Chapter 1
The Methods Issue Revisited: From a Developmental and a Socio-Cultural-Political Perspective

José Morais

Abstract This chapter aims at discussing several aspects of the "methods issue" rather than at offering a systematic review of the specialized literature. It will: (1) distinguish, in terms of cognitive processing, between the notions of learning to read and write and of literacy development; (2) consider learning to read and write in the context of previous and subsequent developmental stages; (3) recall the history of the methods used to teach reading and writing abilities, in connection with social and cultural contexts; (4) contemplate the training of parents and teachers for, respectively, educating their children for literacy, and teaching their pupils to read and write.

1.1 Introduction

At the last Society for the Scientific Study of Reading (SSSR) meeting held in Porto, Portugal (June 13-16, 2016), no oral or written presentation targeted the learning to read methods issue mainly and explicitly. This might indicate that the issue is over, or that the people involved, for one reason or another in this issue, are tired of the aggressive polemics that for so many decades have shaken them. However, the issue is not over; it is over from the theoretical scientific perspective, but not entirely over from the perspective of applied research. It is most certainly not over at all from the perspective of actual pedagogical practices.

After analyzing the concept of literacy and offering a portrait of the situation of literacy in the world (Sect. 1.2), and after restating the theoretical psycholinguistic ground as synthetically and as clearly as possible (Sect. 1.3), this chapter deals in Sect. 1.4 with the learning to read methods, and attempts to draw a historical and political account. In Sect. 1.5, it addresses parents' and teachers' preparation.

José Morais
UNESCOG, CRCN, Université Libre de Bruxelles (ULB), Belgium,
e-mail: Jose.Junca.De.Morais@ulb.ac.be

1.2 Learning to Read/Write, and Literacy Development

"Learning to read and write" is an underspecified expression, in much the same way as "learning to play" is underspecified. Indeed, learning to play football is very different from learning to play tennis, and both very different from learning to play chess, and chess from poker, and these from playing the piano. The game or ability at issue must be specified. Likewise, learning to read and write depends on the writing system. Although there are very general traits common to, and similar constraints on learning whatever the writing system, learning to read and write in an alphabet does not help much in learning an ideographic or a morphographic system, or even a syllabic one. As it would be impractical to specify the writing system each time I speak of learning to read and write, I invite the reader to take into account that here I am only concerned with the alphabetic writing system, more specifically the Latin alphabet.

Learning to read and write must be specified on a further dimension. To read is to transform written words into spoken ones (more exactly, to find for the former(s) the correspondent(s) among the latter), and to write is the reverse. In principle, it is possible to acquire these abilities without knowing the oral language that the written words represent, more precisely without knowing the meaning of those spoken words. In a classical example, Milton's daughters learned to read in languages they were unable to understand (in both their written and oral form). Obviously, except in such an unusual situation and in most of the present print-verbal transformation devices, one reads (writes) to access (code) meaning from (into) print. Yet, the precise definition of reading and writing (or spelling) does not imply understanding nor intentional meaning communication under a written form.

It is this precise definition of reading and writing that creates the necessity of distinguishing the ability to read and write from literacy. Literacy was introduced in English from Latin via Middle Age French, and became the usual word for referring to the ability to read and write. Although it is a recent word (it appeared in the last quarter of the 19th century), some non-English-speaking countries or provinces have imported it. This is the case in Portugal (but not in Brazil), Spain and Québec (more recently, also in the French-speaking cantons of Switzerland, and Belgium). Official texts still resist adopting "littératie," partly because it is wrongly believed to be an Anglicism, and partly because "lettré," which corresponds to literate, is not merely a person able to read and write but an erudite or someone who possesses culture and knowledge.

I proposed (Morais, 2016) to use, in French, the word "alphabetisé" to designate a person who is able to read and write in the alphabetic system in the strict sense considered above; and to use "lettré," to designate someone who reads and writes skillfully and uses productively her/his ability of reading and writing. The idea of productive use implies that these abilities are purposively employed for operating on meaning. Whether the English language will be able to differentiate between the notions corresponding to "alphabetisé" and "lettré", beyond the fact that the former specifies the system in which this chapter is written, is not a point I will address. What is useful, even necessary, is to establish clear distinctions between terms such

as illiterate ("illettré"), functionally illiterate, and literate, including between types of literacy.

Illiterate, according to the UN and UNESCO, is the individual of at least 15 years of age, who is unable to read and write a single short sentence characteristic of or consistent with her/his daily life. This is more demanding than the criterion used in the Modern Age of being unable to put a signature, other than a cross, in a contract (typically the contract of marriage). This is clearly insufficient to enable an individual to take a significant part in the social, economic, political and cultural life of the modern world (although there are exceptions, such as the case of one member of the present Brazilian parliament who, although being completely illiterate, voted on important matters, including the presidential impeachment). By definition, all those who are not illiterates in that sense should be considered literates, but the term of functional illiterate designates those who have learned to read and write to some extent at school but did not practice enough and suffer tremendous difficulties. There are no criteria for establishing functional illiteracy and there is no systematic evaluation of these people. Non-governmental associations and foundations have reported there are almost three million in France and around seven million in the UK.

In Morais (2016), I called the person who can read and write *in a predominantly automatic way* all words (isolated or in text) that are consistent with her or his level of spoken language and knowledge, "type 1 literate." In the case of alphabetic writing at least, automaticity in reading and writing refers to the immediate and direct access, through complex but non-conscious processing, to the phonological and orthographic word forms, respectively. I called the person who uses regularly these abilities in a productive way, i.e. to acquire knowledge (through reading) and to communicate it, (through writing) "type 2 literate." Most type 1 are also type 2 literates, yet some people read frequently and skillfully but write only occasionally. We do not actually know to what extent and how long skillful reading and writing can be maintained as a result of scarcity or absence of practice.

I propose to call "type 3 literate" the person who uses reading in a critical perspective, and writing to communicate her/his critical evaluations. This is crucial for not only personal but also constructive participation in the democratization of institutions and communities, and for allowing sociocultural changes and the progress of knowledge. People who go further the critical stance and use reading and writing in a creative or innovative way may then be called "type 4 literates" (it is the case in principle of scientific researchers), and those who elaborate new theories encompassing general phenomena or domains, "type 5 or top literates." Orthogonally to these literacy types, it is usual today to consider domains of literacy, for example scientific literacy, philosophical literacy, literary literacy, etc.

How are those types of literacy distributed among the population? We do not possess quantitative information for adults. However, the data from PISA (2013) can give us an idea of their distribution among schooled 15 year olds, which is highly unequal between countries. I present below a tentative analysis based on this data for three countries (France, Ireland, and Brazil) that use alphabetic writing. It would give a large super-estimation of the portrait of the whole adult populations of those

countries as these include many more low literates but also functional illiterates and, in the case of Brazil, more than 10% of illiterates. I have chosen France because it is a country with an old culture where educational inequalities are increasing and because the orthography of French presents many inconsistencies; Ireland because it is one of the countries with the best PISA results among those using alphabetic writing (most of the children begin learning to read and write in Gaelic, whose orthographic code is much more transparent than the English one); and Brazil, where education has been in crisis for many years, and shows very poor results in learning to read and write in spite of a relatively transparent orthographic code. Another reason to choose France and Brazil is the dramatic "methods war" into which they plunged and from which they seem unable to escape.

