



**Seven simple ideas
about dyslexia and reading**

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What I want to do is to go through a very simple set of ideas about dyslexia and about reading.

1.

What is *dyslexia*?

- *an impairment in the processing of written language*
- *more precisely, in the identification of written words*

First, dyslexia is an impairment in the processing of written language. In principle there is no impairment in the processing of spoken language. What is affected is only the secondary representation of language and, more precisely, it is an impairment in the identification of written words. Certainly, dyslexia may occur with deficits in other functions and not within the reading function.

There may be other impairments associated with dyslexia,

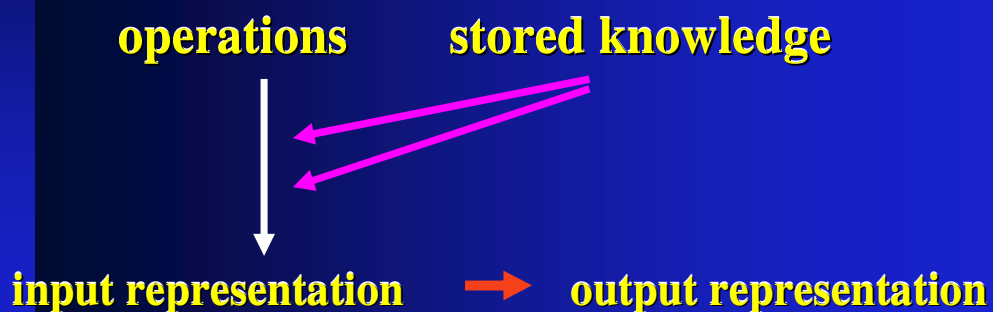
but the impairment in written word identification is a *necessary* (not a sufficient) condition to say that someone is dyslexic

Someone who is good (fast and accurate) at identifying written words cannot be considered as dyslexic

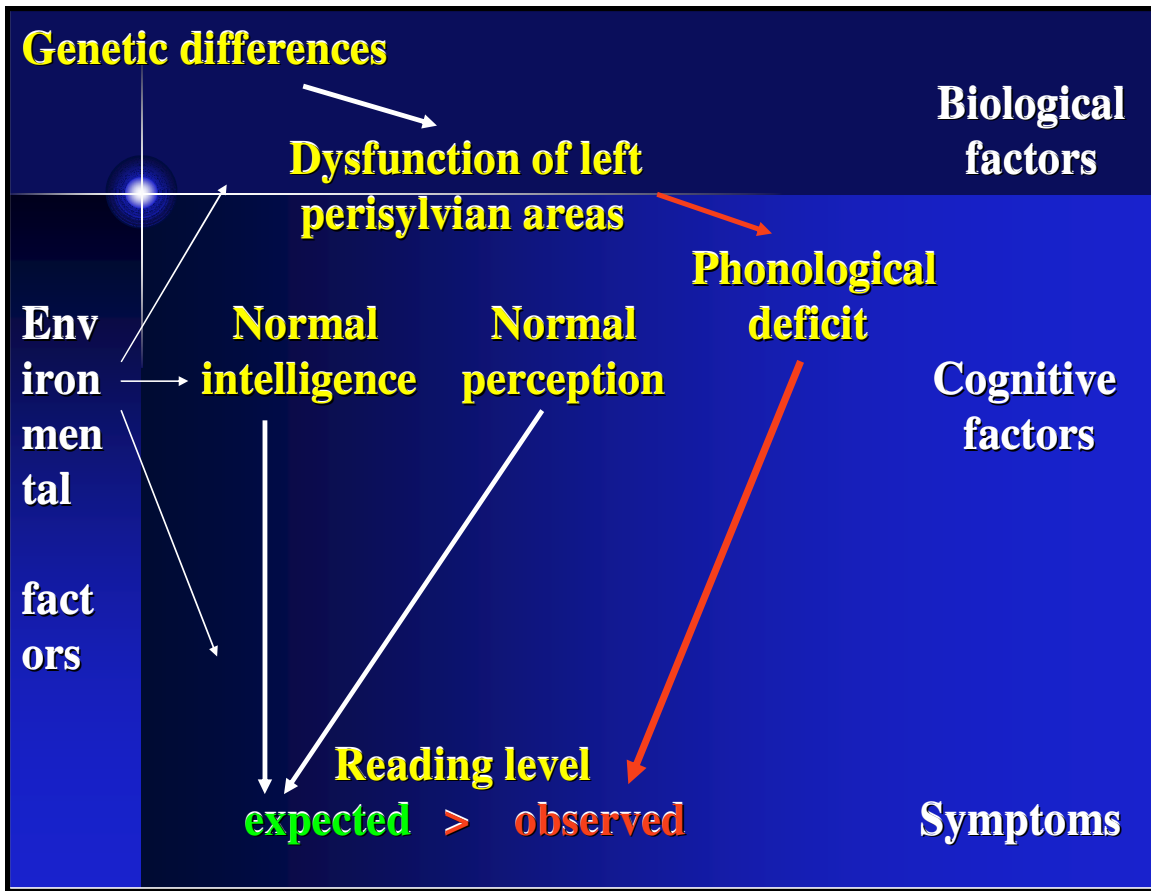
Obviously, someone who is fast and accurate at identifying written words cannot be considered as dyslexic. Therefore the inability in written word identification is a necessary condition to say that someone is dyslexic. It is a necessary but not a sufficient condition. The mere presence of this inability does not allow us to consider the child or the adult as dyslexic. In other words, it must be selective. If all the cognitive components of reading activity are impaired then it is a global deficit, it is not dyslexia.

