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THE TREATMENT OF VOCAL STEREOTYPY IN CHILDREN WITH AUTISM SPECTRUM DISORDER

TRETMAN VOKALNIH STEREOTIPIJA KOD DECE SA POREMEĆAJIMA IZ SPEKTRA AUTIZMA

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ABSTRACT

People with autism spectrum disorder (ASD) exhibit different impairments in the domain of auditory processing of pitch, altitude and prosody of sounds and voices from the environment. It is believed that altered sensory processing of these individuals originates from insufficient stimulation from the persons' surroundings, therefore they have the need to stimulate themselves in a way of emitting vocal stereotypes of different forms. Having that in mind, the aim of this literature review is to present interventions used in reducing vocal stereotypy in children with ASD, as well as to examine their efficiency.

For literature search engines Google Scholar, SCIndex, ProQuest and Serbian Library Consortium for Coordinated Acquisition – KoBson were used. Original research articles were searched in Serbian and English language. Literature review focused on interventions whose primary aim was reducing vocal stereotypy with the self-stimulatory function in participants diagnosed with ASD. A total number of participants in all articles was nine, whose mean age was 7.1 years old. Different procedures were implemented and in 34.8 sessions on average these procedures and their combination led to an 86.5% of success in reducing vocal stereotypy on average. Having the success of mentioned interventions in mind, it is necessary to educate special educators from our region on how to implement them and introduce these procedures in curriculum of all the Faculties which educate future special educators who will work with children diagnosed with ASD.

Key words: Vocal stereotypy, auto stimulation, self-stimulation, autism, treatment.

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SAŽETAK

Ljudi sa poremećajima iz spektra autizma (PSA) imaju različite probleme u domenima auditivnog procesuiranja visine, jačine i prozodije glasova i tonova iz okruženja. Veruje se da prisutno izmenjeno senzorno procesuiranje potiče zbog nedostatka stimulacije koja dolazi iz njihovog okruženja, zbog čega imaju potrebu da se dodatno stimulišu u vidu emitovanja različitih vokalnih stereotipija različite forme. Imajući navedeno u vidu, cilj ovog pregleda literature je da prikaže intervencije primenjene u cilju redukcije vokalnih stereotipija kod dece sa PSA i da prikaže njihovu efikasnost. Za pretragu literature korišćeni su pretraživači Google Scholar, SCIndex, ProQuest i Konzorcijum biblioteka Srbije za objedinjenu nabavku – KoBson. Radovi istraživačkog karaktera su traženi na srpskom i engleskom jeziku. Pregled literature fokusiran je na intervencije sprovedene sa ciljem redukcije vokalnih stereotipija za koje se pokazalo da imaju funkciju auto stimulacije kod ispitanika sa PSA. Ukupan broj ispitanika u svim radovima iz pregleda je bio devet, prosečnog uzrasta od 7.1 godina. Različite procedure su primenjivane i za 34.8 tretmana u proseku su bile uspešne izolovano ili u kombinaciji u redukciji vokalnih stereotipija za 86.5% u proseku. Imajući u vidu uspešnost prikazanih intervencija, neophodno je edukovati defektologe iz našeg područja o načinima implementacije istih, kao i uvrstiti njihovo podučavanje u kurikulume fakulteta koji edukuju buduće defektologe koji će u budućnosti raditi sa populacijom dece sa PSA.

Ključne reči: Vokalne stereotipije, autostimulacija, samostimulacija, autizam, tretman.

INTRODUCTION

Interaction with the environment and other people relies on the information we receive through our senses (Van Dam, Paris & Ernst, 2014) and in order to perform everyday activities, it is necessary that a person has the ability to adequately integrate information received from different sensory inputs (Hainaut & Bolmont, 2013). Sensory system receives information from seven different modalities and those are: auditive, visual, tactile, olfactory, gustatory, vestibular and proprioceptive (Mamic & Fulgosi Masnjak, 2010). The adequate development and information input through different sensors has a huge impact on a quality of life of an individual, as well as his or hers behavior (Boterberg & Warreyn, 2016) and appropriate sensory processing is the basis of satisfactory adaptive behavior of a person, as well as the possibility to obtain new information (Jirikowic, Olson & Kartin, 2008). Difficulties in sensory processing have an impact on overall development of a person, as well as quality of life (Dunn, 1997).

Normal sensory processing is crucial for receiving, modulating, integrating and organizing information received, in order to produce acceptable behavioral responses of an individual (Bundy et al., 2002).

