ANALYSIS OF IMPAIRED NONVERBAL COMMUNICATION IN PEOPLE WITH AUTISM SPECTRUM DISORDERS

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Abstract

The impairment of nonverbal communication in people with autism spectrum disorders (ASD) is a differential-diagnostic criterion that predicts their development and, at the same time, it serves as a striking determinant of their socialization. In this paper, we focus on the analysis of nonverbal forms of communication in a group of individuals diagnosed with ASD. The presented conclusions are partial results of the specific research grant (IGA PdF_2012_021, researcher: Kateřina Vitásková).

Keywords: *autism spectrum disorders, impaired communication ability, nonverbal communication, speech therapist, logopaedic intervention.*

Introduction to the issue

Impaired communication ability (ICA) is a specific dominant symptom of autism spectrum disorders (hereafter referred to as ASD) with marked insufficiency at all language levels, inhibited imitation, decreased production of gestures, hypomimia and lack of communication plan during somatic-conditional expression (Svoboda, Krejčířová, & Vágnerová, 2001). Already at early childhood (during the first year of life), parents of children with ASD certainly detect symptoms that – from the diagnostic point of view – could be designated as specific for ASD diagnosis (Říhová & Vitásková, 2012). These symptoms include impaired speech development or directly its delay, problems with the initiation and retention of eye contact, and difficulties in facial expression (*Logopaedic intervention in people with autism spectrum disorders*. Department of Special Education Studies. Faculty of Education, Palacký University in Olomouc, 2011/2012, IGA PdF_2011_010, Říhová, Vitásková). A differentiating comparison of the communication ability in children with ASD and intact children was made by Phillips et al. (1995) in two-year old children. The resulting research data indicates significant aberrations in skills implying the ability of nonverbally expressed requesting, and incentives for object- centred attention of people with ASD. At the same time, they also report problems coexisting with sharing attention and dedication of sufficient concentration to the communication content.

Interesting investigations have been rendered focused on the quantification of specific nonverbal communication in people with ASD and their subsequent qualitative analysis, biological conditionality and diverse characters with regard to a group of intact respondents. Jones, Carr, & Klin (2008) conducted a comparative study using a video-presentation; they

mapped and analysed the frequency of eye-mouth visual fixation in 66 respondents aged two years (suspected ASD = 15, delay development = 15, intact = 36). The results clearly indicate that the group of children with suspected ASD showed a statistically significant difference in the given activity with respect to both control groups. In children with ASD, fixation on the eye as well the mouth areas was substantially lower; conversely, a higher percentage of fixation represented focus on objects. This result correlates with the subsequent investigation and the issue that has engaged the interest of professionals – prosopagnosia, i.e. impaired recognition of familiar faces. Through FMR examinations of individuals with ASD without mental disabilities, Schultz et al. (2003) found that their right g. fusiformis and right lower temporal lobe react pretty homogeneously while watching faces, identical to the cortical areas of intact individuals when viewing objects. Repeated research has shown again that discrimination of faces in individuals with ASD is activated by the lower temporal lobe more than in the control group, specifically the left lobe. Dalton (2005) used magnetic resonance to evaluate eye movements and concluded that persons with ASD showed excessive amygdala excitation which, according to him, was in direct relation to unpleasant feelings (up to feelings which give rise to threat). Establishing and functional use of eye contact – which is quite natural and often a source of pleasant emotions in the intact population – has, therefore, a completely antagonistic character in persons with ASD. Consequently, a new and unexplored area of research is the study of genetic mechanisms affecting amygdala hyperfunction that serves as the basis for the development of therapeutic strategies aimed at abnormal amygdala function in autistic people (Meyer-Lindenberg et al., 2009).

