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Расстройство аутистического спектра как дегенеративное заболевание*

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Аннотация. Расстройство аутистического спектра как одно из речевых расстройств относится к классу сложных нейродегенеративных заболеваний, которое характеризуется трудностями в развитии не только речевых, но и коммуникативных навыков. Люди с расстройством аутистического спектра испытывают трудности при выражении и восприятии эмоций, что влечет за собой сбивки в коммуникации. Расстройство проявляется по-разному (признаки могут быть серьезными, средней тяжести и мягкими) как у взрослых, так и у детей. Несмотря на то что существует большое число работ по данной теме, по-прежнему остается много вопросов относительно причин возникновения данного расстройства, связи между особенностями речи и проявлением расстройства, когнитивными способностями и навыками говорящего, возрастом и возможностями развития. Наряду с этим специалисты подчеркивают значимость исследований процессов речепорождения и речевосприятия для выявления диагностического потенциала нейродегенеративных заболеваний.

Ключевые слова: речевые расстройства; расстройство аутистического спектра; нейродегенеративные заболевания.

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Autistic Spectrum Disorders as a neurodegenerative disease*

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Abstract. As a type of speech disorder, Autism Spectrum Disorder (ASD) is a complex neurodevelopmental disorder which causes difficulties in developing both language skills and communication skills that may include recognizing emotions, gestures, facial expressions, etc. For instance, some people with ASD are unable to speak vocally, while others have limited speech abilities and have difficulty connecting and socializing with others (Steinbrenner, 2018). There are other characteristics of ASD, such as linguistic delays, impairments, or communication deficit which can be severe or mild, and these may also differ in adults and children. Even though several studies have focused on the characteristics of ASD, there is still a need for research to determine whether there is a link between speech impairments and neurodegenerative illness. However, this study concludes that there is an intricate link between emotion and attention. This is justified by the juxtaposition of the studies on ASD, which propose that the speaking ability of people with ASD is affected by attention and age. Moreover, it highlights speech disorders as a significant marker of neurodegenerative diseases and how these differ in adults and children with ASD in terms of language and communication skills.

Keywords: speech disorders; Autism Spectrum Disorder; neurodegenerative diseases.

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Introduction

Speech disorders are broad terms that encompass various problems resulting from articulation, fluency, and voice. Consequently, the volume, rate, and quality of speech are abnormal, potentially affecting

the ability of a speaker to be understood [Machine learning …, 2021]. Thus, speech disorders affect an individual while creating or producing speech sounds necessary for communication with other people. Those who have speech disorders encounter difficulties in the process of trying to understand information. One of the speech disorders which this study focuses on is the spectrum disorder associated with Autism.

Autism Spectrum Disorder (ASD) is a complex developmental condition which borders on various practices that may be traced to a triad of symptoms such as impaired reciprocal social interaction, disordered verbal and nonverbal communication, and restricted, repetitive behavior or circumscribed interests [CGH findings …, 2021]. It is also a neurodevelopmental disorder characterized by linguistic delays or impairments ranging from severe to mild. Communication deficit is one of the characteristics of ASD. People with ASD have also been reported to exhibit communication difficulties, as well as poor social functioning [Short report …, 2020]. Some people with ASD cannot communicate verbally, and some have minimal speech skills and difficulty interacting with others [Steinbrenner, 2018]. Besides, many children with neurodevelopmental disorders such as ASD also have difficulty recognizing and understanding emotions [Speeded …, 2018]. They also frequently struggle with nonverbal communication methods such as hand gestures, eye contact, and facial expressions [Burzawa, 2018]. Essentially, this is an obstacle to fully utilizing the ability to speak.

Literature overview

This article examines empirical literature that is relevant to this study. Therefore, the review entails studies that relate to speech disorders and how it is indicative of neurodegenerative diseases. First, however, this study explores autism as a form of speech disorder in children and adults, which are symptoms or signs of neurodegenerative diseases.