The reading tests used in PISA (writing was not evaluated) allow distinguishing between six levels, the lowest one – 1 – being subdivided into 1a and 1b. I calculated the percentages of schooled adolescents that did not reach level 3, those who were attributed level 3, and those who were attributed at least level 3. The tests relative to level 4 required the reader "to locate and organize several pieces of embedded information, (...) interpreting the meaning of nuances of language in a section of text by taking into account the text as a whole, (...) understanding and applying categories in an unfamiliar context, (and using) formal or public knowledge to hypothesize about or critically (italics mine) evaluate a text". As inferior levels do not require critical reading, I inferred that, to be "type 3 literate," the adolescent must be above PISA's level 3. Indeed, at this level, adolescents are only required "to integrate several parts of a text in order to identify a main idea, understand a relationship or construe the meaning of a word or phrase." Level 2 is a baseline level of proficiency in reading, and below level 2, according to a longitudinal inquiry, further schooling and a professional future would be seriously compromised.

Using this grid of analysis, I found roughly the same proportion of type 3 literates (above PISA's level 3) in Ireland and France (37% and 36% respectively), which means that on the edge of adulthood, only little more than one third of the schooled population is prepared to intervene critically in the sociopolitical debate. In Brazil, there were only 5% of type 3 literates, which implies that, given this "oligoliteracy," Brazil will still remain an oligarchy (the government of an elite) for a large number of years unless an educational revolution takes place. At PISA's level 3, thus "type 2 literates" (those who simply read well, with comprehension), and below PISA's level 3 (thus poor readers, those who do not read automatically and with clear comprehension) Brazilians were respectively only 16% and 79%, which means that only 1 out of 5 schooled adolescents will be literates, the 4 others will be poor readers, functionally illiterates or even illiterates. Between the two other countries the relation between PISA's level 3 (in Ireland, 34%; in France, 27%) and below level 3 (29% and 37%, respectively) was inverted. In France, not in Ireland, there are as many poor literates (below PISA's level 3) or even worse as critical readers (at least PISA's level 4). A comparison with PISA's 2002 results shows that literacy inequalities increased in France through significant increases of the proportion of both good and poor readers.

To understand better what this involves in terms of reading processes, it is necessary to consider their normal development, assuming that teaching to read and write respects the main contributions of scientific research in this domain.

1.3 The Developmental Conditions of Learning to Read and Write in the Alphabetic System

For many generations through three millenaries, many individuals, mostly children, have been taught, and learned, to read (less so to write), this with very little knowledge or reflective and analytic awareness of what they were doing. Since many different ways of teaching were used (see Sect. 1.4), they also learned in different ways with more or less success, needing more or less time, and developing different degrees of awareness of how alphabetic writing represents language. Probably, most of them only experienced a very tiny intuition of the alphabetic principle.

This large variety of learning roads may give the impression, shared by many people, that one learns to read whatever the method, and that methods do not matter too much. However, this is not true because we must distinguish reading and recognizing. The perceptual system, with a specific neural basis, that the learners develop to read words is not the same as the object or form recognition system they can use to *recognize* them. In the latter case, they do not acquire a new system; they only use a preexistent system on new exemplars, with great memory limitations. Thus, the fact that there may be many learning roads does not imply they lead to the same outcome, nor to the same proficiency.

Furthermore, we are aware neither of our reading processes nor, to a great extent, of what we do to acquire them. The idea that the letters of the alphabet, in a more or less transparent way due to the consistencies or inconsistencies of the orthographic code (which makes necessary the notion of grapheme), represent phonemes is a recent one. In the classic Huey (1908)'s book, "The psychology and pedagogy of reading," letters represent sounds, or phones. The author also uses "phonetic," the quality of phones, and "phonic," a learning to read method, but neither "phonology," "phonological," nor "phoneme". Indeed, the notion of phoneme already proposed by a linguist, Baudouin de Courtenay, in the last quarter of the 19th century, remained for a long time in the linguistic domain, and its full admission only occurred in the 1940s when Troubetskoy and Jakobson clearly distinguished between phonetics and phonology.

The fact that the phoneme has no acoustic invariance, and therefore is neither a sound nor a perceptual "unit," and that it actually corresponds to a dynamic relation between the speech articulators, was introduced only in the 1960s by Alvin Liberman and the Haskins group (A. M. Liberman, Cooper, Shankweiler, & Studdert-Kennedy, 1967). This work immediately impacted the way of conceiving reading and learning to read. This was expressed in many chapters of two outstanding books, edited respectively by Kavanagh and Mattingly (1972) and by Reber and Scarborough (1977). At the same time, the development during reading acquisi-

tion of phonological and, as a special case, phoneme awareness, was theorized by Isabelle Liberman (I. Y. Liberman, 1973) and became the object of experimental investigation (I. Y. Liberman, Shankweiler, Fischer, & Carter, 1974).

Below I briefly describe what I have called the developmental *conditions* of learning to read and write in the alphabetic system (Morais, 1994, in French; 1996 and 1998, for respectively the Brazilian Portuguese and Spanish editions). There are no successive stages or phases in learning to read. Instead, three specific acquisitions must take place, each being a condition for the subsequent, but developing in large part simultaneously, in reciprocal interaction. This progression is valid whatever the learning method, but can be much more facilitated by some methods than by others. With the less efficient methods, the learner also eventually grasped the alphabetic principle, became able to decode and, hopefully, to automatically address lexical orthographic representations, but these skills are intermingled with non-specific ways of recognizing written words.

Acquiring at least some intuition of the alphabetic principle, i.e. that letters (more exactly, graphemes) correspond to phonemes, is the first condition to read words and any sequence of letters that could potentially be a word (being able to read new, unknown words is a necessary attribute of being a reader). It is acquired by being presented with alphabetic strings and led to mentally represent the corresponding phonemes and how these can blend. Blending phonemes is not blending sounds, so that to abstract the phoneme from a sound it is necessary to combine perceptual and inferential abilities. This is facilitated by playing initially with sounds in which the phoneme-target is more apparent in the sound and in its articulation. Phoneme awareness is not phonological awareness, although it may be considered as a special case of phonological awareness (but for practical purposes, one would better treat them as distinct). Phoneme awareness is not an instantaneous acquisition, although there is probably some initial insight. It develops with decoding until the learner uses it in an efficient way. For that reason, tasks evaluating phoneme awareness (not used as such in reading) are the main predictors of individual differences in decoding skill, and reciprocally, but only for some time (mostly in the first year). Later, as for many other skills, it ceases to be necessary for reading, and becomes an important matter only for psycholinguists and (it should, at least) learning-to-read teachers. Most skilled adult readers may show, in appropriate tasks, that they remain aware of phonemes, but they are at pains, and usually are unable, to explain correctly what it is.

