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Review Article

Hyperlexia from a personal point of view: some counselor's insights

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Abstract

In this article, I discussed my experiences and opinions as a gifted counsellor, on Hyperlixia, an important exceptionality that remains mysterious, within the framework of the opinions of experts in this field. First of all, I explained that Hyperlexia and Hypercalculi also occur in gifted people and the approach of families. Then, I reviewed the course of Hyperlexia and Hypercalculia research. Here, I explained the lack of definitive and angular diagnostic criteria, as well as the possibilities of determining the existing signs of these two exceptionaities. Then, I included the definitions of experts in the last 30-40 years on the definition of hyperlexia and hypercalculia, as well as the discussion at what age this diagnosis should be made. I gained insight from research on the prevalence of hyperlexia in society and its distribution by gender. In this study I have presented a personal point of view, that of a counselor, on hyperlexia, a phenomenon not very well known among education and mental health professionals, and much less among the public. In my opinion, this knowledge can serve very many children who are either not identified for autism or identified much later had they not have hyperlexia, which, in many cases, serves as a mask, covering the poor or even non-existence of the child's social abilities, and serves as a "reason", "explanation" for his or her repetitive behavior. I have concentrated in five aspects of hyperlexia – not necessarily those perceived as "the most important" but those which help the potential reader "make sense" of the seemingly contradictions characterizing it: very high reading ability at a very young age, perceived as a characteristic – even as a "proof" of precocity or giftedness, along with social disability and repetitive behaviors, typical to autist which are perceived as having low intelligence level.

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Introduction

The phenomenon of children reading at a very young age has been intriguing me for six decades – even before children who could read at age 3, 4 or 5 were named "hyperlexic" or "having hyperlexia". It had probably to do with my Ultra-Orthodox background, where 3-year olds – or, at least – toilet-trained 3-year old boys – started going to the cheder, literally: "room"; a traditional primary school teaching the basics of Judaism and the Hebrew language. Both my brothers did not attend such a traditional cheder; my older brother started attending the preparatory class attached to his Talmud Torah school at age 4; my younger brother did attend a sort of a cheder a month before his 3rd birthday – he was born at the end of the month of September, and the Ultra-Orthodox school year starts on the first day of the month of Elul – the last month of the Jewish year, still in August. However, this place for 3-6-year olds, though also called "cheder", had both a male tutor, in charge on the Jewish and literacy materials, and a female kindergarten teacher, for teaching music, art, social issues and everything else a pre-school child has to lean and experience.

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Both my brothers started reading shortly after being exposed to systematic learning. At age 5 my older brother was reading fluently and started formal school; at age 4 my younger brother enjoyed reading children's books. He was very happy in his cheder and continued his education there for additional two years. A month before he was 6 he started school, but on the third school day my mother was told that her son had to skip to grade 2. The headmistress explained her that "everybody was just learning the letters, and the teacher could not satisfy the needs of a child who had already been reading for 3 years".

As for myself: I was exposed to reading at age 6, when starting school. Within a few days I was reading fluently. As a result, my headmistress called my mother to her office, and scolded her for "teaching me to read". For me this event was quite dramatic, and I refused to go to school. I had been staying at home from September 4 1956 until after the Passover vacation, in April 1957, when many of my peers has also acquired the skill of reading.

But soon enough I had learnt that some children, though exposed to letters, words, sentences, had difficulties combining letters to words, and words to sentences. Many who did manage to read each separate word could not summarize a whole paragraph, and certainly not grasp the meaning of a whole story. In my time dyslectics were considered "dumb" (see Deacon et al., 2020): 'deficit' perspective, i.e. lacking intellectual ability; 'stupid', 'thick' or ' not academic'; (see: Carawan et al., 2015): 'lazy'; different, stupid, lazy, inferior, and ashamed). This negative self-perception still exists in the third millennium, both among educators and laypersons (e.g. Ingesson, 2007, 'different' and 'stupid', 'inferior'; Nalavany et al., 2011: 'stupid'). I could not accept this attitude toward those occasionally intelligent children, who had reading difficulties; I knew it was "something else" rather than stupidity or laziness.