The presented research results demonstrably show that deficits manifested in the nonverbal communication component are the clear and dominant symptom of ASD clinical picture. In the national context (see, e.g., Hrdlička & Komárek, 2004; Thorová, 2006), information about the issue of nonverbal communication in persons with ASD is absent or contained only in the minimum, marginal part of the text. Alternatively, nonverbal communication strategies are included rather under social manifestations (Beranová & Hrdlicka, 2012). One reason may be the fact that parents and professionals focus primarily on the development of communication in terms of the development of its verbal component, which they consider more important. However, the ability to produce and receive nonverbal information is an essential part of social learning as well as the determinant of the overall development of the child. Despite the fact that nonverbal communication implements homogeneous function as verbal communication, i.e. the interpersonal transmission of information, we register research surveys (Leathers, 1997; Burgoon & Hoobler as cited in deVito, 2008) drawing attention to specific functions for which the nonverbal communication becomes particularly important. It is the ability to create and manage impressions differentiated into subcategories such as credibility, likeability, attractiveness, dominance and skills to define relationships and drive conversation and social interaction through this form of communication. Knapp and Hall (2006) complement influencing, deceiving and nonverbal expression with emotions that can be represented by postures and gestures, eye kinesics as well as pupil width.

The importance of nonverbal communication and the current lack of attention to this form of communication in people with ASD encouraged the implementation of the research (see IGA PdF_2012_021, researcher: Vitásková) whereof the particular research data shows that 56.52% of speech therapists in the Czech Republic (n = 69 clinical and school speech therapist) do not prefer the development of nonverbal communication in individuals with ASD within the realized speech therapy. At the same time, the given respondents (86.67%) report that they do not have diagnostic and interventional materials, preferring rather intuition or experience.

The primary goal of the research – which we will discuss in the next part of this paper – is to detect and analyse the specifics of nonverbal communication in a selected group of children with ASD based on systematic observation.

Research aim and objectives

In the time period March 2013 – June 2013, a study within a grant specific research was conducted at the Department of Special Education Studies, Faculty of Education, Palacky University in Olomouc (*Communication deficits in selected forms of impaired communication ability with the view to assess partial determinants of verbal and nonverbal components of communication in special education practice*, PdF UP, PdF_2012_021, 2013/2014, researcher: doc. Mgr. Kateřina Vitásková, Ph.D.). The aim of the presented research implemented within the framework of the specific research grant at the Faculty of Education in Olomouc was to detect and compare the specifics of nonverbal communication in a group of children with ASD through longitudinal observation, particularly through direct observation carried out during individual logopaedic interventions with the view to detect, analyse and compare nonverbal communication in a selected group of preschool children diagnosed with ASD.

In this paper, we will focus on these research objectives:

• detection of nonverbal expressions (eye contact, facial expressions, gestures, postures, proxemics and imitation) in children with ASD (using the application of Diagnostic scale from Říhová & Vitásková, 2012) realized during the direct observation (in 4 month period), and the quantification of the results using a specific numeric scale, and

• subsequent analysis of the deficits represented by the arithmetic mean of the values using the numeric scale evaluating the partial forms of nonverbal communication and their mutual comparison.

Methodology

The research group consisted of children with autism spectrum disorders at preschool age (3-6 years) attending a kindergarten for children with special education needs. The total number of children was 12, 7 boys and 5 girls (see Figure 1). From the diagnostic point of view, they were children with childhood autism (n = 8, 3 girls, 5 boys), atypical autism (n = 3, 2 girls, 1 boy) and combined cerebral palsy and atypical autism (n = 1, 1 boy).
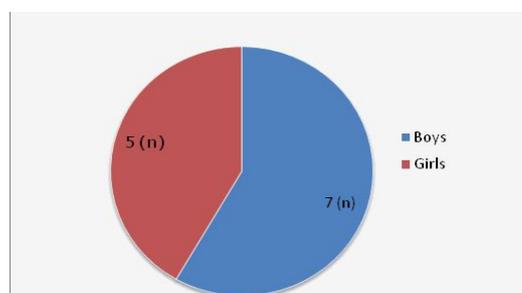

Figure 1. Distribution of the research group of children with ASD by gender

Figure 1 clearly shows that the research sample consisted of boys in a slight absolute predominance (58%). Regarding the diagnosis within the ASD nosological unit, the dominating childhood autism (67%) is followed by atypical autism (25%) and dual diagnosis of cerebral palsy combined with atypical autism (8%) (see Figure 2).

