

Features of Orientation to Social Signals of Children with Mental Retardation

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Keywords: mental model, attention, joint attention, social cognition, tentative basis of actions, age development, preschool age, theory of mind, eye contact, autism, mental retardation

Abstract. The article discusses the role of a mental model and separately a mechanism of joint attention in the normative age development of preschool children. It is shown that children with joint attention deficit may have difficulty acquiring a wide range of developmental skills, and the ability to use the direction of sight is part of the overall mechanism. This mechanism will allow to further interpret and understand the meaning of social information, the child's ability to accumulate normal social experience. It was found that the typically developing children, children with a lower developmental limit and a delayed age development, the differences between them may be related to the fact that children participating in joint attention have more conditions for expanding opportunities for social learning. Changes in the accuracy indicators of identifying the direction of sight demonstrate the dynamics of the cognitive development of the child. In comparison, this makes it possible to assess the characteristic differences not only with pathology, but also with a decrease in the overall level of age development.

1. Research Highlights

- The dynamics of the child's cognitive development demonstrates the rate of development of the accuracy of identifying and detecting the direction of gaze. Age contrast in terms of identifying intentions in the direction of sight is an important source of information about the normative development of a child.
- Recognizing the direction of gaze can be viewed as the main mechanism by which the child's attention is socially coordinated in a targeted action. The data confirms that such an orientation can give the observer indications of another person's intentions, his/her attention to the goal.

2. Introduction

Joint attention is a key skill that children can use to get information from others. This skill is associated with subsequent development in various areas for typically developing people. The ability to "joint attention" is to use eye contact, gaze direction, and pointing gestures to interact with other people. With a deficiency of joint attention, the child cannot initially reflect the social understanding of other people's intentions [3, 5]. A child with limited joint attention may have difficulty acquiring a wide range of developmental skills, including learning to interact with other people and make friends, how to speak, understand words, and how to process and use the incoming information. Regulatory development of the child involves the formation and expansion of more complex behavior, such as adjusting the direction of the gaze, when the initial gaze of the succession was not successful, the ability to gaze following the direction of the gaze of adults.

Paying more attention to the direction of gaze, responding to changes in the direction of gaze and directing your own attention (based on someone else's gaze), the child becomes involved in interaction with the carrier of competence (adult or more developed peers) and becomes more sensitive to expanding the zone of proximal development. This is a prerequisite for the development of social and cognitive processes.

In the case of the underdevelopment of the skill of joint attention, the child is not able to distinguish between his own opinion and the opinion of another and based on this to predict his actions [1, 3, 6]. Mentalization is absent in autistic children; the ability to accumulate normal social experience is impaired in a child (see the researched conducted by Perner, 1991). It is shown that people with a mental model deficit can perceive information related to people's behavior (direction of sight, body movement, facial expressions), but the mechanism is unformed, which further allows them to interpret and understand this information (relevant research was conducted by Baron-Cohen, 1992). Summarizing many empirical data, two aspects can be stated in violation of the deficiency of development of orientation in social signals: the ability to initiate and respond to the attraction of joint attention and interpretation of orienting social signals as an aspect of the formed mental model.

The purpose of the study is to identify the peculiarities of orientation to social signals of children with mental retardation; namely, the analysis of the degree of sensitivity to a social signal to the direction of a partner's gaze as the basis for combining attention with a partner.

3. Methods

Empirical sample of the study includes 64 children of pre-school age from 4 to 6 years. 32 children of pre-school age attend groups of compensatory orientation. The preschoolers with the presence of combined forms of mental developmental characteristics and (or) deviations in behavior (violation of cognitive functions, speech, emotional-volitional sphere, behavior, communicative function) constituted a sample. All sampled children are diagnosed with mental retardation. 32 preschoolers compiled a sample of contrast. They correspond to the age norm of development.

We developed a task as an analogue of the classic diagnostic task "What Charlie Wants" (S. Baron Cohen, P. Cross, 1992) to study the possibility of using the direction of gaze of the character in the picture as an indicator of the intention to choose an object from the range proposed. This task was applied. In our study, we suggested that children identify in different directions a person's gaze in the picture, his intentions in choosing a subject that surrounded him in the image (a total of 8 series of tasks).

Data processing was carried out using the SPSS V.23.0 program.

4. Results and Discussion

According to the results of the psychodiagnostic study, the children were divided into 4 groups: 1 group – children of 5-6 years corresponding to the norm of age development; group 2 – children of 5-6 years, their development corresponds to the lower limit of the age norm; group 3 – children of 4-5 years; 4 group – children of 5-6 years with mental retardation.

With the help of a dispersion analysis, differences were identified between the group of children with standard age development, the group of children with lower limit of indicators of standard age development and the group of children with mental retardation. Also, the differences are obtained from these groups of children 5-6 years old with a group of children 4-5 years old Leven's Test ≥ 0.05 , $F = 41.86$, $p = 0.000$, $\eta^2 = 0.221$ (Fig. 2).

The results show that children with a standard age development better determine the correctness of the sight direction. The group of the lower limit of the age norm, as well as the group of children 4-5 years of age, showed results slightly below the group of children corresponding to the age norm of development. Children with mental retardation showed drastically different results, the correctness of sight direction in children with mental retardation is much less than in contrast groups.