A cognitive explanation is necessary

Information processing



This leads us to the idea that we need a cognitive explanation of reading. A cognitive description is one in terms of information processing in which representations are transformed into other representations through operations that employ stored knowledge. In a minute I will apply this to reading.



Dyslexia may be described at different levels, neurobiological, cognitive and behavioural and, in this schema, dyslexia results from a phonological deficit that may have a genetic origin. This is a deficit that is frequently observed in dyslexics, but there may be other deficits as well.

A phonological deficit affecting reading may result from other biological causes

The case of deaf children

Deafness makes learning to read difficult

But deaf children can develop phonological representations and learn to read by other means (lip reading + a system of signs called “cued speech”)

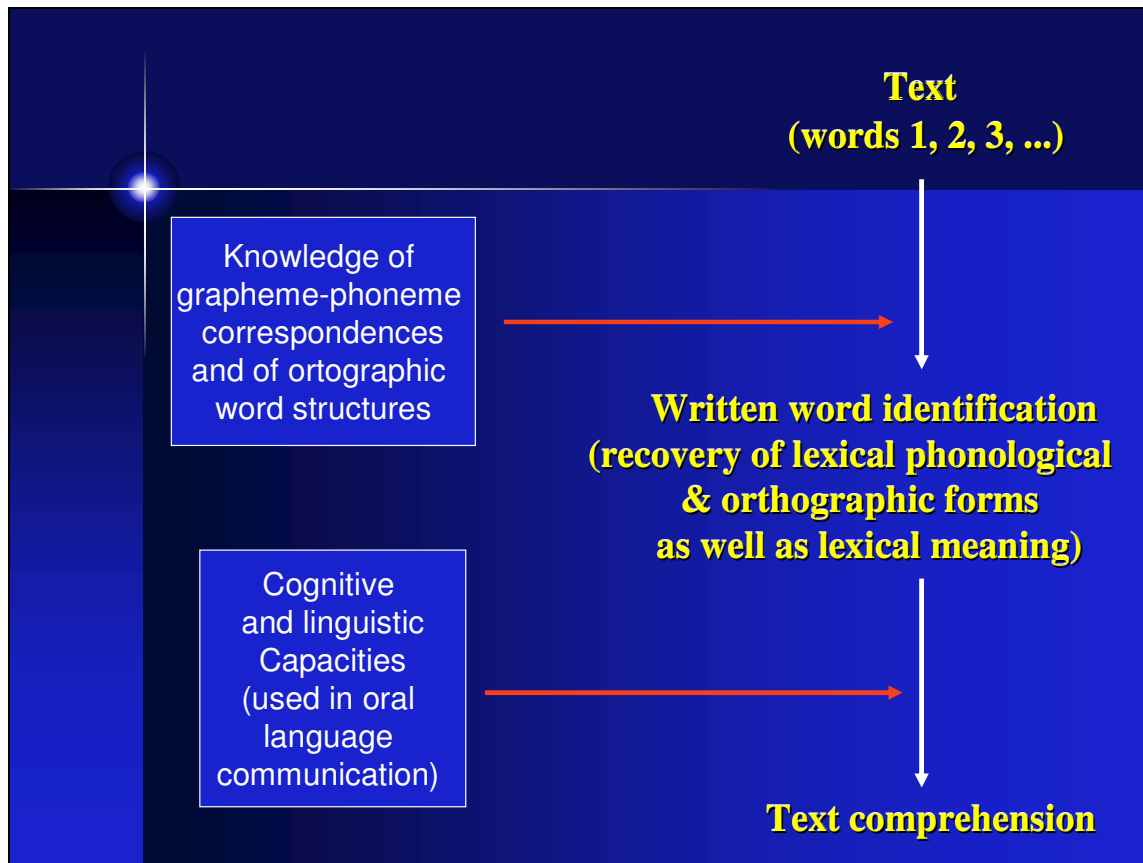
A phonological deficit in development may arise for other reasons such as in deafness. Deafness makes the identification of written words difficult but the person cannot be called dyslexic. In deafness there is actually no intrinsic phonological anomaly. The proof is that some deaf children can develop phonological representations and they can learn to read reasonably well by processing cued speech signals in order to compensate for the insufficiency of lip reading.