But it took me many more years to understand the still not very recognized phenomena of hyperlexia and hypernumeracy, I had become familiar with both only when practicing interventions as a counselor of families with gifted and talented children. This work describes the first steps I have done in my ~20-years track of investigating these phenomena.

Why hyperlexia and hypercalculia?

Hyperlexia and hypercalculia has been a special challenge for me as a counselor of gifted children and adolescent and their families. I had to "put together" my "old" knowledge" about reading in general, and my observations of children and adolescents who had mastered reading at a very young age, without instruction, or could calculate at age two or three, but could not correlate to others, and did not seem to improve their repetitive behaviors. I met quite a number of parents of such children, who either refused to have their children diagnosed for autism or rejected the autism diagnosis, not believing that their "super-reader" or "math-genius" child was autistic. In some cases, they believed that lack of social interest and repetitive behaviors could be compensated by early reading or calculating. In others they were convinced that their children were "too smart" for others, or "were not interested in foolish games". Quite often I have heard from such parents that "my child has not friends because he or she is gifted" (David, 2020b, 2021)

Many parents of hyperlexic or hypercalculic children began their first counseling session by admitting that they were hoping there was some mistake. In some cases, after meeting both child and parents on a regular basis for a while, the parents abruptly terminated the intervention when I said the "D word" – suggested they took the child for diagnosis. These parents had no knowledge about hyperlexia or hypercalculia, so they were not aware of the fact that most hyperlexic or hypercalculic children are autistic. Martos-Pérez & Ayuda-Pascual (2003) stated that hyperlexia was more common among autistic children than in the general population; according to Ostrolenk et al. (2017), for example, 84% of hyperlexics and hypercalculics were autistic.

A long time after brain sciences opened their gates to me, I had first applied my new knowledge in the service of learning disabled children (see David, 2009, 2010, 2011a, 2011b, 2013, 2014a, b, 2015a, b, 2016a, b, 2017, 2020a). But only after psychology and education were simultaneously studied by an increasing number of scientists, and the neurological basis for psycho-educational phenomena was well developed, I published my first work about neurodiversity gifted children and adolescents (David & Gyarmathy, 2023). The publication of this work had whetted my appetite to explore in depth some less-known phenomenon I have been encountered with for decades. Both hyperlexia and hypernumercy had been the two I have found most challenging. This article begins with hyperlexia.

The stage of hyperlexia- versus that of hypercalculia studies

Both hyperlexia and hypercalculia are diagnosed, in most cases, at a young age, and the study of them is at its first stage; their main knowledge body is mostly based on case studied. A google search of "hyperlexia" resulted in about 430,000 results; of "hypernumeracy" – in about 19,200, and in "hypercalculia" – just about 1820 results (on November 4, 2023). This should be surprising, as, according to Wei et al. (2015), 9% of the 6-9-year old autistics in their sample were hyperlextic, while more than double, 20%, had hypercalculia. Maybe the reason for it is that "supercaculatrors" had been descried in the literature as savants (e.g. Corrigan et al., 2012; Goldberg, 1987; Gyarmathy & David, 2023; Mottron et al., 2009, 2013; O'Connor, & Hermelin, 1994; Patti, & Lupinetti, 1993, Treffert, 2011), and until recently there had no distinction made between these two phenomena. In addition, here are some of my insights about this discrepancy of research between hyperlexia and hypercalculia:

- There are many more tests for diagnosing verbal disabilities than for identifying mathematical disabilities.
- The ceiling in many verbal tests are higher in comparison to those testing mat abilities.
- Practically everybody in the western world is expected to be literal, but many are "bad in math" or manifest t symptoms of math anxiety, and thus social scientists and educators prefer to explore hyperlexia, dealing with words, and thus seem less mysterious and less frightening for them.
- Inability to interpret a written after reading it correctly while fascination with number, recognizing series of numbers and being able to memorize them – including long, complicated ones – does not necessarily interfere with social connections or relationships.
- At a young age, when hyperlexia is usually identified, there is a substantial gap between children who are able to read and their age-matched peers, who do not read at all. This fact causes expectations of high level of understanding – both of written and oral materials. When these expectations are not materialized it is obvious that the child faces a problem, which intrigues kindergarten- and school teachers, parents, and researchers.
- Though there are exceptions (e.g. Patti & Lupinetti, 1993 describe a 22-year-old woman with autism who exhibited hyperlexia), most hyperlexic children have been labeled as autistic, even when at age plus-minus 3. This has to do with two of the main characteristics of autism: social difficulties, and repetitive behaviors, easy to notice even when very young. When a child who already starts reading at age 18month, and generally before age 4, but does not use oral language properly for social interactions, caretakers and teachers pay attention to this phenomenon. But when a loner child is very good at math while still as young as 2, 3, 4 or 5, it does not always seem so exceptional, as people who are interested in math are usually perceived and "nerds" (e.g. Hall, & Suurtamm, 2020; Schoffer, 2002).
- 6Not only parents, kindergarten- and school teachers, but also many mental health professionals, with whom a hyperlexic or a hyperclaculic child meets, feel much better when having to figure out, assume or diagnose hyperlexia than hypercalculia. That might have to do with the lack of clear criteria according to which such identifications are made. Furthermore, according to The Diagnostic and Statistical Manual of Mental Disorders (5th ed.; DSM–5; American Psychiatric Association, 2013), the criteria for identification of autism are far from being absolute, and heavily depend on the opinion.

Definitions of hyperlexia and hypernumeracy

The term "hyperlexia" has been used for over 50 years, in the (Silberberg & Silberberg (1967) study of 28 early reader children. According to them, hyperlexic children have a higher ability level to recognize printed words than to comprehend what they have read or their verbal functioning in general.

But referring to hyperlexic children without using the term "hyperlexia" is documented in studies conducted over a century ago. For example, Parker (1917) wrote about "A pseudo-talent for words", describing an autistic student with special reading ability, but as Gordon, the described child, was already 10, we cannot be sure he was "truly hyperlexic", namely, reading awhile still in kindergarten. Obadiah, described also by Parker (2018), was hypercalculic. He had "numerical obsession. He was perpetually counting, translating everything into number" (p. 248). The doctor that had

observed him noticed that "this six year old prodigy solved problems in multiplication, division and fractions to an extent that was nothing short of phenomenal (p. 249). On the same year Hollingworth (2016 [1918]) published her work stating that some children were "generally stupid", but they had an innate gift of reading.

In his work describing 11 children with "autistic disturbances" Kanner (1943) introduces us to a hyperlexic girl (case no. 5, pp. 229-230). As the term "hyperlexic" was not known in the 40ites, we can only conclude that Barbara, the child described, was indeed hypelexic. In addition to her lack of relating herself to others, the fact that Barbara was initially admitted to the clinic for autism and did improve in time is an additional evidence that she was hyperlexic. Burd et al. (1987) had shown that unlike "simple" autistics, it is quite common among hyperlexic that improvement can be observed in social abilities. In the Burd et al. (ibid) study, that included just 4 hyperlexic children with autism, the average IQ in the first evaluation, when they were 2-4-years old, was 43, and in the last, when they were 8-25-year old – 94.7. Like Burd et al. (ibid), I have also noticed in my work with hyperlexic kindergartners that stronger reading skills in early childhood predicted, quite often, higher intelligence later.

Age of hyperlexia identification

There is no dispute about the minimal age of identification of hypelexia, but as to the maximal – there have been many opinions, many ideas and many definitions. According to Hopper (2004), the skill of reading without being taught can be defined as hyperlexia when the child is under 5, but sometimes it appears even among 2-year olds. For Coburn (2022) hyperlexic children were those developing reading skills before the age of 3.

Macdonald et al. (2022) included in their hyperlexia study children aged 36-70-months old. Healy (1982) included in his hyperlexia study 5-11-year old children. On the other hand, Grigorenko et al. (2002) state, that age does not matter in the diagnosing of hyperlexia.

But as there is no accepted definition of hyperlexia (e.g. Davidson, 2021), and one of the disputes that prevents an agreement on a common term is that between scholars who use "hyperlexia" for describing under 3 children who can read and the others who use it for all children with excellent reading skills, I fail to see the need to aspire towards an "absolute" definition.