Developing decoding skill is the second condition. It is highly dependent on phoneme awareness and skills at the beginning and this dependency decreases as decoding becomes based on larger and more complex structures (complex onsets, rhymes, syllables, morpheme-related phonograms …). Decoding is conscious, intentional, controlled, but it is not the only mechanism involved in sequential reading. There is also an implicit learning, based on frequency, of how parts of words tend to be spelled and pronounced. This learning of statistical regularities can be observed quite early in the first year (e.g., Martinet, Valdois, & Fayol, 2004). It coexists with, and may occasionally dispense, decoding.

As these two mechanisms become dominant and involve larger word structures, they begin to be overcome by the automatic access to stored representations of the words in a specialized long-term memory. This is the third, final and decisive acquisition. It is the repeated successful decoding, and possibly also the use of implicit knowledge of spelling-sound word parts, that allows this storage (Share, 2004). However, more exactly, its acquisition does not finish with learning to read; alternatively, one may say that learning to read never finishes. In my view, it seems worth saying that learning to read is completed when the mechanisms of skilled reading (automatic access to stored word representations) are in place.

Obviously, this lexical long-term storage may not be inalterable. Automatic access is likely to be impaired with age, perhaps also for particular words following long lack of exposure to them. Additionally, such a lexical store is never fixed, as it must increase with the diversification of reading. Many theoretical questions can be raised, and are addressed experimentally, concerning this store and the access to it. They concern two main issues: one is how it is structured: the other, what types of information are represented in it. This mental lexicon must be at least orthographic, i.e., abstract, not visual even if dependent on vision in sighted people (or on the tactile sense in the blind). But it may be also both orthographic and phonological or, alternatively, activation of the stored word orthography immediately propagates to a corresponding phonological store. Finally, to what extent and how semantic information is automatically accessed is an important question, about which there still is little knowledge.

1.4 A Historical and Sociocultural Account of Learning to Read and Write Methods

Huey (1908) offered, in his Chapter XIII – The history of reading methods and texts, a detailed account of how reading and writing had been taught in the alphabetic system since the Greeks and Romans until his time. His first remark is important: “Among the early peoples who used an alphabet each letter was used for a definite purpose,” which was, according to him and certainly to those peoples, “to represent a definite sound.” We know that each letter, even in a one-to-one correspondence, does not represent a sound but a phoneme, and it requires an additional mental effort for converting a sequence of sounds into the correct word. An imperfect but still interesting analogy in the strict speech domain is the name of Brazil, pronounced “Braziu” by the Brazilians but “Burajiru” by the Japanese. After hearing other examples of Japanese conversion of an Indo-European language, it would not be difficult to overcome the conversion and understand the words. If I read cat as “keate” and rat as “reate,” I will understand that “beate” should be bat. Something similar may have happened with the Greek and the Roman children. Huey was right saying that univocal letter-sound correspondence “made the letters of much greater importance at present” (he was probably thinking of English, not of Finnish). As it is well known (cf. Seymour, Aro, & Erskine, 2003), it makes a great difference to

learn to read English, French and European Portuguese than to read Spanish, German or Italian. We should therefore not be surprised, or feel pity for the Greek and Roman children upon hearing that "the ABC method of learning to read became general (...) and persisted to recent times in the Western world" (...) The Greeks and Romans, in teaching the child letters, taught their combination into syllables and words, and then of words into sentences" (p. 240).

The implementation of the method was a matter of imagination, good will or prepotency. Huey mentioned that one Greek "purchased twenty-four slaves as playmates for his stupid boy, giving to each the name of a letter" and that Quintilian "advised giving the young child blocks and tablets containing the letters (...) and that he should be allowed to trace with a pen the forms of the letters as engraved on ivory tablets." In modern times, imagination is more appropriate than mere prepotency, and for English the gingerbread method was invented: "To Master John the English maid / A horn book gives of gingerbread, / And that the child may learn the better, As he can name he eats the letter." One of its enthusiastic advocates was Basedow (1723-1770), who proposed to give the school a baker to prepare gingerbread each morning and assured the cost would be modest, as "it is not necessary for any child to eat the alphabet more than three weeks."

In the Middle and the Modern Ages, reading teaching was mostly organized by the Church, whatever the confession, or directly influenced by it, and was associated with religious instruction. In the Abecedarian of the nineteenth century there was the Credo and the Paternoster, later the Ave Maria, etc. The Reform did not change this. "The German word for primer, Fibel, appeared in 1419, and signifies a little Bible" (Huey, 1908, p. 269). To America the Puritans brought an ABC Catechism, which was only replaced by the "New England Primer" in $\sim$1690. One says of this little book, present in every home (three million copies were sold), that it accompanied John Adams through his life[1]. It was a Church book, containing the alphabet, lists of syllables such as ab, ib, ib, etc., and of words with increasing number of syllables, rhymes, moral injunctions, prayers, etc.

The spelling-books, necessary for English, appeared in the middle of the eighteenth century. In USA, the most famous, the Webster's Spelling Book, written by Noah Webster,[2] was first published in 1783. Used in all the country, five million copies had been sold until 1818, and 47 million until 1847; in 1900 it was still sold at the annual rate of hundred of thousands. Huey estimated that the Webster's Book

[1] John Adams, third president of the USA, wrote that direct democracy, i.e. by the people, is arbitrary, tyrannical, cruel, that the people cannot judge, act or think, and that the destiny of the poor is the work, whereas the rich are qualified for the superior functions given their education, independence and leisure.

[2] Noah Webster, who, before Lincoln, defined democracy as the government of the people for and by the people – although later on he considered people, equality, and democracy as "metaphysical abstractions" –, was formerly a free mind, abolitionist, federalist, who eventually converted to Calvinism, wanted language to serve and to fear God necessary to social order, and wrote his own version of the Bible. Editor and journalist, he is called the "father of American education and schooling." Indeed, he also wrote dictionaries, attempted to normalize the pronunciation of English words, highly diversified by the many regional dialects, and reformed the orthography (colour becoming color, centre center, etc.).

was "artificial in its arrangement of words, thought, and vocabulary, most ill-adapted to the needs of its users and to the various ages of the children." Yet, he recognized that, through its universal use, it contributed to the homogeneity of language and of pronunciation across the USA. It most probably helped to avoid the situation of Brazil, where Portuguese is highly diversified within the country and very different from the European Portuguese in terms of lexicon, syntax, pronunciation, and, to a smaller extent, orthography. Regarding the learning method, the book did not contain anything particularly relevant or new.

The first American primer to advocate the whole-word method for reading was probably the Worcester's Primer of 1828. According to its author, the child "may learn first to read words by seeing them, hearing them pronounced, and having their meanings illustrated; and afterward (...) to analyze them or name the letters of which they are composed." In the USA, the whole-word method was more clearly presented in the 1840s, however it was still claimed in the "Word Builder" of 1860 to be new and original. It is only by 1870 that the whole-word method "began to be adopted by progressive teachers in various parts of the country," (Huey, 1908, p. 259) and the literature only entered reading-books by $\sim$1880.