2.

**One cannot understand dyslexia
without understanding reading**

The second idea is the following: I believe that dyslexia is only understandable by reference to what is involved in reading.



The reader uses knowledge of grapheme-phoneme correspondences and of word structures to convert the surface representation of words into pronunciation and meaning. Then the reader uses other, more general, linguistic and cognitive capacities, also necessary to understand oral language, in order to convert lexical information of successive words into a meaningful and articulate representation of the text.

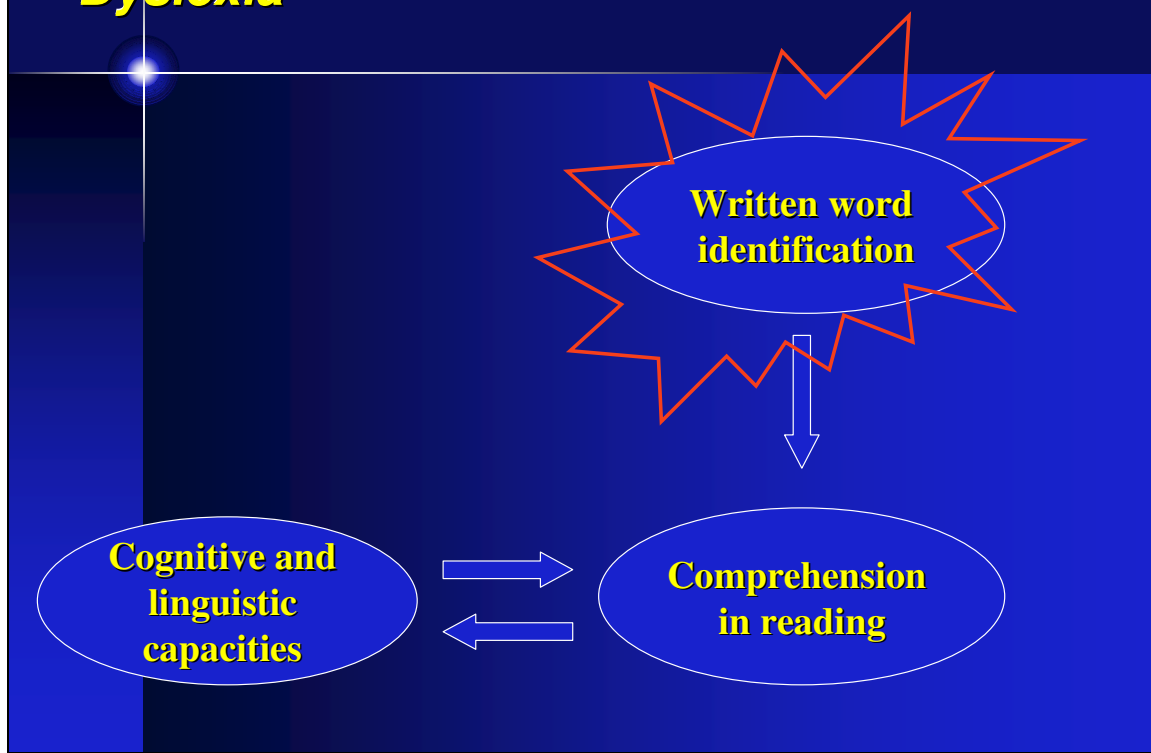


3.