Patterns of reading and math ability vary substantially among children with autism (e.g. Bullen et al., 2022). Thus it has been necessary to draw a line between "children with autism" and "hyperlexics". For kindergarten children, some have drawn it as "reading before age 5"' "recognizing letters and words at age 3-4" (e.g. Rabiee & Shahrivar, 2012), or, mainly for elementary school children "reading 2 years ahead of the expected level according to the mental age". In all these definitions the common ground for these children is having difficulties with social interactions and reading at a much higher level than comprehending the read texts.

Peter Huttenlocher who was considered one of the fathers of developmental cognitive neuroscience studied was one of the pioneering in studying children with hyperlexia for a few years, while identifying the youngest at age 1. Three boys aged 1-4 with hyperlexia were included in the Huttenlocher & Huttenlocher (1973) study. They were going through neurological and psychological examinations at age 4-6. In addition to their apraxis they all could complete just half of a set of 2- and 3-part commands, given usually in a spoken or written form to children aged 4.5. Their four basic speech functions, namely statement, offer, question, and command as well as verbal memory were intact; they could repeat 10-word sentences, and they often learned long passages verbatim.

Kennedy (2003) had observed, that some hyperlexics demonstrated an improvement both in their reading comprehension and their other autistic symptoms. He found that the improvement was directly related to the child's IQ level.

Definitions and criteria for hyperlexia

Until nowadays there is no general agreement about the definition of hyperlexia. The origin of this disagreement stems, in my opinion, in the difficulty of finding clear-cut criteria on which professionals would rely. Macdonald (2022) who had cited two of the most well-known scholars in the field of neurodivesities (Ostrolenk et al. 2017; Zhang & Joshi 2019) had recently stated that: "Currently, no consensual criteria are available to define hyperlexia across studies" (p. 1598). Zhang & Yoshi (2019) state that:

> *no clear understanding of the following aspects of hyperlexia: a) population criteria (e.g., typically vs. atypically developing children), b) specific criteria (e.g., precocity, definition of "good decoding") on their associations with reading, and c) the applicability of reading theories to hyperlexia (e.g., phonemic awareness is critical in decoding; both decoding and listening comprehension contribute to reading comprehension (ibid, from the abstract, p. 1).*

Whitehouse & Harris (1984) included, in their hyperlexia study, 20 children. But according to Hopper (2004), only five of them were "really described as hyperlexic" (p. 16).

A simple definition of hyperlexia has been that of Rispens & van Berckelaer (1991): "Hyperlexia refers to a condition in which developmentally disordered children have advanced word recognition skills but show little reading comprehension" (p. 141).

There are many more definitions. For example, Elliott & Needleman (1976) define hyperlexia as "a remarkably accelerated ability to recognize written words, which may or may not occur along with truly pathological conditions" (p. 340). However, the fact that there is no accepted-by-all definition for hyperlexia, and the changes that autism has gone through the last decades – especially the enormous increase in the number of children identified as gifted (Goldberg & Rothermel, 1984), can explain a part of these very different rates of hyperlexia suggested by the mentioned scholars, as well as by others.

Frequency of hyperlexia

The study of prevalence of hyperlexics among autistic children has been estimated in a variety of rates. Ostrolenk et al. (2017) had stated, there are a few kinds of hyperlexia; many other scholars have discussed the variety frames of autism; thus the fact that hyperlexia is more common among autistics than in the general population dos not necessarily mean that all hyperlexic are autistic.

Though both hypelexia and hypercalculia are not very common, there are substantial differences of opinion among health professionals, educators and researchers regarding they actual rate among pre-school- and school age children. These differences have consequences on the ways chosen for treating them, on the extra financial investment needed, on the manpower which has to be educated and hired to give optimal answers to children whose complexities are currently far beyond those that school resources are ready for. It must not be forgotten or ignored that while education systems in modern countries have acknowledged the special needs of "regular" autists, even though there are still many parents who struggle for more resources in order to fill their children's needs, the very first steps that might substantially help both hyperlexics and hyercalculic have not been done. Even in the US which is no. 1 in the world in the research of hyperlexia and hypercalculia many parents with hyperlexic or hypercalculic children prefer homeschooling over free public- or even private education – as in both cases the support their children would get is not satisfactory.

