

Summary

Development of inhibitory control in childhood

The book fits into the tradition of studies on the intentionality of human actions, which have been taken up for centuries in philosophy and also in psychology since the beginning of its academic existence. In recent years, a group of functions responsible for the organization of purposeful human activities, called executive functions, has gained particular attention among those researching human mental development. However, the current interest in executive functions is not only a continuation of the previously known path of psychological studies, but also a response to the specific requirements of modern times. Contemporary humans face the necessity of being the author of themselves, of determining for themselves what is right, and taking up the challenge of intentionality in how they function in the world.

One of the most important executive functions is inhibitory control, which allows a person to change and choose responses instead of automatic behavior. Many researchers consider it to be a basic function, which precedes and facilitates the development of other executive functions, because this function develops very early and can be measured at least from the middle of the third year of a child's life. Adele Diamond includes inhibitory control in the core executive functions (along with working memory and cognitive flexibility) and points out that its high efficiency measured in childhood correlates strongly with a high level of school achievement and good health (physical and mental), as well as high social status in adulthood. Researchers also point out that despite the great importance of this function for human behavior, the definitions of inhibitory control remain unclear. For this reason, it is necessary to study in detail the dynamics of the development of this function to and trace how it works in different situations and in people of different ages.

The main aim of this monograph is to formulate and conduct an initial empirical verification of the developmental concept of inhibitory control in childhood. The author achieves this aim by integrating knowledge from the field of developmental psychology, general psychology (especially cognitive psychology), psychology of voluntary behavior, neuropsychology, neuroscience and psychodiagnostics. The theoretical framework for achieving the aim is the cultural-historical psychology developed by Lev Semyonovich Vygotsky, supplemented by several of Alexander Romanovich Luria's neuropsychological ideas. On the one hand, this framework allows the reconstruction of the mechanisms of developmental changes (and not only the sequence of these changes) in the system of mental functions. On the other hand, it allows the author to combine in a convincing manner (and not merely to juxtapose) the pro-

cesses of the organism's biological maturation with the impact of the socio-cultural environment. For this reason, despite having been developed many years ago, it is still a very popular and inspiring theoretical tool for researchers and allows them to take up the challenges of modern psychology of human development.

The book also has a long-term practical goal, although it could be only achieved indirectly. Describing the main milestones in the development of inhibitory control and key indicators of this development is the starting point for a more accurate assessment of children's activity. Sensitizing child psychologists to the manifestations of developmental variability of inhibitory control seems to be the key to identifying children at risk of atypical development or the occurrence of mental disorders. This work could also provide an initial impulse for introducing changes in diagnostic protocols and general concepts of supporting the development of both children who are undergoing typical development and those developing in an atypical way. Researchers emphasize that executive functions training produces results at every stage of mental development, also in adulthood. This allows us to take an optimistic view of the possibility of setting future living conditions which have potential to improve the efficiency of inhibitory control in children.

The monograph consists of the following parts: an introduction, chapters 1 to 4, a conclusion and two annexes. In the first chapter, the author analyzes the main ways of defining fully developed (i.e. characteristic for adulthood) inhibitory control and presents his own definition of this function as the ability to modulate the inhibition of habitual activity and increase or decrease the degree of their influence on behavior, according to the actual motive and purpose being achieved by the person, and appropriately to the stage of preparing the final reaction. He also points out that in defining a fully developed form of inhibitory control, it is worth taking into account the context of other mental functions. Placing inhibitory control among other functions in the functional system of voluntary behavior allows us: (1) to explain the different forms of its application, identified both on the basis of behavioral and neuroimaging studies; (2) to understand the development process of inhibitory control in which, following to the author's concept, the main changes concern the functionality of the elements of this system and the position of inhibitory control in relation to them, and (3) to go beyond the view of inhibitory control activity as a binary sequence of "inhibiting vs. not inhibiting" automatic reactions and to define this function as the ability to modulate the inhibition of habitual reactions.

The second chapter of the book is devoted to discussing the results of research on the cerebral basis of inhibitory control. It is noted here that studies conducted to date have brought no more knowledge about the different forms of inhibitory control than behavioral research has. The developmental variability of the cerebral bases of inhibitory control is yet to be discovered, which is partly justified by both the lack of a theoretical framework for the development of this function, and serious limitations in neuroimaging techniques themselves, especially when neuroimaging is used as a tool for basic research on children. On the other hand, the results of brain research confirmed the usability of perceiving inhibitory control as a component of the functional system of voluntary behavior.

Chapter Three presents an original theoretical concept for the development of inhibitory control during four childhood periods: infancy, early, mid- and late childhood. The view of inhibitory control presented in this concept shows a mental function that gradually extends its participation in the reaction process. This results in decreasing dependence of human behavior on environmental stimuli, as well as an increase in its flexibility and intentionality. During the course of human development, inhibitory control changes following the nervous system maturation, general progress in mental function and the increasing number of social experiences. These changes mean that the inhibition of reactions is carried out by functional systems which have specific organization (i.e. mechanism of activity) on every stage of development. The developmental concept of inhibitory control is also used in this section of the book as a starting point for analyzing the efficiency of the most often used methods in the inhibitory control developmental assessment. The author notes that the research tools in current use focus on recording the effects of inhibitory control activity during children's self-directed performance of various tasks, which practically renders researchers unable to track the developmental variability of the mechanisms underlying this function, which are postulated in the aforementioned concept. For complete operationalization of this concept a new generation of methods is needed. Such methods should enable these processes to be tracked (not only the final results) taking place during the performance of tasks and giving the subjects the possibility of cooperating with other people.

In the final chapter of the book, the author conducts a preliminary verification of selected assumptions of the developmental concept of inhibitory control. This verification is based on data collected by the author in his own research project, completed a few years ago. The project had specific aims and a research scheme not linked directly to the content of this book. Despite the limitations of original methodology applied in the project, several important findings were obtained. Firstly, most of the data analyzed was consistent with the assumption that there were two key turning points in the development of inhibitory control: (1) the loosening of the relationship between inhibitory control and the perceptual field, in the transition from early to mid- childhood, and (2) the activation of reactive inhibitory control which is guided by the purpose of action retained in the memory – at the transition from mid- to late childhood. Secondly, the same connections between biological conditions and inhibitory control that were assumed in the developmental concept were observed. Thirdly, the hypothesis that the level of inhibitory control in mid-childhood predicts school achievement in late childhood was partly confirmed. However, data consistent with the assumptions regarding the dynamics of changes in the biological and social conditions of inhibitory control were not obtained. In addition to the initial verification of the developmental concept of inhibitory control, the results of the project allowed the author to confirm and empirically illustrate some typical problems with the developmental assessment of this function appearing especially when it is undertaken with the use of traditional methods.