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Children with Language Disorders or Late Bloomers – the problem of differential diagnosis

Abstract: Communication problems are often the first noticeable symptom of developmental abnormalities. About 15% of children at the age of 2 years demonstrate a lower level of speech expression than their peers. Speech development disorders may constitute either symptoms of global developmental delay or only isolated difficulties. One of the main challenges for professionals dealing with early development support is recognizing whether a child whose linguistic competence differs significantly from that of their peers suffers from a specific language impairment, or whether they belong to the group of 'late bloomers' who at some point, without the intervention of a specialist, will achieve an appropriate level of communication skills.

Although a differential diagnosis can be extremely difficult, the analysis of the literature leads to the conclusion that there are some markers that can aid a specialist in establishing an accurate diagnosis.

Key words: Late Talkers, Language Impairment, diagnosis, SLI, children

Introduction

Speech is one of the most important aspects of functioning of a person as a rational being. The proper development of communication skills enables a child to gain an adequate place in the human community. Children who acquire language skills quickly tend to reach a higher position among their peers (Hadley & Rice, 1991; Gallagher, 1993; Kemple, Speranza, & Hazen, 1992) and are perceived by adults as being more capable or more intelligent than those children whose language development is delayed.

Communication problems are therefore often perceived by the environment of the child as the first symptom of developmental abnormalities the larger or the older the child is. About 15% of children at the age of 2 years demonstrate a lower level of speech expression development than their peers (Desmarais et al., 2008; Horwitz et al., 2003). Research shows that boys are three times more prone to language development delay than girls (Zubrick, Taylor, Rice, & Slegers, 2007).

Diagnosing speech development disorders in Poland poses many difficulties. Firstly, there are no specified procedures as to who should make such a diagnosis. It seems that the people best qualified for this task are speech therapists. Sometimes, however, speech therapists refuse to establish a diagnosis if the symptoms of the

disorder are not typical, or the child's behavior suggests a concomitance of emotional and/or cognitive problems. Such children are therefore referred to a psychologist, even though well-qualified psychologists typically lack sufficient preparation for diagnosing sometimes complex speech disorders. Dealing with issues concerning typical and atypical language development, communication problems, accurate diagnosis or the search for effective therapeutic methods requires a good level of knowledge in linguistics, psychology, pedagogy, and neurology. The combination of the knowledge of a speech therapist, psychologist and often a doctor with a certain specialization is required to determine the causes of the problem, and thus to implement the optimum treatment plan.

Undoubtedly, in many cases of speech development abnormalities a diagnosis should be established by a team of specialists familiar with the problems of combined developmental disorders.

Speech and language disorders as a symptom of developmental difficulties

Speech and language disorders are often one of the first visible symptoms of developmental difficulties noticeable to the environment. Such difficulties always accompany intellectual disability, autism spectrum

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disorders (American Psychiatric Association, 2013), cerebral palsy (Michalik, 2015) or certain types of epilepsy (Rescorla & Lee, 2000). They are also inherent of many genetic disorders. Sometimes communication difficulties are preceded by serious problems in the area of primary speech activities, such as biting and chewing. This type of situation occurs in children with Prader-Willi syndrome (PWS), who due to hypotonia tend to have serious difficulties in articulation.

In Landau-Kleffner syndrome (LKS) or in Rett syndrome (RS) the first symptom of abnormalities in the child's development noticeable to the environment may be a gradual loss of previously acquired communication competence. In LKS a child can lose acquired skills within a few weeks or even days.

Communication difficulties which accompany genetic disorders can manifest themselves not only as the lack or loss of the ability for speech comprehension and/or expression, but also as problems in para – and non-verbal communication. In children with fragile X syndrome (FXS) (Błęszyński, 2010) vocabulary and syntax develop in a similar manner to their peers, but there are other symptoms such as difficulties in answering questions, echolalia, or accelerated pace of speech. Disorders of voice emission can be also observed in children with Williams Syndrome (WS), who demonstrate, in addition to speech development delay, a characteristic low, hoarse voice.

Apart from the above examples, where abnormalities of speech development occur as symptoms of global developmental delay, there are also situations where communication problems seem to be the only, primary disorder, i.e. specific difficulties in the acquisition of the native language, while other cognitive and motor skills are mastered sufficiently. In such cases, additional irregularities in pragmatic competence appear as secondary, usually caused by the limited possibility of contact with peers and adults (Czaplewska, 2012).