Speech disorders affect the ability of a person to produce sound during word-formation. As noted by D. Mulfari et al. [Machine learning …, 2021] speech disorders exist in various forms like the apraxia disorder which happens at childhood, fluency, stuttering, autism, resonance, etc. Voice disorders can also be analyzed and categorized as speech disorders. As for autism, which is a neurodevelopmental disorder, various scholars have conducted various studies in particular

[Barokova, Tager-Flusberg, 2020; Chenausky, Norton, Schlaug, 2017; Behavioral predictors …, 2018]. It seems quite vague why a lot of studies have focused more on this particular speech disorder. It is stated that there is a steady increase in the number of students experiencing autism [Gurbuz, Hanley, Riby, 2019]. Unfortunately, this study focuses on university students within the UK which makes generalization difficult. Studies like [Kuder, Accardo, 2018] seem to be more encompassing as to the reasons for the increase in autism research. The aforementioned study explains that negative societal attitudes and overall difficulties result from inherent peculiarities. Attitudes towards persons with this disorder are such that it makes access to opportunities limited and general survival difficult [Cage, Howes, 2020]. These factors include higher stress and anxiety, difficulty interacting in social spaces, and self-confidence [Elias, White, 2018].

Furthermore, speech disorders are a broad phrase that encompasses a wide range of talents and differences relating to problems with articulation and as a result, user speech is atypical in volume, rate, or quality, impairing the ability of a speaker to be understood [Machine learning …, 2021]. However, other speech disorders have attracted the attention of scholars. These disorders include dysarthria, stuttering, clustering, childhood apraxia of speech (CAS), etc. D. Mulfari et al. [ibid.], note that dysarthria is a neuromotor speech impairment and is one of the most prevalent speech disorders. It can be inherited or acquired at any age as a result of a neurological injury or disease.

Similarly, a study conducted by M. Sommer et al. [Prevalence …, 2021] explains that the prevalence of speech disorders such as stuttering, cluttering, and other developmental speech and language disorders. This study discovered that these speech disorders have increased as data presented between 2015 and 2018, shows that the numbers have changed significantly. On the other hand, the statistics for cluttering were relatively too low to determine whether the numbers have really increased, whereas the crude prevalence for stuttering remained stable. Perhaps this is an indication that some of these disorders are more prevalent than others. The first study was conducted through the German health insurance data that examined the incident and prevalent diagnoses of speech and language disorders. However, J.S. Jiang et al. [Processing of …, 2021] state that in everyday speech there are forms of degradation that take place. This process is further explored as dependent on the compe-

ting sounds and unique vocal qualities or abilities which is characteristic of different individuals. Moreover, while the understanding of the speech is usually automatic, there is a tendency of reliability on the flexible and adaptive processing which cuts across the distributed neural networks. Therefore, this situation avails the cognitive ability with a profound computational challenge, thereby making the modifying of degraded speech exposed to a range of brain disorders.

However, it is worthy of note that these aforementioned studies stresses the significance of the problems associated with speech disorders to the growing population of humanity. According to P. Madaan et al. [Autism, epilepsy …, 2020], autism spectrum disorder entails deficits that repeatedly makes it difficult to socially engage in communication with a person. In other words, a person who is diagnosed with such a disorder, finds it difficult to interact with people. This in essence is a restraining factor for the full utilization of the speech ability. Perhaps this further strengthens the reason behind the extensive focus on autism. But it does not mean that other speech disorders as mentioned in earlier paragraphs are not obstacles to speech. In fact, A.A. Alhabeeb, A.M. Aldossari, and N.A. Qureshi [Alhabeeb, Aldossari, Qureshi, 2021] posit that speech fluency disorder can be burdensome, full of complexities, and neurological in nature. Similarly, P. Madaan et al. [Autism, epiletpsy …, 2020] state that autism can be complex in that there exists some form of relationship between autism, epilepsy, and developmental regression. In other words, this study emphasizes the possibility of autism coexisting with epilepsy which can lead to a neuroregression cycle. But this may not be sufficient to establish a link between autism as a speech disorder and neurodegenerative disease.

