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## What Might Be Particular In The Development Of Cognitive Competencies In Dyslexics -An Experiential View

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Development and nature of cognitive competencies in dyslexics is an interesting issue. In relation to this issue I'll be dealing with "working memory".

To begin with, I'd like to quote the following passage from a radio programme I was listening to some days ago on France Culture, my favourite radio programme. The programme was presenting Dominique Sampiero, the author of the "The Women's' God". Of course I got attracted to what he was saying about the novel, but even more to how he was describing his writing and his memory.

*"I can not believe that writing is a reality nor an activity. I keep thinking that it is somehow ephemeral. At least, writing helps me. Writing helps me to compose myself, to know where I stand and who I am in this world. It helps me remember, because this memory of mine is somehow fragmentary, not synthetical at all. My memory is by no means linear. It is difficult for me to remember what came before and what came next. This sequencing in time is very difficult for me. But I do remember details, all sorts of tiny details. I can, for instance, remember that the man who aggressed me in the street was wearing a Lacoste shirt. In fact I only remember the label Lacoste. Yes, details. Details come back in my memory. They become very important, extremely important. And with those details entire situations come back and this is how I remember. I have no memory, and I think one day it will be very easy for me to have lost it. Now, I do not have an entire view of what I have lived.... It is all fragmentary. When writing, I get the feeling that I exist here... and now in the present. And this feeling is even more important for me than the writing itself".*

No wonder, I have found this quotation interesting. It depicts how myself and probably many other dyslexics feel about our memory. It is difficult for me to remember the contents of my lectures... and for oral exams I have to give to my students.... I go back and study.... in order to be able to retrieve various items and facts, and ideas at the right moment. .... Moreover, it is difficult for me to keep in mind a whole picture of the contents... so I have to build it up in advance; I have to write it down.... To be sure of the good sequencing...of the structure... and then I can trust myself, because in the course of the lecture all sorts of details will come back... and finally the lecture will end up successfully.

## Working memory

From studying the international literature in the field it can be deduced that cognitive competencies and cognitive activities are dependent on what is called *working memory*.

Now, what *is working memory*? We associate working memory with a dynamic system that enables the retention of information. As a result of this cognitive activity the very dynamic system changes (Hutton and Towse, 2001) Working memory is thus not the same as short term memory, the latter enabling only more or less passive storing of information.

The notion of working memory has become very popular in cognitive psychology over the last twenty years. Namely, in the process of acquisition and application of the basic cognitive capacities, the working memory plays a central role. It is, namely, related to the development of complex cognitive activities such as:

- Speech comprehension,
- Reading,
- Writing,
- Calculating and
- Reasoning.

All these complex cognitive activities can be or some of them can be specific in dyslectic children and adults. To illustrate this point, particularly the activity of reasoning, let me quote for you Peter's case.

*What Goethe is to Germans France Prešern, a great Slovenian poet, is to Slovenes. Peter is an eight-year boy attending primary school. When his class is given a test, the teacher warns the class and Peter in particular to be attentive, not to write »stupidities«. One of the questions in the test was: Where was France Prešern born? The correct answer Willow tree (Slov, Vrba). How was Peter reasoning: Willow tree.... No, such a great poet could not possibly be born at the foot of a willow tree... Unless his mother pregnant with him did not have time to get to the maternity hospital on time and was left at the foot of this willow tree... And after all, how can such a great and important poet be born in a small village. No way... He must have been born in Ljubljana, the capital city.*

*Or let me quote an example of my own way of thinking. It is, as you will see, quite divergent. .... When taking the driving test I was presented with a picture showing a red light regulating the traffic on a road. Half of the road was blocked and the other half was open to traffic. Well I understood of course that red light mean that the traffic should stop...altogether. But I was thinking, that the red light was meant only for the line that was open to traffic... and may be the other half.... Well, it was obviously blocked but for me it was just a detail that did not stop my further thinking... I think that for some*

*dyslexics to taking into account the given context...may be at times quite difficult. We like being free of the context.*

*Or yet another example of an adult dyslexic student...who when we were discussing, in a generalised way, the transformations going on in contemporary families... all of sudden said » But not, this can not be true... What about Muslim families....« A totally unexpected but valuable comment demonstrating the divergent way of thinking...in dyslexics.*

### **The Baddeley-s model of working memory**

Now, to go back to working memory. The most elaborated model of working memory seems to be the one that was developed by Baddeley and his collaborators (Baddeley, 1986, 1992) .

This model was based on the idea that multiple forms of memory storage were tied together in a particular architecture in which the stream of data flowed from sensory memory to a short term store and from there to long term store.