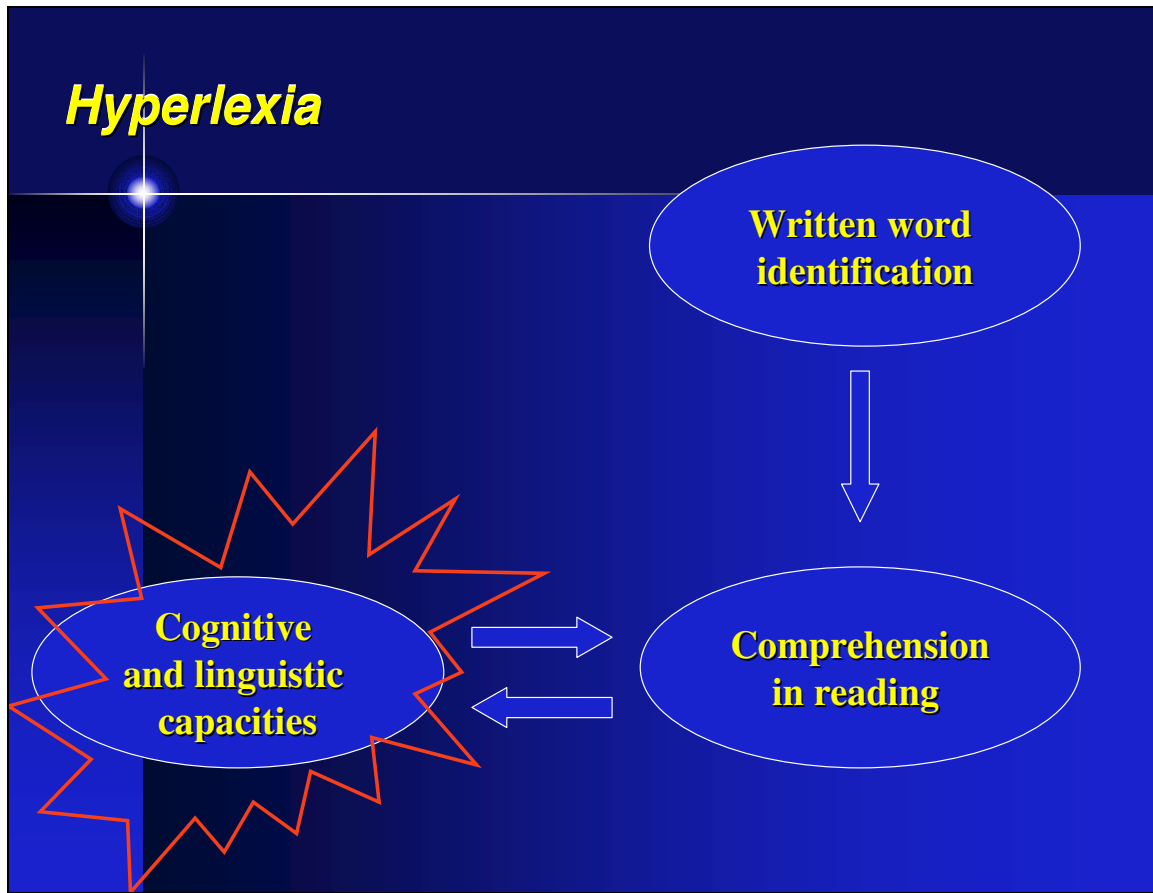
**Deficits may occur
in one of these two main components
of text comprehension or in both**

The third idea is that deficits may occur in one of these two main components of text comprehension, or in both.