Comparably, A.D. Gitler, P. Dhillon, and J. Shorter [Gitler, Dhillon, Shorter, 2017] explain that neurodegeneration is characteristic of diseases that are irremediable and are widely increasing in society. According to this study, diseases such as this have been difficult to manage as therapeutic strategies that have been devised to tackle it are not really efficient. Also, the complex nature and pathophysiological aspect needs to be explored so as to affect a new model that can be effective. However, this classification of diseases is not limited to neurodegenerative alone but others which include Alzheimers, Parkinsons, Huntingtons, dementia etc. [Gitler, Dhillon, Shorter, 2017]. One significant feature that cuts across these diseases as mentioned in this

study is that it affects the cognitive aspect of a person. And if this be the case then it might be right after all to establish a link between autism and neurodegenerative diseases.

In accordance with the study by A.D. Gitler et al. [Gitler, Dhillon, Shorter, 2017], American Speech-Language-Hearing Association, as cited by E. Murray et al. [Differential …, 2021], explained that childhood apraxia of speech (CAS) is a neurological speech condition in which motor planning and programming of speech motions are disturbed, although there are no neuromuscular impairments such as aberrant tone. A similar study by J. Iuzzini-Seigel [Iuzzini-Seigel, 2021] extends the evaluation of children with apraxia and learning impairments. This is an indication that speech disorders affect learning procedures, especially in children. The study examined children with speech sound disorders and discovered that they showed signs of insufficient learning processing and were rated lower on language and motor assessments [Iuzzini-Seigel, 2021]. Moreover, traces of grammatical and motor impairments were found. In other words, speech disorders are not just a dynamic feature, it is a complex process that affects other parts of the human cognitive system. The brain is an essential component of speech coordination [Hodgson, Hudson, 2018]. Therefore, deductions made from scholars like J. Iuzzini-Seigel [Iuzzini-Seigel, 2021], E. Murray et al. [Differential …, 2021], M. Sommer et al. [Prevalenc …, 2021] tend towards the notion that these speech disorders may likely be robust markers of motor neuron diseases because the brain is involved. And since in the process of neurodegeneration the cognitive ability is affected, it may be safe to postulate that speech disorders like autism are a marker of neurodegenerative diseases.

However, B.G. Schultz et al. [Automatic …, 2021] examine the use of automatic speech recognition to improve communication amongst persons with progressive disorders that impairs speech intelligibility. The study concluded that speech accuracy decreased with increased disease duration. In other words, this study recognizes the link between neurodegenerative diseases and speech disorders and states that with the increase in the duration of the disease, speech accuracy becomes difficult to achieve. This study is seemingly similar to J. Iuzzini-Seigel [Iuzzini-Seigel, 2021] and is an affirmation that speech disorders are markers of neurodegenerative diseases.

From the brief overview provided, it is debatable that this knowledge is critical for life course research on individuals with autism and for an understanding of the speech disorder as one of the examples of diagnostic markers of neurodegenerative diseases.

Conclusions

The study concludes that attention and age affect the speaking ability of persons with Autism Spectrum Disorder (ASD). Also, there is a significant effect of emotion on attention. Meanwhile, concentration with regards to its effect on the speaking ability is influenced by emotions. Therefore, to improve the speaking ability, good emotional management and increased awareness are required. Furthermore, some predictive factors related to linguistic and cognitive skills are observed as being responsible for these difficulties. Accordingly, information about impaired emotion recognition, underlying linguistic and cognitive skills help to select intervention procedures. Without this information, therapy provided may be inaccurate.

Children with ASD demonstrate very similar emotion recognition skills and are also significantly delayed in their development of these skills. While adults with ASD, have trouble deciphering what people are thinking or feeling. Also, facial expressions, body language, and social clues are difficult to solve, and it is strenuous to maintain a discussion and keep a conversation going. Moreover, this study highlighted the speech disorders and how it was indicative of neurodegenerative diseases, indicating the variables consistently impaired at each level, aimed at identifying those that appear to be most suitable to distinguish each pathological condition from healthy persons and for the differential diagnosis among different pathologies. All these endeavors will undoubtedly be supported by the theoretical view of ASD. Thus, further research is needed on the issue of communication barriers among people suffering from progressive disorders that impair speech comprehension.

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