One of the greatest difficulties faced by diagnosticians in the field of early speech development abnormalities is deciding whether the specificity of the problems indicates a serious disorder, that is a specific language impairment (SLI), or the child, being a "late talker" (Rescorla, 2011; Roos & Weismer, 2008), will soon, and without the intervention of a specialist, reach a level of linguistic competence appropriate for their age.

Late talkers

The term "late talker" (LT) is used in the English-language literature in relation to children whose speech development is atypical. Some children mainly demonstrate difficulties in speech expression, with relatively well-preserved comprehension, while others manifest abnormalities both in speech production and reception (Rescorla, 2011). Especially noticeable are irregularities in the area of vocabulary, phonology and syntax (Kelly, 1998; Rescorla & Lee, 1999). LT are usually children aged between 18 and 35 months and, apart from the delay in language acquisition, these children do not have cognitive, neurological or

social-emotional difficulties (Rescorla, 1989; Thal, 2000). LT demonstrate an approximately twelve-month delay in the development of vocabulary compared to typically developing children. The average number of words spoken by LT in the studies by Rescorla was 18 words at the age of 24 months, 89 words at the age of 30 months and 195 words at the age of 36 months, while the average vocabulary of a child who develops typically is about 150–180 words at the age of 24 months.

Many children of the "late bloomer" group (Rescorla, 2011) will eventually catch up with their peers in terms of communication skills. The studies by Whitehouse, Robinson & Zubrick, (2011) showed that approximately 70–80% of children who were diagnosed as LT at the age of 2 years made up for the delay in the following years of their life.

Unfortunately, the other children are those who will demonstrate difficulties at school and then on into adulthood (Roos & Weismer, 2008). These are usually children with a specific language impairment, who should be subject to appropriate therapeutic measures as soon as possible to minimize the effects of speech development disorders in later life.

It is obvious that in the case of late bloomers no therapeutic measures are necessary. Forcing the child and the family to devote excessive attention to speech when everything is in order can disrupt the natural developmental processes, especially as the majority of researchers claim that speech development delay at the age 18 months cannot be used to prejudge whether the child will suffer from a serious disorder at school age (Westerlund, Berglund, Eriksson, 2006; Henrichs et al., 2011).

The main challenge for therapists is to recognize which of the LT are late bloomers, and which should be assisted in their development as soon as possible under the justified concern that they may be children with a specific language impairment (SLI).

Specific language impairment

Specific language impairment (SLI) is a dysfunction involving specific difficulties in native language acquisition, which seem to be primary in character, not caused by any major general disorders. In these cases the children are characterized by at least average intelligence, relatively good comprehension, and a lack of neurological or somatic disorders. They do not grow up under conditions of extreme deprivation and are not ill more often than their peers. Sometimes they have siblings whose speech development level is standard, and sometimes several members of their family experience greater or lesser difficulty in native language acquisition (Leonard, 2006; Bishop, 2008; Czaplewska & Sterczyński, 2015).

For many years after the appearance of the term "specific language disorder" in scientific journals (i.e. Leonard, 1981; Bishop, 1999), researchers assumed that the occurrence of SLI excludes the concomitance of other developmental difficulties that by their nature could also cause language acquisition delay. Therefore, problems

such as intellectual disability, autism, damage to the central nervous system, deafness, or anatomical and physiological orofacial abnormalities excluded the diagnosis of SLI.

After the publication of DSM-5 (APA, 2013) which, contrary to earlier announcements, did not contain the term “specific language impairment”, a discussion on the terminology concerning this disorder of unknown etiology began in the *International Journal of Language and Communication Disorders* (2014).

Generally, researchers agree that the term “specific” is not the most fortunate, because it is already known that there are children who demonstrate general difficulties, such as lower than average intellectual ability or deafness, who therefore obviously experience problems in language development, but at the same time these problems are more serious than in their peers with a similar disorder.

As a result some researchers consider that such exclusive factors should be used in a clinical diagnosis of SLI less restrictively, and so usage of the term “specific” does not make sense. Other authors argue that it is better to preserve the existing terminology, since its change could present a border between past and future research in this field, which would not be favorable (i.e. Gallagher, 2014; Taylor, 2014). Others propose replacing the term “specific” with “primary” (Reily et al., 2014).

Despite the differences in this respect, most authors of the special edition of the *Journal of Language and Communication Disorders* (2014) believe that the term “language disorder” proposed in DSM-5 to describe language difficulties of various origins is imprecise and even misleading, because it may suggest that a primary, isolated language disorder is the same as a secondary disorder resulting from another, global developmental disorder, such as autism. Since I agree with that view, I will use the term “specific language impairment” (SLI) in this article, although I am aware of the fact that it does not reflect the essence of the phenomenon, which is the occurrence of problems in native language acquisition while other cognitive and motor skills remain intact.