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Different forms of auto stimulating behaviors are described in the literature as the behavior that obtains pleasant sensory sensations. If the treatment for maladaptive behavior that comes from sensory processing difficulties reduction is constructed in the right way, which would ensure changing inadequate behaviors with adequate ones, but that would allow the person to feel the same or at least similar sensory pleasure.

Adamson, O'Hare & Graham (2006) conducted a research where they used a screening instrument called *Short sensory profile* (Dunn, 1999) on a sample of 44 participants diagnosed with autism spectrum disorders (ASD) with the aim to determine the frequency of sensory difficulties. The results showed that over 70% of the participants display sensory processing impairments, as well as have preferences toward unusual stimulations. Other research (Watling, Deitz & White, 2001) used *Sensory profile questionnaire* (Dunn & Westman, 1995) to assess sensory differences among 40 participants with typical development and 40 participants with ASD, all between ages of three and six. The results show that there are significant differences between those two participant groups and highlight that among the group of participants with ASD there was a need for obtaining sensory stimulation in various ways.

People with autism spectrum disorder (ASD) exhibit different impairments in the domain of auditory processing of pitch, altitude and prosody of sounds and voices from the environment (O'Connor, 2012). It is believed that altered sensory processing of these individuals originates from insufficient stimulation from the persons' surroundings (Eveloff, 1960), therefore they have the need to stimulate themselves in a way of emitting vocal stereotypes of different forms. Having that in mind, the aim of this literature review is to present interventions that were proven to be successful in reducing vocal stereotypical behavior in a sample of people with ASD, as well as to examine their efficiency.

METHOD

For literature search engines Google Scholar, SCIndex, ProQuest and Serbian Library Consortium for Coordinated Acquisition – KoBson were used. Original research articles were searched in Serbian and English language and articles published in the last 15 years were used. Keywords used for searching the literature were autism, autism spectrum disorder and they were crossed with terms vocal stereotypy, auditory self-stimulation, auditory auto stimulation.

The articles were selected by using keywords in the title or abstract. After reading the abstracts, theoretical and review papers were excluded, and papers that showed the results of treatments of different forms of vocal stereotypy were presented, whose function was self-stimulation. The final selection of articles included five papers, whose methodology was described in detail.

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The treatment of vocal stereotypy – literature review

Research by Ahearn, Clark, MacDonald & Chung (2007) was conducted with the aim of reducing vocal stereotypic behavior with four participants diagnosed with ASD, with the average age of seven years. Applied procedure was response interruption and redirection (RIRD), which includes stopping the vocal stereotypy and reinforcing its redirection and it was combined with reinforcing appropriate verbal behavior. For three participants that had developed intraverbal skills, intervention consisted of stopping the vocal stereotypy and asking the participant a set of three questions that were socially significant. For the participant that did not have intraverbal skills, the authors used vocal imitation as redirection. Duration of the intervention was five minutes for each participant and the dependent measure was the duration of vocal stereotypy in one session. After five minutes, intervention was stopped and duration of vocal stereotypy was also noted in the next five minutes, as well as the percentage of using functional communication words. Baseline data indicated that the percentage of vocal stereotypy in a session was between 25% and 78% for all participants. The results of this research suggest that by applying mentioned intervention, vocal stereotypy can be reduced to between 1% and 24% of sessions in 19 sessions on average. Therefore, a decrease in vocal stereotypy between 70% and 97% was noted in all participants. Also, the authors emphasize that the use of functional communication increased in all four participants. The intervention effects were maintained in the next six months as well.

The research conducted by Saylor, Sidener, Reeve, Fetherston & Progar (2012) the authors examined the treatment possibilities of vocal stereotypical behavior which was proven to have the function of auditory sensory reinforcement. The sample consisted of two children, a five-year-old boy and a six-year-old girl, both diagnosed with ASD. The authors implemented a matched stimulation procedure which was noncontingent on the exhibited behavior and which involved the use of an audio player by the participants themselves. The sound loudness was constant and safe, but as well as not too loud, in order for the participants to be able to hear verbal demands from the therapist while wearing headphones which emitted the auditory stimulation. The authors varied three types of sounds, the white noise, audio recording of participants' vocal stereotypy and children's music and they were played on three different color headphones. The authors encouraged independent choice of headphones and measured the percentage of vocal stereotypy based on selected sound. The intervention duration was for each child 30 sessions, each in duration of 10 minutes. Prior to intervention implementation, vocal stereotypy was measured in 20 intervals that were in duration of 30 seconds each and the measured frequency was 75% of the intervals in the first participants and 85% in the second participant. Both participants preferred listening to audio recording of their own stereotypy and children's music and made that selection.