The main research method was longitudinal observation carried out within the period March 2013 – June 2013. In order to assess nonverbal communication in persons with ASD, we applied *Diagnostics of impaired communication ability*, its part *Diagnostics of nonverbal communication* created by Říhová and Vitásková (2012). The obtained results were regularly recorded (video and record sheet), analysed and then compared. These results subsequently represent the starting point for determining the content of speech therapy for each child
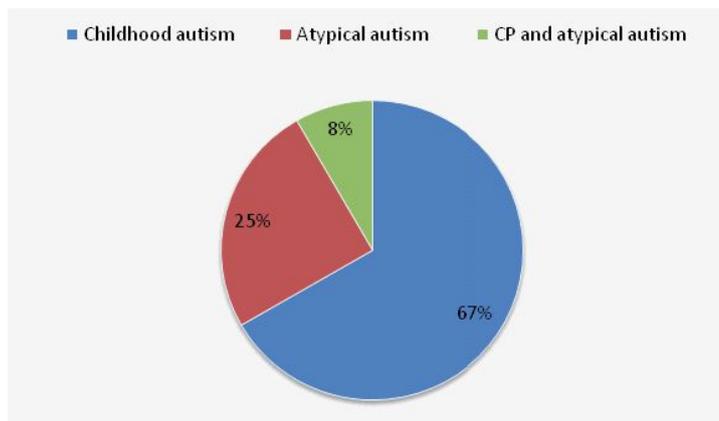
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Figure 2. Diagnostic categories of children with ASD

Research results and discussion

The first area discussed is the evidence of deficits associated with difficulties in making eye contact, facial expressions, gestures and pointing to (asking for) objects (see Table 1).

Table 1. Analysis of results: eye contact, facial mimic perception and facial expression, perception and expression of gestures, pointing to and asking for objects

Child with ASD	Eye contact	Facial mimic perception	Facial expression	Perception of gestures	Expression of gestures	Pointing to objects	Asking for objects
D1	0	0	1	X	0	1	0
D2	1	X	0	0	1	0	0
D3	0	X	0	X	0	0	1
D4	0	0	1	0	0	1	0
D5	1	1	0	1	1	0	0
D6	0	0	1	0	0	0	0
D7	1	0	0	0	0	0	0
D8	0	0	0	1	1	2	1
D9	2	1	1	1	0	1	2
D10	1	1	0	1	2	1	2
D11	1	1	2	1	1	2	1
D12	2	1	2	1	0	2	2

D1–D8: children with childhood autism

D9–D11: children with atypical autism

D12: child with CP and atypical autism

X: the item cannot be evaluated

0: absence of ability in the given nonverbal communication

1: limited ability or presence of specifics in the given nonverbal communication

2: adequate ability in the given nonverbal communication

If we look at the absence of monitored areas (i.e. eye contact, facial expressions, gestures, pointing to objects and asking for objects), we record it in the frequency of 38. This represents a 45.24% inclination to value 0 which is present in all studied areas of nonverbal

communication; in the utmost rate, it is registered in the case of gesticulation expression (n = 7) and its average frequency is observed in various forms of nonverbal communication 5 times.

Limited ability in nonverbal communication such as insufficient frequency of establishing eye contact, facial mimic perception or perception of gestures with help, expression of gestures or facial expression only in the case of transparent expressions or facilitation during pointing to and asking for objects, we recorded in 32 cases of assessment (38.10%; value 1). The value 1 is also present in all studied forms of nonverbal communication with relatively uniform frequency distribution. The greatest frequency was observed in the reception of gestures (n = 6); in the smallest degree, it was registered in the ability to ask for objects through nonverbal communication (n = 3).

The highest value related to the intact ability in selected areas of nonverbal communication was recorded 11 times (13.10%) while it was absent in the case of perception of gestures and facial mimic perception. For these reasons, the given forms of nonverbal communication in people with ASD must be seen as very problematic. This value was most often recorded in the case of 3 records relevant to pointing to and asking for objects. During observations, we also used "X" value which indicates an obstacle to the possibility of evaluating the monitored area. This value was detected in two areas of nonverbal communication – facial mimic perception and expression of gestures (n = 2).

If we look at the distribution of evaluation categories in terms of ASD diagnoses, it is clear that value 2 (absence of impairment in the given form of nonverbal communication) is present in individuals with ASD diagnosed with atypical autism and atypical autism combined with cerebral palsy. The given value is recorded only in one case (pointing to objects, D8, see Table 2). Category "X" relating to interference in the assessment (for example due to a lack of effective cooperation) is registered in 3 children diagnosed with childhood autism.