In terms of symptoms, children with SLI do not form a homogeneous group. The literature contains various data about their competences related to speech production and reception. As far as language production is concerned, most current studies indicate that with the exception of a few areas involving major difficulties, the phonology of children with SLI is in many respects similar to that of younger children developing properly, regarding both consonants and vowels (Leonard, 2006), although some research indicates that there are special difficulties connected with consonants (Bartolini & Leonard, 2000). However, what differentiates children with SLI from those whose speech develops correctly is a number of phonetic peculiarities not observed in typical development, especially a lack of cohesion or the changeability of phonetic errors (i.e. Hall, 2000; Betz & Stole-Gamon, 2005).

Most publications highlight the difficulties of English-speaking children with SLI associated with asking wh-questions: who, what etc. (i.e. van der Lely & Battell, 2003). It is also particularly difficult for English-speaking

children with SLI to construct (and understand) the passive voice (Bishop, Adams, & Rosen, 2006).

What especially distinguishes children with SLI from younger ones with the same MLU score are serious difficulties connected with morphology (Karmiloff & Karmiloff-Smith, 2004; Leonard et al., 2003; Ebbels, 2007). It appears that children with SLI need to achieve a higher than expected level of MLU before their speech begins to reflect the proper use of grammatical morphemes. For the English language a characteristic symptom involves problems with correct verb forms (Leonard, 2006). Rice (2000) and Leonard (2006) noted that data from various studies indicate that these problems with verb morphology may provide a basis for SLI diagnosis in children who already have a sufficiently active vocabulary, therefore it does not concern three- or four-year olds. These deficits often persist at school or even later (Gopnik & Crago, 1991). Data from other languages, such as Greek (Dalakakis, 1994), German (Rice, Noll, & Grimm, 1997), Italian, Spanish, Hebrew (Leonard, 2000) and Japanese (Fukuda & Fukuda, 1994) suggest that these difficulties with verbs forms are a distinctive characteristic of SLI.

So far it has not been possible to clearly establish the etiology of SLI. Although it is generally assumed that SLI is not caused by any serious neurological damage or dysfunction, the literature contains data pertaining to irregularities of this sort occurring in some children with a specific language impairment. Duvelleroy-Hommet et al. (1995), who tested children with SLI, discovered anomalies in the standard hemispheric asymmetry, mainly in the parieto-occipital and parietal-temporal areas. Ullman & Pierpont (2005) found abnormalities, among others, in the Broca area of the frontal cortex, and in the basal ganglia. In children with SLI and concomitant disorders, e.g. dyslexia, an atypically large vicinity of the fissure of Sylvius occurs more often than in the healthy population (Bishop & Snowling, 2004). According to some researchers this may be connected with polymicrogyria (de Vasconcelos Hage et al. 2006), which is an anomaly in the development of the cerebral cortex where neurons from the deeper layers of the encephalon reach the level of the cortex, but are arranged incorrectly and as a result form numerous small gyri. On the other hand, in studies by Trauner, Wulfeck, Tallal & Hesselink (1995), an atypical neuroanatomical structure occurred only in only 10 of 34 subjects with SLI, whereas six different types of irregularities were identified. Data on neuroanatomical changes in children with SLI are ambiguous and should not form the basis for hasty conclusions.

The results of research on the genetic determinants of SLI appear equally ambiguous, many of them indicating that 20 to 75% of the children with specific language impairment come from families with a variety of problems in language development (Flax et al., 2003). Bishop, Price, Dale, et al. (2003) state that 46% of children with SLI come from families where the disorder also occurs, while for the control group the figure was 18%. However, other reports indicate that there is no evidence of the occurrence of SLI in other members of the family. Tallal, Townsend, Curtiss & Wulfeck, (1991) did not identify any language

disorders in 23 of the 65 tested families of children with SLI. Such ambiguous results may indicate that SLI is conditioned polygenetically or that a single gene may only cause the risk of SLI, which then develops solely in certain environmental conditions (Rutter, 2008; Conti-Ramsden, Durkin, Mok, Toseeb, & Botting, 2016).