Huey noted that the alphabet method was almost universally used until $\sim$1880 and had not been discarded yet by the time of his book. This was in contrast to Europe, in particular Germany, where imitative pictures of the sounds of the letters appeared as early as 1534, for example *r* or *m* placed near, respectively, the picture of a dog and of a cow. Thus, the idea was to associate the visual form of the letter to the "sound" of its name. As Huey wrote: "Germany much earlier than America began to realize that spelling was not the only or the best approach to reading, but the spelling method held its ground there until well into the nineteenth century" (p. 256). Perhaps the spelling inconsistency of English has masked for a longer time the pertinence of teaching the alphabet phonetically. As Huey writes, the whole-word method also appeared earlier in Europe. It could have been the case of the Comenius' book of 1657 or 1658, which, translated into ten European (plus four Asiatic) languages remained the most popular textbook in Europe for more than one hundred years. It seems, anyway, that the book was little used as a method. According to Huey, in Europe the ABC practice remained "until Jacotot (1770-1840) advocated the word-method as a part of his system, and set forth clearly the arguments for it" (p. 285). This is not entirely exact for two reasons. First, it was the teacher Nicolas Adam, who used his own whole-word method and proposed it in a book published in 1787. Second, there was stricto sensu no Jacotot's method. However, he had a much greater influence than Adam, and it is justified to dedicate here some comments to his life and ideas.

Joseph Jacotot proposed, more generally, that learning should proceed in an analytic way, which does not necessarily imply a whole-word method. The authors of several learning books claimed to have been inspired by Jacotot's system, but among them there was also, for example, an ABC-book, by M. Rousset. Anyway, as Jacotot was a humanist whose explicit aim was to contribute to the emancipation of the people, his presumed involvement in the whole-word method for learning to read may help understand the association of this method with humanism. As a young

man, he had a main role in the organization of several revolutionary federations. A doctor in humanities, law and mathematics, he became professor of literature at the Catholic University of Louvain where he conceived a system of "universal teaching" (as, for him, all intelligences were equal) based on the idea that everyone, child or adult, is capable of self-instruction (its main principles being repetition, immediate application of everything that is learned, and research of relations with everything else), leaving to the teacher the task of orienting and supporting the student's attention. This would be valid for all domains, scientific, literary and artistic. Recently, referring to Jacotot's system, the Marxian philosopher Jacques Ranciére criticized the "myth of pedagogy," i.e. that the teacher's explanations are crucial. Later, I will come back to this idea.

The alphabetic method began to face two main competitors at more or less the same time (since the 17th century), namely the whole-word method and, somewhat earlier, the phonic method. Based on the myth that the child can embrace the world and give order and meaning to it, the whole-word method led subsequently to the sentence and text methods, i.e. to the whole-language method. This is also presented as approach or philosophy, rather than method, as, indeed, it is very difficult to specify its procedures and to evaluate them through experimental testing. Concerning the phonic method, it started with the Jansenists from Port-Royal, who opened small schools where the teachers had classes for five or six children and presented the consonants followed by a neutral "e" so that "be" and "a" would make "ba." The difference between the alphabetic and this phonic method is tiny for the plosives, but the difference may help. Huey wrote that, in the USA, this phonic method was introduced in several regions in the 19th century, apparently with success. Note that the Jansenists' phonics was still based on sound and was overtly synthetic, as it was based on making a syllable from two sounds. Thus, it is completely different from what we call phonics today, based on mentally abstracting from the consonant something that we call phoneme and synthesizing it with the vowel.

In the old phonic method, the children combine sounds given by the teacher. It is the teacher who changes the sound of the official letter name and gives this new sound to the children, hoping that it will be more accessible for their correct reading of the CV syllable. Today, many teachers still use these phonics. However, the present phonics teacher, even when they use the more accessible sound names of the consonants, does not explain that be+a makes /ba/. The teacher offers the children different combinations of C and V, with identical or with different C or V, while pronouncing each syllable, and thus just shows the reality, but an arranged reality, and it is the children who analyze the material, compare what is the same and what is different in the sound and visual form of the syllables, and from this mental analysis extract an intuition that enables them to read. This is their intuition of the phoneme, without knowing what is the phoneme, and perhaps without immediately giving it a sound as we do. This process is thus the exact opposite of the Jansenist's phonic: let the children do it! But, before, show them the written language as an enigma and let them find the answer! They will!

In the USA, from the old version of the phonic method developed quite soon what has been called the "phonetic" method. Its most well-known version was the

"Pronouncing Orthography," published by Edwin Leigh in 1864. "In this system the letters were given various special forms to represent their different sounds, these forms being slight modifications of the ordinary form. Silent letters were printed, but in hairlines" (Huey, 1908, p. 260). The reason justifying these letter manipulations was the larger number of sounds (44) than letters (26). Indeed, due to the numerous inconsistencies of English orthography, even adult readers of English find it difficult to segment speech phonemically. Adolescents 16 to 18 years old do it worse than young readers from grades two to four (Calfee, Lindamood, & Lindamood, 1973), undergraduates in linguistics are at pains to segment three and four phoneme words correctly (Scholes, 1993), and the performance of psychology students still remains far from perfect after a short instruction on graphophonemic segmentation (Connelly, 2002).

With Leigh's method, the children could immediately find the way the letters are pronounced in a particular word and read it correctly. However, according to Huey, the method did not survive, despite its initial great success, because it was hard on the eyes, caused confusion in reading, and made trouble for the printer and the scripter. Yet, there might be better ways of modifying the visual form of the letters according to their phonological role in the word context. In Morais (2016), I presented an illustration of such a code, which, created for French by a visual artist, Sarah Cleeremans, and named *Phono* by her, allows us to display for each written word both its usual spelling (as all the letters are present in some form and/or position) and its graphemes identified by joining the letters corresponding to a phoneme (see Fig. 1.1). This system, which might also be called a "Graphemic or grapho-phonemic alphabet" (the grapheme being actually defined by the phoneme), is not necessary for the skilled reader. However, as for the beginning reader of Hebrew, who can take benefit from diacritics to read correctly words and sentences, the beginning reader of French (or English) could learn to read more accurately and faster with this system than with the current presentation. It is not a problem of principle, but of finding the more appropriate design. *Phono* should be tested and, if necessary, improved.