The prevalence of hyperlexics among autistic children has been estimated by many professionals in the last four decades. For example: while Burd, & Kerbeshian (1985) and Burd et al. (1985) inquired into the incidence of hyperlexia in a statewide population of children with pervasive developmental disorder. Their estimation was that the rate of hyperlexics was 6.0%. According to Wei et al. (2015) 9.2% of the children with autism showed early hyperlexic traits. Solazzo (2021) found that 9% of children with ASD showed early hyperlexic traits. Grigorenko et al. (2002) found the highest rate: according to them, 20.7% of children identified as autistic are

These are just some of the findings; a longer list is not going to change the picture of many children who need proper education and treatment with good prospects to change their life in time rather than live with the gifted of hyperlexia as if it was just a disability.

Gender distribution of hyperlexia

As there is no reliable up-to-date data about the male/female rate among autistics, and as most hyperlexics are also autistic, we can only conclude that there are more hyperlexic boys than girls. However, there are many estimations – based mainly on several case studies or small samples.

Fontenelle (1982) stated, that hyperlexia is seen predominantly in boys rather than girls. According to Burd et al. (1985), the male/female rate among hyperlexics is 4:1. Lin (2014) found, in their sample of 15 hyperlexic 4-, 5-, and 6-year olds,

that the girl/boy ratio was 2:15. According to Goldberg (1987), The male-female ration of hyperlexia was approximately 10:1. Huttenlocher & Huttenlocher (1973) had found that the male:female ratio among hyperlexic children is 14:1. A similar rate was found in the Solazzo et al. (2021) study of the 155 examined Autistics, 13 boys were hyperlexic and one girl. The study of Mehegan & Dreifuss (1972) Included 11 boys and just one girl aged 5.5-9. In the study of Richman & Kitchell (1981), 10 hyperlexic children participated, aged 5 years, 9 months to 9 years, 7 months (X = 7-6 years); 8 were boys and 2 – girls.

Summary

In this work I have presented a personal point of view, that of a counselor, on hyperlexia, a phenomenon not very well known among education and mental health professionals, and much less among the public. In my opinion, this knowledge can serve very many children who are either not identified for autism or identified much later had they not have hyperlexia, which, in many cases, serves as a mask, covering the poor or even non-existence of the child's social abilities, and serves as a "reason", "explanation" for his or her repetitive behavior.

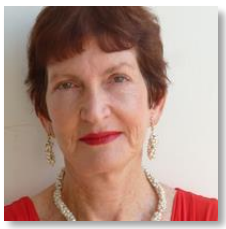
We have concentrated in five aspects of hyperlexia – not necessarily those perceived as "the most important" but those which help the potential reader "make sense" of the seemingly contradictions characterizing it: very high reading ability at a very young age, perceived as a characteristic – even as a "proof" of precocity or giftedness, along with social disability and repetitive behaviors, typical to autist which are perceived as having low intelligence level.

Limitations of Study

This work has many limitations that I know about, and I guess many that I am not aware of. To the first group belong mainly two: the case stories I have mentioned should have been elaborated in order to help professionals recognize hyperlexia among as young as possible autistic children, and thus make them able to have access to suitable treatment as soon as possible. /the second main limitation is the Leaving out five of the main issues of the highest importance both in research and practice of autism in general, and autism with hyperlexia or hypercalculia in particular. Due to space limitation I will only mention these seven of the missing subjects:

- Concentarting only on hyperlexia and "leaving out" hypercalculatia"
- Lack of description of the neuropsychological aspects of hyperlexia (e.g. Temple & Carney, 1996; Mammarella et al., 2022; Solazzo et al., 2021)
- No description of comorbidity of hyperlexia with other disabilities, emotional problems (e.g. Burd, & Kerbeshian, 1988)
- Omitting the findings and discussion about connections between intelligence and hyperlexia (e.g. Burd et al., 1987; Kennedy, 2003; Lin, 2014; Silberman & Silberman, 1967)
- No elaboration of the genetic aspects of hyperlexia (e.g. Temple & Carney, 1996)
- No case studies from my clinics
- No description of potential treatment (e.g. Abnett, 2013; Lin et al., 2013; Oberschneider,2003).

Biodata of Authors



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