Although, in principle, researchers are unanimous in the opinion that SLI is a strictly linguistic problem (cf. Pačalska, Jastrzębowska, Lipowska, & Pufnal, 2007) and does not concern children with more serious intellectual development disorders, there are studies showing that some of the children with SLI also experience difficulties in certain cognitive functions. The literature contains reports of difficulties in different components of the executive functions. For instance Vance (2008), Marini, Gentili, Molteni & Fabbro (2014) demonstrated in their studies that children with SLI manifested impairment of their phonological short-term memory (STM) abilities. Poorer functioning of the working memory in children with SLI was also confirmed by Im-Bolter, Johnson & Pascual-Leone (2006). The material used in their tests was visual-spatial, which, according to the authors, clearly indicates that the problem with working memory is broader and concerns more than verbal processing. It is interesting that some studies on children with SLI show that they have visual difficulties in distinguishing between similar shapes (Bishop, 1999; Miller, Kail, Leonard, & Tomblin, 2001). In 1974 Alan Baddeley and Graham Hitch noticed that difficulties in distinguishing between similar shapes may have the same source as problems with distinguishing phonemes. For instance, in the case of attention deficits it may not matter whether the presented material is visual or auditory – in either case the task will not be solved correctly.

In the literature there are reports concerning deficits in other functions important for communication, such as planning (i.e. Finneran, Francis, & Leonard, 2009; Henry, Messer, & Nash, 2011), inhibition, and cognitive shifting (Vugs, Hendriks, Cuperus, & Verhoeven, 2014; Finneran et al., 2009).

Data concerning the attention processes in children with SLI are both less numerous and less clear. Some studies show impaired attention processes in children with SLI in comparison to children with correct speech development (i.e. Nickols, Townsend, & Wulfleck, 1995), while other studies (Schul, Stiles, Wulfleck, & Townsend, 2004) do not confirm this relation. Sometimes it is reported that SLI co-occurs with attention deficits combined with hyperactivity (Tallal, Sainburg, & Jerningan, 1991).

The occurrence of problems with information processing in many children with SLI is the basis for the statement that these difficulties are an essential pathomechanism of SLI. They may be related to problems in the area of phonology, morphosyntax or pragmatics. Difficulties in eliciting words from the personal vocabulary, problems in recognizing geometric shapes after touching them (Montgomery, 1993), or a longer reaction time for tasks which require a specific reaction to non-verbal stimuli (Townsend & Wulfleck, 1995) in children with SLI

can have the same source as difficulties in retaining more elements in memory while formulating statements (Bishop & Adams, 1991) or in recognizing phonemes produced at an average pace (Tallal, 2000). However, a broad review of the literature either confirming or excluding the hypothesis of the limited information processing ability in children with SLI as the main pathomechanism of this disorder leads to the conclusion that too little is yet known to formulate definite and final conclusions.

SLI is a relatively common developmental dysfunction. Various sources show (i.e. Tomblin, 1996; Leonard, 2000) that children with SLI comprise from 3% to 7% of the population. Estimates suggest, therefore (Smoczyńska, 2000), that the number of such children aged three to six years in Poland is between 54 and 126 000. Unfortunately, in Poland the vast majority of children and adults with this disorder remain undiagnosed or incorrectly diagnosed (Czaplewska, 2015). One of the reasons may be that the diagnosis of SLI under Polish conditions poses many difficulties for speech therapists.

The main problem is the shortage of standardized diagnostic tools. Such tools for speech therapists have appeared only recently and include the “Visual Vocabulary Test – Comprehension” (OTS) (Haman & Fronczyk, 2012) and the “Test of Language Development” (TRJ) (Smoczyńska et al., 2015). Another problem is the limited number of studies concerning Polish children with SLI, there being only a few publications (i.e. Smoczyńska, 2000, 2012; reports from such studies. Other publications appearing in Poland mostly concern other areas related to linguistics.

Traditionally, SLI is diagnosed after the 4th year of life. Non-speaking children below this age are usually described as belonging to the SLI risk group (Czaplewska, Kochańska, Maryniak, Haman, & Smoczyńska, 2015).

Late talkers and specific language impairment – clinical markers

An accurate diagnosis leads to the determining of suitable therapeutic measures. Because disorders of speech and language development are of interest to representatives of various professions, it is difficult to establish clear criteria for use in diagnosis. Even specialists in the same field may present different approaches to the problem of LI. This is not exclusively a Polish problem, as a similar situation can be observed in other countries as well (Bishop, Snowling, Thompson, & Greenhalgh, 2016).