As I wrote in several books in French and Portuguese (Morais, 1994, 2013, 2014, see Morais, 2015, for and adaptation to Spanish) (Morais, 2016), I think that the methods used for learning to read are not neutral ideologically and politically. The "new" phonics is the most democratic of all of them, in the sense that it gives the children (including those who are socially, culturally and linguistically disadvantaged) the key to cross the door and enter in alphabetic literacy. It would be expected of leftwing and rightwing people, progressive and conservative people, to be sympathetic with phonics and global (word or text) methods, respectively. Actually, in most cases it is the opposite (as it will be exemplified in the next section). How to understand this paradoxical situation of having the most democratic method supported by the rightwing and the less democratic by the leftwing? This could be due to the irrational reasoning of the kind many cognitive psychologists have shown to be at play in social-cognitive situations. However, irrational reasoning also needs to be understood in each particular context. The main justification for recalling in this chapter, as I did, the history of learning-to-read methods is that we will only be able

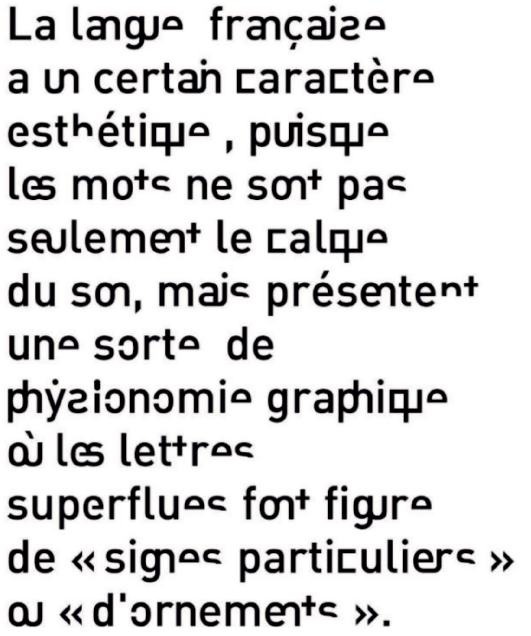

Fig. 1.1 Pierre Burney in "L'Orthographe", 1970

to solve the paradox by taking into account both the social and the scientific history of literacy.

First, literacy, including alphabetic literacy, is from its onset an instrument in the hands of the elite and exploited by the powerful to their advantage. Alphabetic writing was invented from other writings across successive changes and adaptations to the languages, without conscious knowledge of what this instrument involves in terms of mental capacities. The alphabetic or ABC method was the most superficial one could imagine: writing is made of letters, so letters and their names must be taught. The old phonic method, developed in Port-Royal, among people who were studying logic and language, was a progress, but did not go further into the mental mechanisms, because, for that, a much more comprehensive analysis of phonetic variations (which was done much later at the University of Kazan, in Russia) and an experimental investigation of speech perception and production (which is the enormous legacy of Alvin Liberman and his colleagues) would have been necessary.

Interestingly, the discovery of the phoneme posed more difficulties to science than the discovery of the atoms. Even discounting the fact that Greek philosophers had postulated the existence of the atom, soon after they invented the alphabet, the atom had been inferred by an English chemist, Joseph Dalton, in 1808, and the relations between atoms by another English scientist, this time physicist, Michael Faraday, in 1832. No English scientist discovered the phoneme in that century: certainly, all of them were frequent readers, but English orthography seems to have contributed to the concealment of the phoneme to their mind's ears. Eventually, by

the end of the century, assailed from all sides, the atom began to display its internal constitution, and the (also British) physicist Joseph Thomson discovered one of its particles, the electron. In much the same way, after the conceptual formulation of the phoneme, it has been necessary to show how the modulations of the consonantal formant transitions, due to the action of the speech articulators, and depending on their vocalic context, correspond to particular phones perceived as categories through phonetically irrelevant variations and influenced by literacy itself. Penetrating the atoms of language as well as those of matter required a long analytic process. The fact is there: it has been more difficult to penetrate the atoms of language than the atoms of matter.

During all this time, the battlefield of learning-to-read methods was open for the confrontation of the apparently technical approach, the phonics, that require patience and effort, and the global approach that would reveal immediately both language and meaning (with all their promises). Today, the science of literacy has clearly backed the former approach of teaching reading and writing in the alphabetic system. Unfortunately, as described in detail by Morais (2014) regarding Brazil, the defenders of the global approach have been strongly influencing the educational authorities of many countries, including by preventing the future teachers of reading and writing to be correctly informed about the teaching of the science of literacy.

In the title of this section I referred to methods of learning to read and write, but I limited its content to the description of learning to read. This is a consequence of the social discrimination against writing, even greater than the one against reading. It was believed that children should be able to know and recite the religious texts (Bible, Koran, etc.), but that teaching them to write would be foolish; it would give them a powerful instrument of action and intervention. Writing was therefore limited to the oligocrats and their courts. Writing is still socially discriminated against. The reasons why PISA assesses reading but not writing are unclear: it may be because expertise in writing is not judged as necessary as in reading, and/or because writing is more affected than reading by the complexity of the orthographic code, which largely differs across languages.

The scientific team in which I am working has recently elaborated a course of alphabetic literacy for Portuguese illiterate adults who are unable to read (or write) even a single word among the most frequent ones. After three months which allowed them to become accustomed to the sounds of words, and created situations for letting them acquire an intuition of the phoneme and go through the whole orthographic code (a semi-transparent one), seven out of eight gypsy women, whose social life is to sell goods, bear children and be governed by their husbands and who attend a social-religious center that helps them in many respects, could read at least 20% of words never studied or seen at our classes and write a little less. The individual differences were very large, one of them reached almost 90% accuracy in reading, and the average was about 50% (Kolinsky, Leite, Carvalho, Franco, & Morais, 2016). Obviously, the method was phonic and progressed from the more accessible and consistent correspondences to the more complex ones. A major characteristic of the method is that writing was trained and evaluated as much as reading (at the beginning, these ladies still had to be helped to draw the letters). The partici-

pants' motivation was unequal, but they liked what they did, and at the end they had developed a friendly relationship with their two teachers. If the governments applied a program like this, in less than one year adult alphabetic illiteracy could disappear, and all first-graders would be autonomous readers and writers.

1.5 Two Crucial Conditions: Nurturing the Parents, Teaching the Teachers

Some authors have proposed the term "emergent literacy" to refer to the acquisition of knowledge about (or awareness of) some aspects of alphabetic writing, phonology, the correspondence between letter sequences separated by blank spaces and words, the linear organization of texts, and directionality of reading. The children become familiar with most of this before they can read words. We may thus admit the existence of a pre-literacy period during which both the human (mainly parents and preschool) and the physical environment contribute to increase the sensitivity and the ability of the children to benefit from later reading and writing instruction. However, I disagree with the idea that "there is no clear demarcation between reading and prereading," that there is "developmental continuity between emergent literacy and later reading from the early preschool period to the early elementary school period" (Lonigan, Burgess, & Anthony, 2000). These authors justify these claims on the basis of correlational data involving "phonological sensitivity" (measured at different times) and reading performance. However, this term refers to a group of tasks (rhyme and alliteration oddity, and blending and deleting syllables and phonemes) without distinguishing between them. The same merging characterizes the CTOPP (Wagner, Torgesen, & Rashotte, 1999), which is used to provide a very global indication of "phonological awareness," but leads to serious mistakes when it is crucial to distinguish between phonological awareness and phoneme awareness.

Phoneme awareness develops when one begins learning to read and write, whereas all the (other) forms of phonological awareness may develop earlier. Preliterate children and illiterate adults are able to distinguish "cat" and "bat," thus they are *sensible* to a phonetic difference without being aware of /k/ and /b/ as segments. Many of them may be able to indicate above chance level the pictures, among those of cat, fish, door and flower, whose names begin with f. . ., but very few, perhaps only those who already know a fair number of letter sounds, become capable of deleting the initial phoneme of an utterance (for example, say fish without f. . .) after a short training. Accordingly, Stanovich, Cunningham, and Cramer (1984), testing kindergartners, found much better performance on the substitution of the initial consonant of a monosyllable by another consonant (86% correct responses, on average) than on its deletion, for example "if I tell you task" say it without the /t/ sound (25%). To say it simply, one thing is the preliterate's phonetic sensitivity; another is the awareness of phoneme that usually develops with alphabetic literacy. The purpose of this argument is to leave it clear that emergent literacy (which is actually preliteracy) and literacy, in the case of alphabetic writing, are marked by a specific and crucial

discontinuity, namely between the mere intuition of phonetic similarities or differences, and the development of both phoneme awareness and the ability to operate on phonemes.