Table 2. Arithmetic mean, median and mode

	Eye contact	Facial mimic perception	Facial expression	Perception of gestures	Expression of gestures	Pointing to objects	Asking for objects
arit. m. μ	0.75	0.42	0.67	0.5	0.5	0.83	0.75
Me $\tilde{x}$	1	0	0.5	0.5	0	1	0.5
Mod $\hat{x}$	0; 1	0; 1	0	1	0	1	0

Regarding the monitored nonverbal expressions, we applied the methods of arithmetic mean, median and mode for statistical reasons. The arithmetic mean in the monitored nonverbal areas (eye contact, facial mimic perception and facial expression, perception and expression of gestures, pointing to and asking for objects) has a specific value in the range of 0.5, i.e. between the scales 0 and 1. Inclination to scale 1 is obvious in the case of pointing to and asking for objects, and eye contact. On the other hand, the proximity to scale 0 is evident in the facial mimic perception. Even in the case of median, the value of 0.5 dominates; regarding the mode, it is obvious that also scales 0 and 1 alternate in uniform representation.

The above-presented Figure 3 provides a comparative view of eye contact, facial mimic perception and facial expression. The highest value (scale 2) was observed in eye contact and facial expression in clients diagnosed with atypical autism and atypical autism combined

with cerebral palsy. Figure 3 shows that value 1 is recorded 14 times, and value 1 relating to the lack of ability associated with the given skill is recorded 16 times in relation to all forms of nonverbal communication and primarily in the diagnoses of childhood autism with the exception of two descriptions in atypical autism.
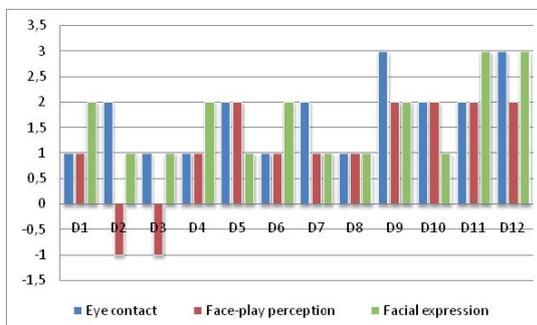

Figure 3. Comparison analysis of eye contact, facial mimic perception and facial expression

Note:
For better visual record in the chart, individual scales correspond to:
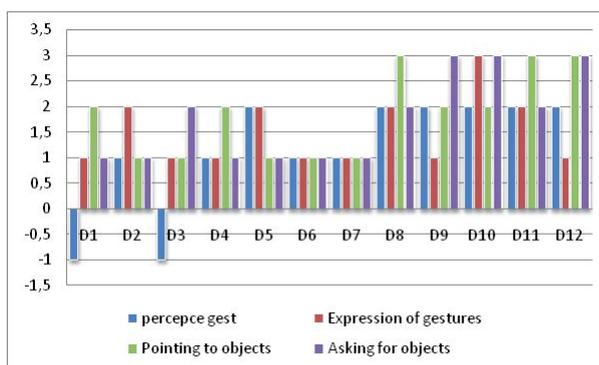scale X: -1
scale 0: 1
scale 1: 2
scale 2: 3

Figure 4. Comparison analysis of gestures, pointing to objects and asking for objects
Note:
For better visual record in the chart, individual scales correspond to:
scale X: -1
scale 0: 1
scale 1: 2
scale 2: 3

When comparing gestures, pointing to and asking for objects, we obtained value 2 which is presented in 7 records relevant to pointing to objects (n = 3), asking for objects (n = 3) and expression of gestures (n = 1). Antagonistic value 0 is recorded 22 times, which can be considered as a significant quantitative indicator.

The other research area of nonverbal communication in persons with ASD was the analysis of spheres that include the use of another person's body, active interest in people and things, the ability to imitate, respond to own name, posture and proxemics. Table 3 below presents the given areas in monitored preschool children with ASD.