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The intervention effectiveness was 100% in both participants when children's music was emitted and the stereotypy was reduced for 73% following 100% when audio recording of their own stereotypy was emitted. Audio recording of white noise was not proven to be successful. The authors debate the social acceptance of wearing headphones in school context is a topic that should further be discussed.

A case study conducted by Hodges, Wilder & Ertel (2018) focused on a four year old participant diagnosed with ASD who emitted vocal stereotypy that was maintained by automatic auditory reinforcement. Researches implemented differential reinforcement of other behavior (DRO) that was combined with noncontingent reinforcement (NCR). The participant had toys available and play was divided into one minute intervals. If the target behavior did not occur within the interval, access to musical toys was available. Intervals progressed over time and later, a token system was introduced. The participant received tokens that she could exchange for access to musical toys. Prior to intervention implementation, vocal stereotypy was emitted in 83% of 3 minute intervals. After 50 sessions, vocal stereotypy was reduced to the duration of 30% in 3 minute intervals. The intervention continued and led to an overall reduction of the target behavior by 90%.

Reduction of vocal stereotypy was the aim of the case study focused on an eleven-year-old participant diagnosed with ASD (O'Connor, Prieto, Hoffmann, DeQuinzio & Taylor, 2011). The participant exhibited vocal stereotypy whenever he was reading and looking at books, which disabled the process of obtaining knowledge from used books, as well as other children at school. The authors implemented discrimination training procedure, where they taught the participant that with a presence of a red card, if he emits vocal stereotypy his access to a book would be denied. If the green card is presented, this was a signal that time frame where his engagement in vocal stereotypy is allowed. All sessions were in total duration of five minutes and they were gradually prolonged. In generalization probes, where the frequency of problem behavior was measured in different settings and environments (classroom and school library), the vocal stereotypy was reduced for 100%, where the red card was present. It is important to highlight that the green card remained being present in the participants' parents car, which he used on his way to and back from the school.

Another research that used discrimination training procedure with the aim to reduce vocal stereotypy in an eight-year-old participant diagnosed with ASD was the study conducted by Haley, Heick & Luiselli (2010). The participant exhibited vocal stereotypy in the school environment, which disabled the process of obtaining knowledge, as well as other students in the classroom. The authors implemented discrimination training procedure, where they taught the participant that emitting vocal stereotypy is not allowed when he is presented with the red card, while it is allowed when he is presented with the green card. If he exhibits stereotypy while presented with the red card, the therapist would stop it with the comment 'You cannot talk in classes'.

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The red card also had words 'Quiet' and 'You can talk' written on them. If the participant followed the given rule, he would receive reinforcement and if he did not follow the rule, the reinforcement was not available. Baseline data about the frequency of vocal stereotypy prior to intervention implementation was 48%, while after 31 sessions, reduction of 59% was noted.

Table 1. Literature review

Reference	Sample	Procedure	Number of sessions	Treatment effectiveness
Ahearn, Clark, MacDonald & Chung, 2007	Four participants diagnosed with ASD, with the average age of 7 years	RIRD	19 sessions on average	83.5% on average
Saylor, Sidener, Reeve, Fetherston & Progar, 2012	Two participants diagnosed with ASD, with the average age of 5.5 years	Matched stimulation	30 sessions	100%
Hodges, Wilder & Ertel, 2018	A four-year-old participant diagnosed with ASD	NCR and DRO	50 sessions	90%
O'Connor, Prieto, Hoffmann, DeQuinzio & Taylor, 2011	An eleven-year-old participant diagnosed with ASD	Discrimination training	44 sessions	100%
Haley, Heick & Luiselli, 2010	An eight-year-old participant diagnosed with ASD	Discrimination training	31 sessions	59%

CONCLUSION

Literature review focused on interventions whose primary aim was reducing vocal stereotypy with the self-stimulatory function in participants diagnosed with ASD. A total number of participants in all five articles was nine, whose mean age was 7.1 years old. Procedures that were implemented included discrimination training, RIRD, matched stimulation, NCR and DRO procedure and in 34.8 sessions on average these procedures and their combination led to an 86.5% of success in reducing vocal stereotypy on average.

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This implies that all of these procedures can be successfully used in reducing vocal stereotypy whose function is auto stimulation in children diagnosed with ASD.

Having the success of mentioned interventions in mind, it is necessary to educate special educators from our region on how to implement them and introduce these procedures in curriculum of all the Faculties which educate future special educators who will work with children diagnosed with ASD. The fact that none of the research articles were implemented in our region with the aim of reducing vocal stereotypy in children with ASD can be interpreted that none of the procedures that can lead to this particular behavior reduction is known to experts working with population of children with ASD in our region.

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