The family and preschool milieus are the main determinants of the child's emergent literacy acquisitions. In particular, the parents' and the teachers' influence is crucial. However, both their interactions with the child and the quality of the overall human environment (in terms of literacy, but also of mental, physiological and physical health, well-being, affectivity, and cognitive stimulation) are greatly impacted, from the child's birth and even before, by their socioeconomic and sociocultural status and life conditions. These are, as everybody knows, extremely unequal. "Leveling the playing field" through public policies is practically impossible; the field has never been so slanted. In the upper part, individual differences are determined by genetic factors because the manifestation of these is not restrained by the social factors, whereas in the lower part it is the social factors that are determinant because they leave almost no room for the genetic differences to manifest (...). Leveling the playing field can only be obtained through two simultaneous progressive changes: restraining and eventually suppressing the heritability of the appropriation patrimony (Piketty, 2013, emphasizes this source of inequality, but does not go so far) and organizing and improving in and by the communities themselves the socioeconomic and educational support of the disadvantaged families, so that all children will benefit from equal conditions for the development of cognition and literacy. This change from inside the society requires that contingents of volunteers be aware of the relevant scientific knowledge, namely of the science of literacy, to "nurture the parents" and "teach the teachers."

Some children do not suffer from a social disadvantage, but from a genetic anomaly that makes it hard for them to acquire reading and writing abilities. They are usually called dyslexics (although *dyslexia* often presents mainly patent impairments in the orthographic component of literacy). In dyslexia, the process of learning to read is disturbed since the earliest acquisitions. Phoneme awareness is more difficult to develop and often does not lead to isolated and operational conscious representations. In *L'Art de Lire*, Morais (1994), I described the case of an active and intelligent young man who managed to apparently overcome his dyslexia and eventually graduated in economy, but who still showed some errors and especially slowness in pseudoword reading. Confronted with the spoonerism task, i.e. exchange of the initial phonemes of two words (in this case, names), he was unable to find the correct answers "Kacqueline Jennedy" or "Kill Blinton." In many dyslexics, decoding is slow and inaccurate. In others, decoding reaches enough efficiency to allow them to read texts with comprehension, but not as fast as it should be, so that they seem not to be able to read with enough automaticity in word identification.

Thus, the different types of impairment shown by the dyslexics correspond to the three successive conditions of alphabetic literacy: phoneme awareness, autonomous decoding, and word identification through automatic access to stored orthographic representations. Correct diagnosis of the impairment(s) allows in principle to work out, respectively, phoneme analysis and fusion, and, through practice and targeting

decoding and orthographically complexities, two kinds of fluidity in oral reading of, respectively, pseudowords and words.

Another, quite basic anomaly is the fact that dyslexics do not seem to process individual letters as normal learners do. This was observed in a same vs. different decision task on two letters presented successively, which requires ignoring a surrounding shape congruent or incongruent with the shape of the letter. Using this paradigm, designed by van Leeuwen and Lachmann (2004), it was found that only dyslexic children processed the letter and its surrounding shape, benefitting from the shape similarity of shape and envelope. All the other groups, namely children who were normal readers, and adults (literates, ex-illiterates and illiterates) ignored the shape surrounding a letter, which never happened for pseudo-letters, showing that only dyslexics did not apprehend the letter-target independently of the potentially disturbing context (Fernandes, Vale, Martins, Morais, & Kolinsky, 2014). The consistent observation that the congruency effect was negatively correlated with phonological ability in the dyslexic group, and with the knowledge of letter names in the illiterate group, suggests that the perceptual processing of a letter may be protected from extraneous stimuli by the spontaneous activation of the letters phonological label. These dyslexics know very well the letters names but it may be conscious knowledge, not knowledge that is mobilized unintentionally. In dyslexics, something that should have happened in the association of visual symbols and their phonological counterparts did not (Blomert, 2011).

How can this letter-processing anomaly be overcome? I can only answer this question theoretically. Learning to read is learning to process written language, thus, it should never, at none of the stages, be dissociated from learning to write. At the beginning, letters must be hand-drawn solicited by their names and by their phonetic values. Like phoneme grasping, which starts and develops best when manipulating appropriately pairs of spoken-written syllables, in the other way, round letters must be imbibed by phonology from the beginning and the success of this learning process must be checked by the teacher.

Dyslexia has received diverse explanations based on visual, or visuo-spatial, or visuo-attentional factors. The latter is a particularly interesting case, because all the data supporting it as a cause of poor reading can also be interpreted as a consequence. During reading acquisition, the letter perceptual span increases (but the size of the orthographic units, which represent phonological units, also increases). In Bosse, Tainturier, and Valdois (2007), from 1st to 3rd to 5th grade, the % of letter sequences correctly identified jumped from 7% to 34%. Dyslexics aged 11.5 years on the average had a mean reading age of about eight years and could obtain only 26% correct identifications, much less than the normal readers of the same chronological age (60%). However, the fact that in the dyslexics compared to normal readers there was a greater lateral masking effect only for Latin letters, not for Korean ones (Pernet, Valdois, Celsis, & Demonet, 2006), implies that the dyslexics' inferiority concerns a late stage where the letters are put in relation with stored knowledge (which could be phonological). The idea that some phonological impairment is involved in dyslexics assumed to present a visuo-attentional deficit is supported by the fact that they were found to be inferior to normal readers when

they had to read a real text but not when they had to search for the occurrence of a target letter, for example "R," in a "text" made only of consonants (Prado, Dubois, & Valdois, 2007). Thus, dyslexia, even in those who have apparently mastered decoding, does not result from a deficit in a general perceptual analyzer, but in one that is specific to orthographic structures, i.e. structures whose function is to code phonological ones. Dyslexics who can decode but rely too much on decoding are much more affected by word length and may need twice the number of fixations that normal readers have (Hawelka, Gagl, & Wimmer, 2010).

The dissociation interpreted as between phonological and visual attention span disorders (Peyrin et al., 2012) may actually reflect different developmental stumbling blocks affecting decoding. In this study, two highly educated adult dyslexics, graduated by the University, have been examined. LL, presented as phonological dyslexic, managed to read and spell both irregular words and pseudowords as correctly as normal readers, but she was slower. In contrast, she failed almost completely a difficult phonemic awareness task (spoonerisms). Her result pattern is thus very similar to that of the economist I examined and mentioned in Morais (1994). LL was a phonological dyslexic and it does not make sense to keep calling her dyslexic unless we invent the expression "dyslexic literate". FG was presented as having a visual parallel processing disorder but preserved phonological skills. Indeed, his global report of consonantal strings was very poor (but not the post-presentation cued report of one of the consonants), and he performed normally with spoonerisms. However, FG, compared to LL, was slower in reading irregular words, poorer in spelling them, and also clearly poorer in pseudoword reading. His excellent awareness of phonemes does not imply that all his phonological skills are preserved. Phoneme awareness, as indicated above, is a predictor of reading performance only in the very initial grades. Augmenting the size of the phono-orthographic units involved in decoding frees the reading process from the phoneme unit. It is either at decoding through larger units or, more likely, at the memorization of word representations automatically accessible that FG had experienced serious difficulties. This would explain why FG made numerous errors in reading and spelling pseudowords and was too slow on irregular words. When these cannot be read fast, it means that they must be read by a necessarily time-consuming "corrected decoding."

