

## Summary of the Ph.D. Thesis

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The title of the thesis:

Capabilities and limitations of preschoolers with autism spectrum disorder in terms of mastering numeracy skills

Key words phrases: autism, autism spectrum disorder, ASD, numeracy and calculation skills, mathematical abilities, preschool age

### Abstract:

In the doctoral dissertation results of research are shown, determine the level of the numeracy and calculating skills in preschool children with the autism diagnosis. The ability to count and calculate of children with autism was considered against the background of the level of the numeracy and calculating skills in children in the broadly understood intellectual norm. The main research method was the diagnostic experiment and the accompanying observation and analysis of children's activities.

To measure the numeracy and calculation skills, decided to use a ready-made diagnostic tool, designed by Edyta Gruszczyk-Kolczyńska. It is a series of diagnostic experiments: *Children's counting and adding and subtracting – chestnuts part one and two*, as well as *Adding and subtracting – an abacus and gaming die*. The results obtained by children with autism diagnosis in the scope of the numeracy and calculating skills were analyzed using as the basis of reference the standards set by Gruszczyk-Kolczyńska in the study of children in the broadly understood intellectual norm. Only on the basis of a comparative analysis of the results of children with a diagnosis of autism in relation to developmental findings concerning children

in the broadly understood intellectual standard, the specifics of the acquisition of the mathematical skills with regards to the numeracy and calculating skills have been inferred. On that basis it has been determined how the counting and calculating skills in children with autism diagnosis are shaped in relation to children in the broadly understood norm).

A total of 36 children (18 children diagnosed with autism and 18 children in the broadly understood intellectual norm) were studied. These were children at a preschool age (at the third, fourth, fifth, and sixth year of age). All children with autism had a current special educational needs statement issued for autism through a counselling and guidance center.

According to the obtained data, the level of mastery of the numeracy and calculating skills in all the examined children in the broadly understood intellectual norm was adequate to their age (the group of children in the broadly understood intellectual norm is homogeneous, with minor individual differences).

In the group of children with a diagnosis of autism, there were large individual differences, which were not in line with the development model of the shaping of numeracy and calculating skills created by Gruszczyk-Kolczyńska (2013). The obtained data showed that the level of numeracy and calculating skills was adequate to the age of not all the examined children with the autism diagnosis. Individual differences in the level of mastery of the numeracy and calculating skills in the range of two and three years are large differences. They are not typical for the development of children. This means that children did not acquire the numeracy and calculating skills according to the developmental standards of Gruszczyk-Kolczyńska (2013). Children with autism diagnosis do not have the competence to count and calculate that are consistent with their age (either a significant delay in the level of mastery of the numeracy and counting skills or a significant acceleration in the level of mastery of the numeracy and counting skills is observed). Such large differences in the mastery of the numeracy skills were not observed in children in the broadly understood intellectual norm, all studied children in the broadly understood intellectual norm performed according to the expected developmental norm.

The doctoral dissertation is ending by proposals which may be the basis for the planning of possible corrective or supportive activities. The entirety of the conclusions gathered by me is based on the results of conducted research. The analysis of these conclusions, contained in the recommendations for pedagogical practice, can positively influence changes in thinking about the didactic aspects of early numerical competence acquisition by preschool children with autism and serve as a stimulus for further research in this area.