Table 3. Analysis of results: the use of another person's body, active interest in people, active interest in things, imitation, response to own name, posture and proxemics

Child with ASD	The use of another person's body	Active interest in people	Active interest in things	Imitation	Response to own name	Posture	Proxemics
D1	0	1	0	0	1	0	0
D2	0	2	0	1	0	0	0
D3	0	1	1	1	0	0	1
D4	0	2	2	0	0	1	0
D5	1	2	1	1	1	1	1
D6	1	2	0	0	1	0	1
D7	1	2	1	0	1	0	2
D8	0	1	2	1	2	0	1
D9	1	3	2	1	2	2	2
D10	1	3	2	2	1	1	1
D11	2	1	3	2	2	2	1
D12	2	3	2	1	2	1	2

D1–D8: children with childhood autism
D9–D11: children with atypical autism
D12: child with CP and atypical autism
X: the item cannot be evaluated
0: absence of ability in the given nonverbal communication
1: sporadic presence of the given form of communication
2: presence of specifics in the given form of communication
3: adequate ability in the given nonverbal communication

When looking at the analysis of other forms of nonverbal communication (i.e. the use of another person's body, active interest in people and things, imitation, response to own name, posture and proxemics), it is clear that all of the offered rating scales are present. Value 0 indicating the absence or severe deficiency in the given assessment area is recorded 23 times (27.38 %), which can be considered as a favourable quantitative indicator with regard to the first group (45.24%) of analysed nonverbal areas. The given value prevails especially in posture (n = 6), followed by the preference for using another person's hand as a tool to achieve some own goal (n = 5); conversely, it is fully absent in non-verbal expression of interest in people.

The other scale characterized by sporadic presence or limitation in the given form of nonverbal communication is registered 33 times (39.29 %). Specifically, this relates to imitation and proxemics (n = 6), the use of another person's body and response to own name (n = 5). Its presence is found in all monitored forms of nonverbal communication with the smallest representation recorded for active interest in things (n = 3).

Value 2 implementing the highest scale in the case of using another person's body, imitation, response to own name, posture and proxemics was recorded 23 times (27.39%), primarily in relation to active interest in people and things (n = 5). The lowest frequency was detected for using another person's body and in the case of physical posture (n = 2). When focusing on active interest in people and things, the highest rating scale is represented by value 3, which was described 4 times (4.76 %).

If we look at the diagnostic categories, values 0 (n = 24) and 1 (n = 23) prevail in children with childhood autism, and values 2 and 3 are conversely present mainly in those with atypical autism.

Table 4. Arithmetic mean, median and mode

	The use of another person's body	Active interest in people	Active interest in things	Imitation	Response to own name	Posture	Proxemics
arit. m. μ	0.75	1.92	1.33	0.63	1.08	0.67	1
Me $\tilde{x}$	1	2	1	1	1	0,5	1
Mod $\hat{x}$	0; 1	2	2	1	1	0	1

The arithmetic mean in the observed nonverbal areas (use of another person's body, active interest in people and things, imitation, response to own name, physical posture and proxemics) has a specific value ranging from 0.63 to 1.92 with variance of 1.29. The lowest frequency value is specific to imitation; on the contrary, the highest described indicator is that for active interest in people. The median is characterized by predominance of value 1, which also dominates the mode.

In the next section, we present a visual comparison of the selected forms of nonverbal communication mentioned in the above-presented Table 3.
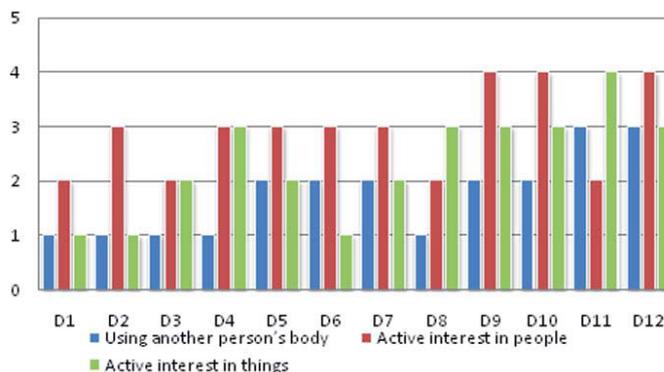

Figure 5. Comparison analysis of the use of another person's body, active interest in people and active interest in things

Note:
For better visual record in the chart, individual scales correspond to:
scale X: -1
scale 0: 1
scale 1: 2
scale 2: 3
scale 3: 4

From the above chart 5, we can deduce that the dominant status over other categories regarding homogeneous frequency representation is occupied by scale 1 and scale 2 (n = 12; 33.33%). The highest scores (scale 2 and 3) implementing smooth nonverbal communication identified with the ability homogeneous with the intact population are detected 18 times (44.44%). When focusing on antagonistic value (scale 0) and with regard to the above-presented chart 5, we can state that the given value was detected 8 times (22.22%) within the research survey in the selected group of respondents.