The theory I suggest is that problems can arise at one or the other, or both, of the first two acquisitions that lead to skillful reading: phoneme awareness and decoding. The difficulties with orthography experienced at advanced decoding are also difficulties with phonology. Orthography exists by reference to phonology. It is a specific way of representing phonology, its code. It may be visual, or it may be tactile: orthography is not tied to a sensory modality. Phonology, too, is not strictly dependent on hearing, as we know that deaf people using "cued speech" develop phonological representation and can learn to read and write quite well (Leybaert, 2000). Regarding intervention, in the same way as phoneme awareness is grasped through appropriate questioning on material arranged in such a way that the learner can "isolate" the phoneme, the repeated exposure and orientation of attention to particular phonograms in different lexical contexts should help the learner to create such units. Additionally, as proposed in Share's (1995) theory, and confirmed ex-

perimentally by him and others, organized exposure to repeated words in teaching classes (obviously, of pseudowords in experimental sessions) should help to create the long-term word memory called the "orthographic mental lexicon."

Does the above theory imply that dyslexia is nothing more than severely-poor reading and spelling that is or seems highly intractable? Before answering this question, it is opportune to recall the impressive study by Fluss et al. (2009). These authors examined more than 1,200 second-graders with at least 16 months of instruction, from 20 schools in Paris. They came equally from high, medium and low classes, which allowed a comparison of the prevalence of poor reading in each social class. Poor readers, according to the criterion of a 12-month delay in the reading tests, were 12.7% of the total sample, and the impact of social class was huge: only 3% came from the high class, 11% from the medium class, and as much as 24% from the low class. Thus, a low class child is eight more times at risk than a high class child of becoming a poor reader. This data shows that the estimations that 10% to 20% of the general population is dyslexic must be gross overestimations.

The 3% of high class poor readers cannot be all dyslexics, i.e. due to genetic anomaly. Assuming that all of them benefit from the cognitive and linguistic advantages afforded by their class, there may be high class poor readers for affective, motivational problems or, indeed, innate and severe cognitive backwardness. The 3% is thus itself an overestimation. On the contrary, to assume that only a maximum of 3% among the medium and the low class children are dyslexics may be an overestimation, as a poor milieu can influence epigenetics. We must admit that we ignore almost everything about these questions. The genes identified as being involved in dyslexia do not seem to be dyslexia-specific, but relevant for other learning domains or for learning in general. Anyway, the concept of dyslexia is vague. If it is defined only by very poor reading, it lacks of specificity; and it also lacks of specificity if it is defined by a genetic origin, given that this origin is not demonstrated to be reading and/or writing-specific.

I am not proposing to abandon the concept of dyslexia. In science one must be patient; we can keep it waiting until more relevant evidence is obtained. In the meanwhile, we should agree that, even if we should continue doing everything that can be done for the so-called dyslexic children and adults, we should also do, not more but as much, for the several times greater part of the population constituted by children and adults who are poor readers and spellers who are poor readers and spellers and in many cases functionally illiterate. Presently, perhaps because "dyslexics" are numerous, or seem to be numerous, in countries' high classes, there are many initiatives such as world foundations and congresses on dyslexia. I think they are welcome. However, there should be also many initiatives, world foundations and congresses on child and adult illiteracy. Since the world's governments became neoliberal, no more international meetings comparable to those on dyslexia worry about illiteracy. Only the UN and its dependent organization UNESCO are publishing reports that repeatedly call the world's attention to the permanence of this serious situation and to the risks of functional illiteracy increase. This is strange because we know it seems feasible and not ruinous to eradicate illiteracy. The vex-

ing case of the revolutionary Cuba, which eradicated illiteracy in a few years, has been voted to embarrassing silence.

What I propose, given the passivity of most of the worlds states, politicians and potential private donors, is the following. Researchers, academics and teachers can form a huge contingent of literate people to come in aid of the illiterate and functionally illiterate people and to raise literacy preparation and learning for, respectively, preschool and primary school children. They can do it, to begin, on a local basis, by joining their efforts and expertise to those of communities, associations and committees that are already operating in the field. Two pressing objectives are (1) to nurture the parents, by showing them how to help their children, at home, to develop emergent literacy (cf. among others, Morais, 2016, chapter 1.4), and (2) to teach appropriately most of the teachers (cf. among others, Rayner, Foorman, Perfetti, Pesetsky, & Seidenberg, 2001) who were not taught themselves how to best teach children learn reading and writing. They were not taught so, partly because their own teachers have old and a-scientific (if not antiscientific) conceptions (see Brady, 2011), and partly because the governments are not interested in transforming education in a way that would put in danger the oligoliteracy (Morais, 2016).

1.6 Conclusion

To conclude, I formulate, first, what should be a preliminary question to the debate on the present issue, and, second, the question that is socially the most relevant concerning the methods of learning to read and write in an alphabetic system.

The preliminary question is: “What ethical values should inspire educational authorities, but also educators and researchers?” Hoping to contribute to triggering a debate, my answer is: The main ethical value, in what concerns the acquisition and development of literacy is a strict equality of rights to be realized in equitable educational efforts, from birth to high-level studies, whatever the social origin of the children and of the families.

The question about learning to read and write methods in the alphabetic system is: “Is there one method more democracy-friendly than the others?” My answer is yes. More precisely, it is phonics, which is based on a clear comprehension that the alphabetic characters stand for phonemes, that it is necessary to learn the decoding-recoding mechanisms in reading and writing taking into account the orthographic code, and that skillful alphabetic literacy is automatic access to word orthographic representations allowing, eventually, in connection with other cognitive capacities, a productive and creative use of the literacy abilities. This method is the only one that is really democratic because it gives each person the autonomy and automaticity of reading and writing that conditions an efficient processing and communication of information and that, by this mean, permits a personal, pondered and critical participation in collective debates and decisions.

Acknowledgments

Preparation of this paper was supported by the FRS-FNRS under grant FRFC 2.4515.12 and by an Interuniversity Attraction Poles (IAP) grant 7/33, Belspo. I thank Régine Kolinsky for very useful comments and suggestions.

