The person stops, the bird stops. Then it waits to see: What will happen next? If the person walks on, the lovely bird runs to the crossroads and steps aside...

On that ancient apple tree, at exactly eight in the morning, the association of winged workers appears: the Great Tit, the Blue Tit, the Marsh Tit, the Treecreeper, the Nuthatch and the tiny Woodpecker Finch followed by a couple of Long-tailed Tits.

What bustling, what hard work these tiny creatures of many shapes are engaged in, exploring and searching that aged tree. Watching the amazing variety of movement makes your eyes flicker. The smallest tits search the thinnest branches swaying up and down: There is no gymnast in the world who could imitate their floating and bouncing. Underneath, the Treecreeper is galloping up the tree trunk peeking into every crack in the bark with its clever little eyes and reaching inside now and again with its fine, slightly curved beak. The colourful little Woodpecker Finch joins the race. But it stops from time to time, starts pecking the rancid places until the tiny chippings of wood fly in all directions – and then stays still. Its alert eyes flash for a moment; that's when it pegs the fat worm wriggling inside the wood onto its needle-sharp tongue – it swallows and moves on.

Oh, the Nuthatch is a real master! It moves along the tree trunk with its head up or with its head down as needed and slides all round the thick branches with great speed and nimbleness, pecking here and pecking there and answering with a song when the Great Tit says, "There's none here! Nor here! Nor here!"

Source: Ottó Herman: Erdők, rétek, nádasok [Woods, meadows and reeds].
Móra Ferenc Könyvkiadó, 1986

In addition to the reading and expressive presentation of the above text, its comprehension can also be assessed (*Task D28*) as it is a common problem in the classroom that when a passage is read aloud as a performance, students do poorly at comprehension.

Task D28
Answer the questions.
What colour is the forget-me-not on the bank of the brook? ....

What settles the dispute between the pine and the apple tree? ....

Which bird plays with people? ....

Who are the winged workers around the apple tree? ....

What do the tits do on the thin branches? ....

What does the Treecreeper do? ....

What does the Woodpecker Finch do?

How does the Nuthatch move along the tree trunk? ....

Task D29 provides an example for testing comprehension in the sixth grade by having students summarise the text, and extract and organise the most important points in a written format using text, tables or presentations.

Task D29
Create a presentation about the birds in the story.

Reading Textbook Texts
Students have new school subjects in the fifth and sixth grades. With respect to the development and fostering of text comprehension skills, History may play an important role as the different text types and graphical elements in history books provide good and varied opportunities for the integration of graphical and linguistic elements and the fostering of reading comprehension skills. History books typically contain narrative and descriptive texts as well as non-continuous documents with the two categories complementing each other. The assessment of the comprehen-

sion of textbook texts should place increasing emphasis on test items going beyond information recall and retrieval (*Tasks D30* and *D33*) and requiring higher-level processes such as inference (*Tasks D31* and *D34*) and reflecting on the text (*Tasks D32* and *D35*).

THE FOREIGN POLICY OF KING MATTHIAS

Once his power had been stabilised within the country, the king wanted to eliminate the Turkish threat. **Matthias** had learnt his lesson from the defeat of the Hungarian army before. **He did not want** to launch **an open battle against the Sultan's army**, which he knew was much stronger than the Hungarian army. **He reinforced the protection of the borders** instead. He captured the strongest Turkish castle

> **Matthias and the war against the Turks.** The Pope repeatedly urged the king to fight a war with the Turks. He promised Matthias that if he started the war, the other Christian countries would send lots and lots of soldiers to help him. Matthias replied, "Duly placing my trust in these promises (...) I am standing in the battle field with the army I have gathered. But in reality I do not see any of the promised support. (...) The enemy is threatening us, leaving the undecided behind and directing its entire attack against me alone."

in Jajce. He sent well-equipped soldiers here and to other border castles. After that he did not attack the Ottoman Empire; in fact, **he tried to live in peace with the Turks**. But in case the Turks were to attack, his army was ready for defence. The Turkish army trying to invade Transylvania was defeated near Kenyérmező by Matthias's most celebrated general, **Pál Kinizsi** (1479). The major defeat put the Turks off attacking Hungary again for a long time.

The texts in fifth and sixth grade textbooks typically use complex structural solutions. The dynamic arrangements of pictures, continuous texts and boxed features evoking the virtual web world of "today's youths" are intended to promote motivated learning. The nature and quality of questions accompanying the textbook pictures and continuous texts are, however, rather varied. The assessment of the comprehension of textbook texts should include a set of test items focusing on the knowledge components at the various levels of reading comprehension. For the diagnostic assessment of the comprehension of the above text, for instance, several questions and tasks can be constructed, which can be sorted into three categories depending on the nature of the cognitive processes they test.