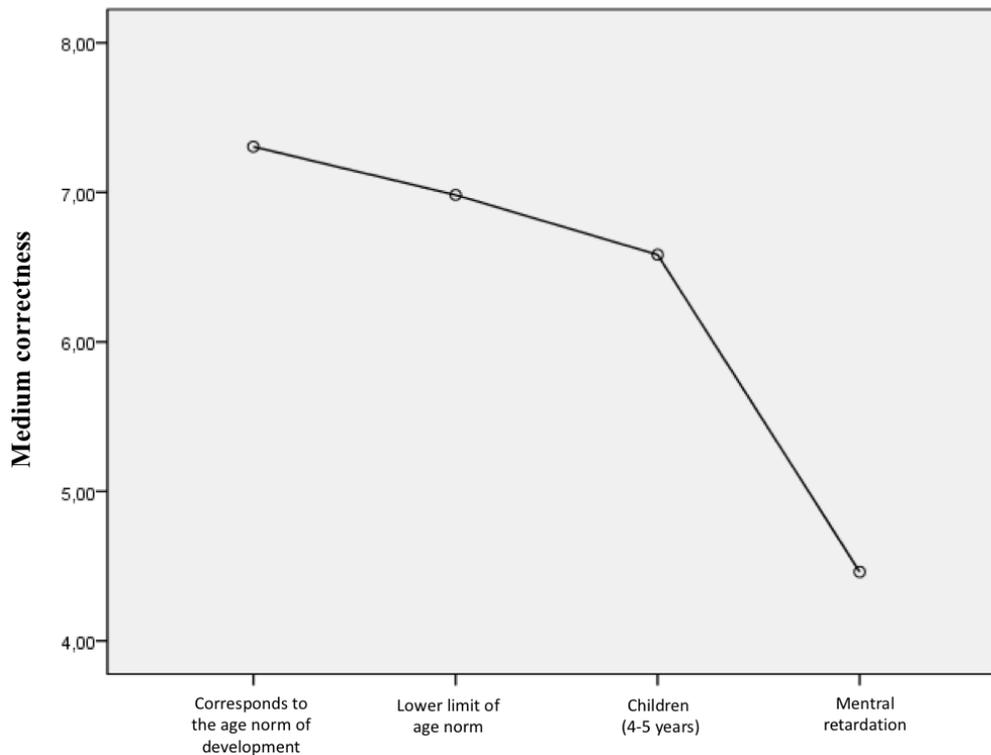


Fig. 1. The results of the comparison groups of preschoolers.

Differences between groups confirm the assumption of the leading role of child participation in joint attention in acquiring the ability to coordinate attention with social partners. This is crucial for children's active participation in learning opportunities. This fact reflects the variability of the formation and possibility of differences in age-related changes in skills of joint attention. More precisely, this fact reveals the presence of ontogenetic differences in the understanding of the intentions of the other in the direction of sight as the most important skill of responding to joint attention and initiating joint attention. Moreover, these differences in age-related changes in skills of joint attention are related to the level of development of the child.

Differences in 3 groups with normative age development, group of the lower limit of the age norm and delayed age development confirm the hypothesis about the leading role of the child's participation in joint attention in acquiring the ability to coordinate attention with social partners, which is crucial for the active participation of children in learning opportunities.

5. Conclusion

Recognizing the sight direction can be viewed as the main mechanism by which the child's attention is socially coordinated in a purposeful action. The data confirms that such an orientation can give the observer indications of another person's intentions, his attention to the goal.

The formation and development of a mental model proceeds in parallel with the development of the child's thinking. It is closely interrelated with the ability to anticipate the results of objective actions, to understand the laws of substance conservation, and to the decentralization of thinking. Based on the results of the study, it can be concluded that under favorable conditions for the formation of a mental model in children, their success in social behavior increases. It can be noted that the possibility of combining the vision of the prospects for joint activities may be hampered due to the difficulty of recognizing the intentions of another person. Namely, the response to attracting joint attention, deliberating initiation of attention may be difficult. The aspect of general awareness may be violated as part of an interactive process of recognizing orientations on the subject of interaction and integration of different mental spaces, a common semantic context reflecting the position of several people.

It can be assumed that, unlike typically developing children, children with mental retardation are insensitive to the main social signals from another person; therefore, they do not perceive the eyes of others

as adaptively informative or socially significant. The data of our study show that this is characteristic not only in the pathology of child development, but also in a decrease in the indicators of the general level of age development.

6. Acknowledgment

The article is published with support of the grant of the President MK-3052.2018.6 “The formation of mechanisms for the arbitrary regulation of the orienting part of joint activities in the early stages of ontogenesis.”

References

- [1] Sergienko, E. A., Lebedeva, E. I., & Prusakova, O. A. (2009). *The model of the mental as the basis for the development of the understanding of oneself and another in the ontogenesis of man*. Moscow, Russia: Publishing House “Institute of Psychology of the Russian Academy of Sciences”.
- [2] Baron-Cohen, S. (1995). *Mind Blindness*. Cambridge, MA: MIT Press.
- [3] Bruner, J. (1985). *Child's talk: Learning to Use Language*. New York, NY.
- [4] Mundy, P., Sullivan, L., Mastergeorge, A. M. (2009). A parallel and distributed-processing model of joint attention, social cognition, and autism. *Autism research*, 2, 2-21. Retrieved from [www.doi: 10.1002/aur.61](https://doi.org/10.1002/aur.61).
- [5] Rossano, F., Carpenter M., & Tomasello, M. (2012). One-year-old infants follow others voice direction. *Psychological Science*, 23, 1298-1302. Retrieved from [www.doi: 10.1177/0956797612450032](https://doi.org/10.1177/0956797612450032).
- [6] Wimmer, H., & Perner, J. (1983). Beliefs about beliefs: representation and constraining function of wrong beliefs in young children's understanding of deception. *Cognition*, 13, 103-128.