Dyslexia



This is the case of dyslexia. I have already said that what is affected in dyslexia, to some extent, is only the written word identification component. Of course this can interfere with fluent reading and comprehension.



In the case of hyperlexia only the component of general linguistic and cognitive capacity is affected, but in a very severe way, so that text comprehension is almost impossible.

Around 20% of low-achieving children, of whom:

3% to 5% dyslexics

very few hyperlexics

**15% to 17% “poor readers”
(poor in written word identification
AND poor in cognitive and linguistic resources,
mostly for sociocultural reasons)**

There might be, perhaps, 20% of low-achieving children, most of whom are actually impaired in both components of reading. Dyslexics may be perhaps 3 to 5% of the whole population.

4.

The learning of written word identification includes 3 steps:

1 — understanding the alphabetic principle (that phonemes are represented by graphemes)

2 — mastering graphophonological decoding

3 — elaborating orthographic lexical representations and accessing them automatically

Now, given that dyslexia is an impairment of written word identification, it is justified to decompose the learning of this ability into main steps. These steps are: Understanding the alphabetic principle, mastering decoding, and elaborating orthographical lexical representations that can be accessed in an automatic way.



5.

**A deficit at one step may have repercussions
on the subsequent steps**

The order of these steps may reflect a relation of dependency, so that a deficit in step one or in step two has an impact on steps two or three, respectively.

Possible deficits:

1 — In phoneme representations (awareness)

(?) in learning abstract letter categories

—> impact on decoding

In step one, possible deficits may be on phonemic representations, on awareness of phonemes and on the abilities linked to the explicit representation of phonemes.

But perhaps there is also some deficit or some difficulty in acquiring abstract letter categories. So any of these possible deficits in phonemic awareness, as frequently demonstrated in the literature, can have an impact on decoding.

Possible deficits:

2 — In mastering decoding at the level of grapheme-phoneme correspondences and above (onset, rime, syllable...)

(?) - in acquiring knowledge of orthographic rules (implicit learning of frequent letter sequences)

—> impact on automatic lexical access

In step two, possible deficits concern the ability to use decoding. First at the level of grapheme-phoneme correspondences and then above, in using larger units like onset, rime or syllable. It is quite important to develop these larger units in order to attain an automatic, fluent way of reading. But there may also be some difficulty in acquiring knowledge of orthographic rules through an implicit learning of letter frequencies, but in my view of the literature there is less evidence for this. These two possible deficits can have an impact on automatic lexical access, which is the aim of step three.

Possible deficits:

- 3 — In the quality of the phonological representations used in decoding,
or in phonological memory needed to assembling processes,
or in “visual” or spatial attention over units of word size,
or in associating different types of information
(phonological, orthographic, semantic)**

In step three, possible deficits may result from a poor quality of the phonological representations used in decoding (there are some ideas about what “low quality” might mean; there have been several attempts to obtain empirical data on these questions, but it is still quite difficult.) Another possible deficit might be in phonological memory, which is needed to assemble the represented units. It might also concern the visual or spatial attention that is necessary to group and to look over units of word size, and finally, perhaps deficits in associating different types of information that are necessary for fluent and correct word recognition, such as phonological information, orthographical information and semantic information.

6.

**Reeducation of dyslexics
requires an early and precise
psycholinguistic analysis and evaluation
of each child**

To finish, I would like to say that re-education of dyslexics requires an early and precise psycholinguistic evaluation of each child. We have seen that there are different possible deficits leading to dyslexia and so in each case a precise evaluation is needed; not many people have the expertise to do that, so we certainly need more experts in psycholinguistic evaluation.

7.

**More generally,
re-education of dyslexics, in most cases,
should not be fundamentally different from
reeducation of “poor readers”**

My final claim is that, more generally (for many cases), re-education of dyslexics should not be fundamentally different from re-education of poor readers because activities that are useful with poor readers will be useful with dyslexics ...

- training of phonological (especially phoneme) abilities**
- immersion in literacy activities and supervised practice in reading (phonics and emphasis on fluency)**
- language development (vocabulary, strategies of comprehension in reading)**

... for example training of phonological abilities, immersion in literacy activities, phonics (an emphasis on phonics and fluency) and also actions for language development.