Task D30
Which was the strongest Turkish castle captured by Matthias?
When did the battle of Kenyérmező take place?

Task D31
Why was Matthias unwilling to launch an open battle against the Turks?
In which year of Matthias's reign did the battle of Kenyérmező take place?

[The first year of his reign is stated in the first part of the lesson.]

Task D32
Ask a question that cannot be answered by someone who has only read the bold parts of the text.

The next example is from a Hungarian grammar book for sixth grade students. Once again, a wide range of typographic tools can be observed. (The text describes spelling rules applying to a large set of Hungarian verbs. See the footnotes for explanations.)

Spelling rules for verbs with prefixes
- The prefix and the verb are **not separated** in writing if the prefix immediately precedes the verb: megnézi, felfogjuk (megértjük), ráveszik[2].
- The prefix and the verb are **separated** in writing if the prefix comes after the verb: nézz meg!, nem fogjuk fel, vegyék rá![3]
- They are also **separated** in writing if there is a word between the prefix and the verb: meg *is* nézem, meg *se* látod, meg *fogja* hallgatni, meg *kell* értenünk, meg *szabad* várnotok, meg *lehet* ismerniük, meg *akartam* enni, meg *szoktuk* beszélni, fel *fogjuk* emelni.[4]

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2 Hungarian verbal prefixes have various grammatical and lexical functions, some of which are not transparent. In certain grammatical environments they are separated from their verbs in speech and writing. The hyphens below are for expository purposes; they are not used in the spelling of these words. *Meg-nézi* [PREF-looks: *he looks at it*], *fel-fogjuk* [PREF-grasp.we: *we can grasp it*] *(meg-értjük* [PREF-understand.we: *we understand it*]*), rá-veszik* [PREF-talk.into.they: *they talk him into it*]

3 *nézz meg!* [look.IMP PREF: *look at me*], *nem fogjuk fel* [not understand.we PREF: *we don't understand*], *vegyék rá* [talk.into.IMP: *talk him into it*]*!*

4 *meg is nézem* [PREF too look.I: *I look at it too*], *meg se látod* [PREF even see.you: *you can't even see it*], *meg fogja hallgatni* [PREF will.he listen: *he will listen*], *meg kell értenünk* [PREF must understand.we: *we must understand*], *meg szabad várnotok* [PREF may wait.you: *you may wait for me*], *meg lehet ismerniük* [PREF may know.they: *they may get to know it*], *meg akartam enni* [PREF wanted.I eat: *I wanted to eat it*], *meg szoktuk beszélni* [PREF tend.we discuss: *we tend to discuss it*], *fel fogjuk emelni* [PREF will.we lift: *we will lift it*].

Usage of verbal prefixes

- **There are** prefixes that are never separated from their verbs: befo-lyásol, ellenőriz, fellebbez, kifogásol[5].
- Novel prefix-verb combinations appearing in colloquial everyday language should mainly be used to characterise the environment or the speaker (bevállal, bevállalós, felvállal). In other contexts the traditional variants should be preferred: elvállal, vállalkozó szelle-mű[6].
- Prefixes should not be added to verbs unnecessarily: ellenőriz, rather than leellenőriz; and if foreign loan words must be used: degradál = degrade, rather than ledegradál[7]!

The text could be even more helpful if it highlighted information needed to answer the following questions.

Task D33
List some examples of prefix-verb combinations where the prefix is never separated from the verb.
What does the word degradál mean?

Task D34
How many contexts are there where the prefix is separated from the verb in writing?
Why is it wrong to say, "bepótoltam"?[8]

Answering the second question involves the application of a general rule specified in the textbook (the rule of unnecessary prefixes) to a specific case. This typically requires the operation of linguistic reasoning skills.

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5 *befolyásol* [influence]*, ellenőriz* [check]*, fellebbez* [appeal]*, ki-fogásol* [object]

6 *be-vállal, fel-vállal* are novel colloquial variants of *el-vállal* [agree to something, take something upon oneself]*, bevállalós* [willing to agree to things] is an adjective derived from the prefix-verb combination *be-vállal. Vállalkozó szellemű* is the standard phrase meaning "willing to agree to things, adventurous"

7 *ellenőriz* [check], *le-ellenőriz* is a non-standard variant of *ellenőriz. Le-degradál* [PREF-degrade] is a non-standard variant of the English loan word.

8 *be-pótoltam* [PREF-made.up.I: *I made up (for an absence or mistake*]. The standard variant does not have the prefix: *pótoltam.*

Task D35

Are there any other prefix-verb combinations where the prefix and the verb are never separated?