The comparison of nonverbal communication in the area of imitation, response to own name, posture and proxemics clearly shows that the representation of value 0 is typically 33.33%, the following scale 1 is present in 43.75%, and that the highest value (scale 3) was observed in 11 respondents (22.92%).
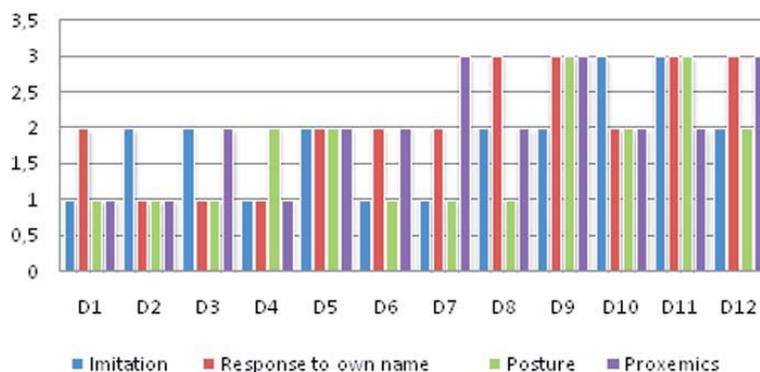
Figure 6. Comparison of imitation, response to own name, posture and proxemics

Note:

For better visual record in the chart, individual scales correspond to:

scale X: -1

scale 0: 1

scale 1: 2

scale 2: 3

scale 3: 4

Conclusions

Autism spectrum disorders – representing a heterogeneous group of specific and non-specific symptoms – have a common deficit area pervading all diagnostic units, i.e. impaired communication ability that is significantly manifested also in aberrations affecting nonverbal communication.

Nonverbal communication implies a wide range of communication (eye contact, facial expressions, gestures, posture and others) and any impairment of its receptive or expressive component always represents significant interference in the communication plan.

As evidenced by the above results of individual researches as well as analysis of nonverbal communication in the monitored group of children with ASD, deficits associated with this form of communication are clear and, at the same time, individually manifesting in each child. As we further found, the deficient area also represents a targeted focus on its development in the context of speech therapy.

For these reasons, the issue of nonverbal communication in persons with ASD constitutes an important research sector that deserves more attention not only at the level of logopaedic care but also in terms of psychological, medical and special education engagement.

References

1. Beranová, Š., & Hrdlička, M. (2012). Časná diagnostika a screening dětského autismu. (Czech). *Československá Psychologie, 56*(2), 167-177.
2. Dalton, K.M., Nacewicz, B.M., Johnstone, T., Schaefer, H.S., Gernsbacher, A., Goldsmith H.H., Alexander, A.L. & Davidson, R.J. (2005). Gaze-fixation and the neural circuitry of face processing in autism. *Nature Neuroscience, 8*, 519-526
3. DeVito, J. A. (2008). *Základy mezilidské komunikace*. Praha: Grada.
4. Hrdlička, M., & Komárek, V. (2004). *Dětský autismus.* Praha: Portál.
5. Jones, W., Carr, K., & Klin, A. (2008). Absence of preferential looking to the eyes of approaching adults predicts level of social disability in 2-year-old toddlers with autism spectrum disorder. *Archives Of General Psychiatry, 65*(8), 946-954. doi:10.1001/archpsyc.65.8.946

6. Knapp, M. L., & Hall, J. A. (2006). *Nonverbal communication in human interaction* (6th ed.). Belmont, CA US: Thomson Wadsworth.

7. Leathers, Dale G. (1997) *Successful Nonverbal Communication : Principles and Applications.* Boston: Allyn & Bacon, Incorporated.