References

Blomert, L. (2011). The neural signature of orthographic-phonological binding in successful and failing reading development. *NeuroImage*, *57*(3), 695–703. doi: 10.1016/j.neuroimage.2010.11.003

Bosse, M.-L., Tainturier, M. J., & Valdois, S. (2007). Developmental dyslexia: The visual attention span deficit hypothesis. *Cognition*, *104*(2), 198–230. doi: 10.1016/j.cognition.2006.05.009

Brady, S. (2011). Efficacy of methods teaching for reading outcomes: Indications from post-NRP research. In S. Brady, D. Braze, & C. A. Fowler (Eds.), *Explaining individual differences in reading* (pp. 69–96). New York, NY: Psychology Press.

Calfee, R. C., Lindamood, P., & Lindamood, C. (1973). Acoustic-phonetic skills and reading: Kindergarten through twelfth grade. *Journal of Educational Psychology*, *64*(3), 293–298. doi: 10.1037/h0034586

Connelly, V. (2002). Graphophonemic awareness in adults after instruction in phonic generalisations. *Learning and Instruction*, *12*(6), 627–649. doi: 10.1016/S0959-4752(01)00034-2

Fernandes, T., Vale, A. P., Martins, B., Morais, J., & Kolinsky, R. (2014). The deficit of letter processing in developmental dyslexia: Combining evidence from dyslexics, typical readers and illiterate adults. *Developmental Science*, *17*(1), 125–141. doi: 10.1111/desc.12102

Fluss, J., Ziegler, J. C., Warszawski, J., Ducot, B., Richard, G., & Billard, C. (2009). Poor reading in French elementary school: The interplay of cognitive, behavioral, and socioeconomic factors. *Journal of Developmental and Behavioral Pediatrics*, *30*(3), 206–216. doi: 10.1097/DBP.0b013e3181a7ed6c

Hawelka, S., Gagl, B., & Wimmer, H. (2010). A dual-route perspective on eye movements of dyslexic readers. *Cognition*, *115*(3), 367–379. doi: 10.1016/j.cognition.2009.11.004

Huey, E. B. (1908). *The psychology and pedagogy of reading*. New York: Macmillan.

Kavanagh, J. F., & Mattingly, I. G. (Eds.). (1972). *Language by ear and by eye: The relationships between speech and reading*. Cambridge, MA: MIT Press.

Kolinsky, R., Leite, I., Carvalho, C., Franco, A., & Morais, J. (2016). Tracking reading acquisition in adulthood: Completely illiterate adults can learn to read in three months. *in preparation*.

Leigh, E. (1864). *Pronouncing orthography*. Isha Books.

Leybaert, J. (2000). Phonology acquired through the eyes and spelling in deaf children. *Journal of Experimental Child Psychology*, *75*(4), 291–318. doi: 10.1006/jecp.1999.2539

Liberman, A. M., Cooper, F. S., Shankweiler, D. P., & Studdert-Kennedy, M. (1967). Perception of the speech code. *Psychological Review*, *74*(6), 431–461. doi: 10.1037/h0020279

Liberman, I. Y. (1973). Segmentation of the spoken word and reading acquisition. *Bulletin of the Orton Society*, *23*(1), 64–77. doi: 10.1007/BF02653842

Liberman, I. Y., Shankweiler, D., Fischer, F., & Carter, B. (1974). Explicit syllable and phoneme segmentation in the young child. *Journal of Experimental Child Psychology*, *18*(2), 201–212. doi: 10.1016/0022-0965(74)90101-5

Lonigan, C. J., Burgess, S. R., & Anthony, J. L. (2000). Development of emergent literacy and early reading skills in preschool children: Evidence from a latent-variable longitudinal study. *Developmental Psychology*, *36*(5), 596–613. doi: 10.1037/0012-1649.36.5.596

Martinet, C., Valdois, S., & Fayol, M. (2004). Lexical orthographic knowledge develops from the beginning of literacy acquisition. *Cognition*, *91*(2), B11-22. doi: 10.1016/j.cognition.2003.09.002

Morais, J. (1994). *L'art de lire*. Paris: Odile Jacob.

Morais, J. (1996). *A arte de ler*. São Paulo: Unesp.

Morais, J. (1998). *El arte de leer*. Madrid: Visor.

Morais, J. (2014). *Alfabetizar para a democracia*. Porto Alegre: Penso.

Morais, J. (2016). *Lire, écrire et être libre: De l'alphabétisation à la démocratie*. Paris: Odile Jacob.

Pernet, C., Valdois, S., Celsis, P., & Demonet, J.-F. (2006). Lateral masking, levels of processing and stimulus category: A comparative study between normal and dyslexic readers. *Neuropsychologia*, *44*(12), 2374–2385. doi: 10.1016/j.neuropsychologia.2006.05.003

Peyrin, C., Lallier, M., Demonet, J. F., Pernet, C., Baciu, M., Le Bas, J. F., & Valdois, S. (2012). Neural dissociation of phonological and visual attention span disorders in developmental dyslexia: fMRI evidence from two case reports. *Brain and Language*, *120*(3), 381–394. doi: 10.1016/j.bandl.2011.12.015

Piketty, T. (2013). *Le capital au xxie siècle*. Paris: Seuil.

PISA. (2013). *https://www.oecd.org/pisa/keyfindings/pisa-2012-results-overview.pdf*.

Prado, C., Dubois, M., & Valdois, S. (2007). The eye movements of dyslexic children during reading and visual search: Impact of the visual attention span. *Vision Research*, *47*(19), 2521–2530. doi: 10.1016/j.visres.2007.06.001

Rayner, K., Foorman, B. R., Perfetti, C. A., Pesetsky, D., & Seidenberg, M. S. (2001). How psychological science informs the teaching of reading. *Psychological Science in the Public Interest*, *2*(2), 31–74. doi: 10.1111/1529-1006.00004

Reber, A. S., & Scarborough, D. L. (Eds.). (1977). *Toward a psychology of reading: The proceedings of the cuny conferences*. Hillsdale, NJ: Lawrence Erlbaum Associates.

Scholes, R. J. (1993). *Literacy and language analysis*. Hillsdale, NJ: Lawrence Erlbaum Associates.

Seymour, P. H. K., Aro, M., & Erskine, J. M. (2003). Foundation literacy acquisition in European orthographies. *British Journal of Psychology*, *94*(Pt 2), 143–174. doi: 10.1348/000712603321661859

Share, D. L. (1995). Phonological recoding and self-teaching: Sine qua non of reading acquisition. *Cognition*, *55*(2), 151–218. doi: 10.1016/0010-0277(94)00645-2

Share, D. L. (2004). Orthographic learning at a glance: On the time course and developmental onset of self-teaching. *Journal of Experimental Child Psychology*, *87*(4), 267–298. doi: 10.1016/j.jecp.2004.01.001

Stanovich, K. E., Cunningham, A. E., & Cramer, B. B. (1984). Assessing phonological awareness in kindergarten children: Issues of task comparability. *Journal of Experimental Child Psychology*, *38*(2), 175–190. doi: 10.1016/0022-0965(84)90120-6

van Leeuwen, C., & Lachmann, T. (2004). Negative and positive congruence effects in letters and shapes. *Perception & Psychophysics*, *66*(6), 908–925. doi: 10.3758/BF03194984

Wagner, R. K., Torgesen, J. K., & Rashotte, C. A. (1999). *Comprehensive test of phonological processes (CTOPP).* Austin, TX.