Why does the word "megértjük" appear in brackets after the word felfogjuk?[9]

Reading Strategies

As was mentioned in connection with the reading strategies for third and fourth grade students, the system of strategies described here is composed of a hierarchically organised set of interdependent, increasingly elaborate elements, and the repeated use and enhancement of previously acquired strategies is of crucial importance.

Monitoring Comprehension

The monitoring of reading and text comprehension is an activity enabling us to constantly follow and evaluate our own comprehension processes during reading. This is a metacognitive ability, i.e., it refers to thinking about thinking processes, the comprehension of comprehension. Comprehension may be monitored in parallel with the reading process including cases where the readers stop in mid-text and, while summarising the information that they have extracted from the text thus far, evaluate their own reading and their comprehension of the text, also identifying problems (*Task D36*).

Characteristics of advanced users of the strategy:
• They possess advanced metacognitive knowledge and skills.
• They have a better than average idea of the characteristics of their own reading and text comprehension skills and of their strengths and weaknesses.
• They can analyse their reading processes in fine detail.

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9 *felfogjuk* is an ambiguous word, one of its senses [grasp] is roughly synonymous with *megértjük* [understand].

Task D36

What are your strengths and weaknesses in connection with reading?

What kind of reader are you?

What do you like reading? What do you dislike reading and why?

What sorts of text are easiest for you to read?

What sorts of text are hardest for you to understand?

The evaluation of the answers to the above questions should not depend on quantitative criteria but we should instead focus on the quality of the conscious monitoring of reading processes relative to the developmental level of a given student. The most important factor in the evaluation of monitoring quality is applicability, i.e., to what extent an individual's knowledge about their own reading processes can enhance their comprehension of various written sources.

Error Correction Strategies
In order to make progress in reading and text comprehension, existing mistakes and actual problems need to be identified (*Task D37*), which is the first step towards correcting or resolving them. The usual instruction methods tend to forget about the need to enable students to explore fully, identify, analyse and correct the errors typical of their reading. As a consequence, Hungarian students do not have any confidence in their ability to rectify their comprehension errors. The four widely accepted strategies are lowering reading speed in order to clarify confusing sections, re-reading, asking the teacher or the reader's peers for help and the identification of the meanings of unknown words with the help of a dictionary, encyclopaedia or the Internet or by inferring meaning from the linguistic context.

Characteristics of advanced users of the strategy:
• They know various error correction strategies effective for their purposes and can use these independently in the right places and at the right times.
• In addition to their reading process, they are also able to monitor their use of error correction strategies.

Task D37

How do you confirm whether you understand the text while you are reading?

How do you confirm whether you have understood the text after you have finished reading?

What do you do if you cannot understand something?

Synthesising

Synthesising is closely related to summarising. Synthesising is a post-reading strategy and consists in not only summarising the content-related aspects of the text but also identifying elements that reveal what activities and strategies were used before, during and after reading (*Task D38*). Besides recalling the reading strategies used, synthesising also involves the evaluation of individual components of the reading process including the preparatory activities preceding the reading process.

Characteristics of advanced users of the strategy:
• They can accurately recall the various elements of the reading and text processing process.
• They can accurately recall and evaluate the tasks and strategies used, their solutions and the relationships between all these components.
• They can make relevant and correct statements regarding the future, they can tell which strategies to use with similar texts and for similar reading purposes.
• They can view the tasks, activities and strategies used before, during and after processing the text as a coherent whole.

Task D38

What tasks did we complete and what strategies did we use in class (while processing the text)?

Which tasks and strategies did you find most useful for the comprehension of the text?

Which ones will you use when you read a similar text in the future?

Selective Reading

Selective reading is defined as the quick reading of irrelevant information and the slower, more analytic reading and re-reading of important information or of interesting sections of the text. Selective reading thus involves skimming, i.e., the quick identification of the main ideas of the text, alternating with – in terms of reading rate – the opposite process of slow, intensive reading and re-reading (*Task D39*). For selective reading, students need to develop the skills enabling them to make a decision during reading with respect to which sections of the text are important and which sections are less important for the given reading purposes. During selective reading, the reader may switch to a scanning technique. Selective reading is the most difficult of the strategies discussed here and presupposes the routine operation of basic reading skills.

Characteristics of advanced users of the strategy:
- They can decide during reading which sections of the text are the most important for their reading purposes and they know where these sections are located in different texts.
- They can vary the method, technique and speed of their reading.
- They possess advanced knowledge and skills in relation to the reading process and their use of strategies.

Task D39

Which parts of text contain the most important points or pieces of information?

How are you going to read the text for the second time?

In what situations and in what way do you use selective reading?

About the Contributors

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