Whatever the differences in terminology, all researchers and professionals agree that therapeutic intervention is necessary if the disorder is so severe and persistent that it causes noticeable negative consequences for education and social development (Reilly, Bishop, Tomblin, 2014). However, such difficulties are usually diagnosed when the child is a little older; therefore, when abnormalities in speech development are the only or the most noticeable symptom of atypical development, it is essential to decide whether they signify a serious disorder or remain within the limits of individual differences.

An analysis of the literature leads to the conclusion that there are some markers that can indicate either severe general developmental disorders or specific language impairments, and therefore should prompt professionals to start therapeutic intervention immediately.

Those features which should alert caregivers of children between 1 and 2 years old include: no babbling, not responding to verbal and sound signals from adults, and no communicative intention (Bishop et al., 2016). At the same time it should be noted that many children who do not demonstrate the above difficulties also develop serious language problems.

The features that are characteristic of atypical speech, language and communication development in children between the ages of 2 and 3 years include: small amounts of interaction, no communicative intention, no words in active speech, and regression or inhibition of speech development.

In children between the ages of 3 and 4 years the alarming symptoms include: a majority of two-word statements, a lack of comprehension of simple commands, and difficulty experienced by family members in understanding the child's speech (Hawa & Spanoudis, 2014; Bishop et al., 2016).

A diagnosis in children who are four or five years old is usually more obvious. If a child at this age does not speak at all, or uses only a few words, it is evident that their development is impaired. If the child's way of speaking is significantly different from that of their peers, it is necessary to introduce therapeutic measures immediately. Attention should be paid particularly to such factors as abnormal interactions, a majority of three-word communicates, and poor language comprehension. After the age of five the alarming features include difficulties in telling and re-telling stories and fairy tales (narrative competence), problems in remembering verbal instructions, frequent cases of too literal understanding and thus missing the actual message, and poor engagement in reciprocal conversation (Reilly et al., 2010). The caregivers should always be alert when strangers signal that they do not understand the speech of a child who is four years old or older.

Regardless of the age of the diagnosed child, the high-risk factors include difficulties in comprehension, a small number of communicative gestures and the occurrence of language difficulties in other family members (Paul & Roth, 2011; Bishop et al., 2016).

Establishing the most accurate diagnosis requires the use of many methods and tools, as each can provide answers to different questions. Standardized tests allow one to estimate to what degree the speech development is delayed or atypical. Interviews with parents can provide a lot of information about the child's difficulties in family life (Bishop, McDonald, 2009); the more so that there are children who are clinically diagnosed as having language difficulties but in standardized tests they rank within the normal limits. Such children may deal with a test situation using various compensation strategies (Spaulding, Swartwout, Szulga, & Figueroa, 2012).

While making a diagnosis one should also keep in mind that there is the possibility that the language

difficulties of a given child are caused by environmental factors. Unfortunately, there is no typical profile for language disorders in a child who grows up in an unfavorable environment. Some researchers believe that more regular, delay-type difficulties are characteristic of problems associated with an environmental background while irregular abnormalities are typical of SLI-type disorders, but the evidence is not conclusive.

There is also a hypothesis that different aspects of language are sensitive to different disturbing factors. For example, vocabulary difficulties are characteristic of environmental influences, while SLI is more often characterized by problems that arise from abnormalities in speech processing, such as repeating nonsense words, repeating phrases and grammatical production of verb forms (Roy & Chiat, 2013; Spencer, Cleg, & Stackhouse, 2012). In practice, however, this is usually an oversimplification, as both risk factors, social and non-social, often co-occur and may interact in a variety of ways (Roy & Chiat, 2013).

As can be seen from the above, when seeking the pathomechanism of speech development disorders it is not always possible to determine how a child will function in all aspects of language during the initial diagnosis, despite the use of sophisticated diagnostic tools. A very important indicator is the observation of how quickly a child responds to treatment, which may provide an answer to the question whether the shortage of vocabulary was caused by poor exposure or difficulties in speech processing (Fletcher & Vaughn, 2009). Therefore, during the initial phase of the diagnostic process, a specialist can often only hypothesize about which aspects are primarily affected, or which are mainly responsible for the poor functioning of the child. Only then can the diagnostic process be continued, utilizing more specific methods.

A detailed diagnosis in the case of more serious disorders can and should be conducted in parallel with the therapy, and ought to take into account the child's response to the therapeutic measures (Bishop et al., 2016). Accurate recognition of the fact that the child belongs to the group of late bloomers may prevent parents from wasting their time, energy and money, while also saving the child from unnecessary stress.

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