8. Meyer-Lindenberg, A. A., Kolachana, B. B., Gold, B. B., Olsh, A. A., Nicodemus, K. K., Mattay, V. V., & Weinberger, D. R. (2009). Genetic variants in AVPR1A linked to autism predict amygdala activation and personality traits in healthy humans. *Molecular Psychiatry, 14*(10). 968-975. doi:10.1038/mp.2008.54

9. Phillips, W., Gomez, J., Baron-Cohen, S., Laá, V., & Rivière, A. (1995). Treating People as Objects, Agents, or "Subjects": How Young Children With and Without Autism Make Requests. *Journal Of Child Psychology & Psychiatry & Allied Disciplines, 36*(8), 1383-1398. doi:10.1111/1469-7610. ep11858099

10. Říhová, A., & Vitásková, K. (2012). *Logopedická intervence u osob s poruchou autistického spektra (odborná publikace pro logopedy)*. Olomouc: Univerzita Palackého v Olomouci.

11. Schultz, R. T., Grelotti, D. J., Klin, A., Kleinman, J., Van der Gaag, C., Marois, R., & Skudlarski, P. (2003). The role of the fusiform face area in social cognition: Implications for the pathobiology of autism. In U. Frith, E. Hill (Eds.), *Autism: Mind and brain* (pp. 267-293). New York, NY US: Oxford University Press.

12. Svoboda, M., Krejčířová, D., & Vágnerová, M. (2001). *Psychodiagnostika dětí a dospívajících*. Praha: Portál.

13. Thorová, K. (2006). *Poruchy autistického spektra.* Praha: Portál.

ANALYSIS OF IMPAIRED NONVERBAL COMMUNICATION IN PEOPLE WITH AUTISM SPECTRUM DISORDERS

Summary

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The particular above-presented results suggest that impairments of nonverbal communication in individuals with ASD represent an obvious symptom, whereas the differences in the degree of disruption of individual forms of nonverbal communication are specific. They reflect individual abilities and dispositions of the child and especially a specific type of ASD diagnosis. When looking at the lowest scale of the performed analysis, value 0, which we used to identify a significant problem in the given communication or even absence of the given ability, we can say that it is registered with a significant presence (n = 7) in relation to the expression of gestures. This value was also detected in the case of posture (n = 6) and nonverbal expression of disagreement (n = 5). The following scale used in the evaluation of communication skills in children with ASD, designated as value 1, implements specifics and deficits in impaired nonverbal communication or includes a potential help with expressing or understanding individual forms of nonverbal communication. The given value was recorded primarily in relation to the reception of gestures (n = 6), imitation (n = 6), proxemics (n = 6) and expressing emotions (n = 5). We also noticed a scale associated with nonverbal communication which, according to our observation, does not show any striking differences with respect to intact people. Even though the given value did not occupy a dominant status in reference to the aforementioned scales, we consider important to note its presence. The highest representation includes nonverbal expression of consent (n = 5), pointing to or asking for objects (n = 3) or active interest in other people expressed nonverbally (n = 2). On the contrary, complete absence of the rating scale is found in the perception of gestures

and facial mimic perception. For these reasons, it can be expected that this sphere of nonverbal communication (perception of gestures and facial mimic perception) represents a very problematic area in people with ASD.

Therefore, disruptions of nonverbal communication in people with ASD show clear and specific symptoms. At the same time, however, it is also necessary to point out the justness to refute false beliefs associated with the lack of interest in social interaction, complete inability of individuals with ASD to express their wishes or requests, and also negate false claims associated with the absence of imitation. The research data conversely indicates interest in establishing contacts with other people through nonverbal communication (value 2, n = 5) and the ability to imitate, although limited or problematic (dominance of value 1), which was recorded in 39.29% along with adequate nonverbal response to salutation. On the other hand, we must not forget the significant deficits manifested primarily in facial expressions and gestures (dominance of value 0 regarding the perception of gestures and facial mimic).

The presented results could be an incentive to reflect on the justification of deeper diagnosis of impaired nonverbal communication in people with ASD, which may become an important diagnostic tool as well as an essential intra-phenomenon differential-diagnostic marker.