*Baddeley-s Working memory model suggested how working memory might work*

*Baddeley proposed that when remembering something we have heard, it is held in a "phonological loop"*

*We can keep something in the phonological loop by subvocal rehearsal*

This model consists of three constituent parts:

**(1) The central executive** performing different functions like:

- Coordination of information from different sources,
- Inhibiting of dominating responses having become non pertinent
- Activation of the permanent memory information.
- Planning of activities ( Baddeley 1996).

The central executive is a flexible and independent part of the working memory.

There are two other specialised composing parts of the working memory dependent on the central executive. i.e.:

**(2) The phonological loop** implied in the temporary storing of verbal information

**(3) The visuo-spatial scratch pad** implied in the temporary storing of visual information

This model has been subject to a lot controversy. Nevertheless it has been widely referred to.

## Verbal working memory Phonological loop and articulatory loop

How many verbal items, how many words can you remember after just one presentation? It has been found that a 12-year-old child can remember as many as an adult... How many you can remember depends on how well your *mental repletion strategies have been developed*. Such strategies are a mechanism allowing for recalling the elements stored by means of the phonological loop. Henry *et al.* (1989) have demonstrated that verbal repetition is much more efficient by using audio than visual stimuli. Young children visual images as visual images. Elderly children, on the contrary convert the image into a verbal code.

If I can dwell on the observation of my own strategies, I can say that I do the same. If I want to remember visual images I have to convert them into words... Well this seems to be a predominant strategy in adults, be they dyslexic or no. When they want to memorise a number of items. A certain spam of items. (Palmer 2000). At the age between 6 and seven children can use both encoding systems at the same time.

### The role of the phonological loop in mental activities - working memory and speech disorders

When a subject can not remember a greater number of verbal items. When his or *her verbal span* is reduced, this is most probably due to developmental troubles concerning speech function. When the phonological loop and articulator loop have been damaged different functions can be changed as a result of it:

*The reading-comprehension*- It has been demonstrated that there is a link between a reading comprehension deficiency and working memory deficiency. That means that when our understanding of written text is deficient our working memory is deficient too.

Let me illustrate this point by my personal experiences. When I read a text intentionally, my feeling is that sometimes I have difficulties understanding it.... at first glance, because I keep forgetting what has been said before... I have the same feeling when I read texts I have written myself...

Several difficulties were detected in children who had difficulties decoding a text in a correct way. The difficulty of

- making inferences on a basis of a text (Oakhill 1984)
- Integrating different elements of the text in order to establish a global meaning of the text( Oakhill, 1982, 1983)
- using the context as to process the text ( Nation and Snowling, 1998)
- gathering the scattered information in the text( Cataldo and Oakhill, 2000) and poor vocabulary

### **Advantages and defficiencies of dyslectic subjects**

They can differ a lot from subject to subject but they can appear in typical clusters.

If I try to analyse my own defficiencies, the defficient working memory is the one that most bothers me. When I start thinking and composing a very abstract and creative thought I am sometimes not sure if I will manage to finish it. To keep track of it. Because I do not keep in my memory the beginning of the thought. It is very risky for me to start one line of thinking and to insert in it another one, to make a digression. Especially if it is a longer one.. I might loose track.

Enumerating is a problem for me. I avoid saying for instance: "There are three phenomena to be taken into account here. First, second, third" I might forget the third one altogether.

When I am invited in a television programme I must do a lot of reading of my own texts before in order to remember basic theses at the right moment, I simply do not trust myself...

All my lectures have to be written down. I do not read them of course. But still.Or at least I need a very good structure jotted down in advance.

I have difficulty imagining real questions after a lecture and when invited to ask them. So I ask questions about things I know.

If I get ill and I am bedriddden for lets say, a fortnight... the feeling I get after some time is that I have difficulties understanding complex information.. moreover I have diffculties memorising it.

But I am extremely good at generalising, discovering principles. I have lots of creative ideas. I can imagine innovative strategies.

I can see all sorts of connections between different areas....

I am very good at setting up projects...

I can get passionately interested...in many different subjects and I can find new connections among them...

Solving problems and problem based learning are very attractive to me.

My perception is not selective in general but it gets extremely selective when I am searching for a solution of a problem.

I could go on enumerating my advantages, or at least those I consider as such. It is time, I think, we started considering not only deficiencies, but also advantages, and, shall we say, gifts dyslexics possess.

### Conclusion

Cognitive competencies of dyslexic subjects can differ from what we expect. Many dyslexics suffer from deficient working memory. As a result of it they develop compensating strategies. Their advantage, however, can be creative thinking.

In the industrial era, based on standardised and massive production and consumption dyslexic way of thinking was, and still is, to some extent, disturbing. But, what about the economy of knowledge? New professions require people who learn and produce in different ways. But, most of all they require creative thinkers, be they dyslexics or not.

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