

The Interaction of the Parent with the Young Child: Structure and Dynamics of Parental Responsiveness

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The article presents a theoretical justification of the concept of Parental Responsiveness (PR) based on the cultural and historical concept, the activity paradigm and the results of an empirical study, the purpose of which is to operationalize the psychological construct of parental responsiveness and build an explanatory model of the dynamic functioning of parental responsiveness. The study involved 55 mothers with children between the ages of 2.4 and 3.3 years, developing within the norm. The method "Evaluation of child-parent interaction (ECPI)", which provides video surveillance, was used. The data was processed using the Observer XT-14 computer program. The Principal component analyses the method with orthogonal rotation Varimax was used to identify generalizing categories that characterize PR and allows describing their variations. As a result, there were 4 categories (scales) that determine the manifestation of responsiveness by the parent: Dominance, Apathy, Sensitivity, and Support. Their stability was shown in the process of parent-child interaction. A profile of parental responsiveness is constructed for each parent, which determines the extend of each scale when interacting with the child. The developed dynamic multidimensional autoregressive model of Parental Responsiveness allows us to evaluate the dynamics of parental behavior and determine the nature of the relationship between scales during the session.

Keywords: parental responsiveness, scales, video observation, Observer XT, toddler, mother-child interaction, mother-toddler dyad, categories of parental responsiveness, multivariate autoregression model.

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Взаимодействие родителя с ребенком раннего возраста: структура и динамика родительской отзывчивости

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В статье представлено теоретическое обоснование понятия «родительская отзывчивость» (РО) с опорой на культурно-историческую концепцию, деятельностную парадигму и результаты эмпирического исследования, цель которого: операционализировать психологический конструкт родительской отзывчивости и построить объяснительную модель динамического функционирования родительской отзывчивости. В исследовании приняли участие 55 матерей с детьми в возрасте от 2,4 до 3,3 лет, развивающимися в рамках нормы. Применялась методика «Оценка детско-родительского взаимодействия (Evaluation of child-parent interaction (ЕСPI)), предусматривающая видеонаблюдение. Данные обрабатывались с помощью компьютерной программы «The Observer XT-14». Для выделения обобщающих категорий, характеризующих РО и позволяющих описать их вариации, использовался метод главных компонент (Principal component analyses) с ортогональным вращением Varimax. В результате были выделены 4 категории (шкалы), определяющие проявление родителем отзывчивости: Доминирование (Dominance), Апатичность (Apathy), Чуткость (Sensibility), Поддержка (Support). Была показана их устойчивость в процессе взаимодействия родителя с ребенком. Построен профиль родительской отзывчивости для каждого родителя, определяющий выраженность всех шкал при его взаимодействии с ребенком. Разработанная динамическая многомерная авторегрессионная модель родительской отзывчивости позволяет оценивать динамику родительского поведения и определять характер взаимосвязи между шкалами в течение сессии.

Ключевые слова: родительская отзывчивость, видеонаблюдение, The Observer XT, ребенок раннего возраста, взаимодействие матери с ребенком, диада «мать—ребенок», спонтанная игра, многомерная авторегрессия, путевой анализ (path analysis), профиль родительской отзывчивости.

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Introduction

The psychological birth of the human infant and consequent development during early childhood is analyzed from various perspectives, but regardless of the approach, all of them look at these processes through the prism of parent-child interaction [2; 9; 14; 15]. Parent-child interaction is a set of behaviours that could be observed and measured [11] with the help of scales that are marked during the observation. These scales could differ in both a set of considered behavioural characteristics, and in the organization of observational processes. The variety of modern procedures for assessing parent-child interaction, on the one hand, makes it possible to study the characteristics of behavior that best meet the objectives of the study, while on the other hand, makes it difficult to compare research results due to the lack of common approach to assessing and interpreting indicators [12].

In modern international studies, the concept of parental responsiveness is actively used to analyze the role of parent behaviour in child's speech [22; 31; 32], executive functions [23; 30], social-emotional and cognitive development [24; 25; 29] and acquisition of various knowledge using computer technologies [26]. It should be noted that the qualitative characteristics of parental responsiveness (PR) vary in different empirical studies, since there is no single definition of this concept.

A number of researchers propose to consider 'responsive behavior' to be the one that is characterized by immediacy and urgency of the parent's reactions that are compliant with the situation and circumstances (contingent); by positive emotions and affectively positive reactions [21]. Others consider the parent's ability to follow the child's current focus of attention, support of child's interest, and his activity to be the main characteristics of the PR [19]. In some studies, the PR considers a

combination of characteristics such as sensitivity, reciprocity, and positive control [31].

In Russia, the assessment of parent-child interaction does not incorporate the concept of PR. However, researchers indicate certain characteristics of adult behavior during one's interaction with the child to play a decisive role in psychological and personality development of the latter [1; 3; 8]. The most profound and developed method of standardized observation of parent-child interaction in the Russian psychology is based on the approach of M.I. Lisina. Her approach does not limit the analysis of such interaction to the assessment of formal and quantitative characteristics of behavior, but considers the quality of communication and focuses on the analysis of its need-motivational aspects [8].

Building on the previous research [4; 5; 13], we have defined the PR as a psychological construct, the content of which reflects the integral behavior of the parent when interacting with the child. We have also specified indicators of behavior that characterize the PR in relation to parent-child interaction during early childhood.

The methodological basis of the study includes:

- L.S. Vygotsky's theory on the role of social environment in child's development, which sets forth further dynamic changes that occur during each developmental period;
- M.I. Lisina's approach to study personality development in the context of child's communication and based on child's communicative needs to cognize and evaluate oneself through other people and with their help;

– L.I. Bozhovich's position on the central role of the environmental responses to the child's needs and emotional experience in his mental development.

The above approaches and theories laid a foundation in defining the concept of parental responsiveness (PR).

Parental responsiveness (PR) is a psychological construct that characterizes specific activity of the parent and one's sensitivity to the child's signals, which:

- is formed in the process of interaction with the child;
- reflects the parent's unconscious readiness to act;
- is associated with age-specific characteristics of the child;
- a condition for the formation of the child's communicative needs;
- possesses dynamic characteristics (speed, frequency and duration of reaction);
- contains emotional, physical, cognitive and action elements, all of which can be observed in the parent's behavioral expressions (indicators) (Fig. 1).

According to the cultural-historical concept, each age period is characterized by a specific social situation of child's development. L.S. Vygotsky suggested that this social situation shapes child's relationships with surroundings, and above all the social one. Based on Vygotsky's activity theory, child's communication with a significant adult and interaction experiences, in which a child assimilates social and historical experiences of mankind, play a fundamental role in child's general mental

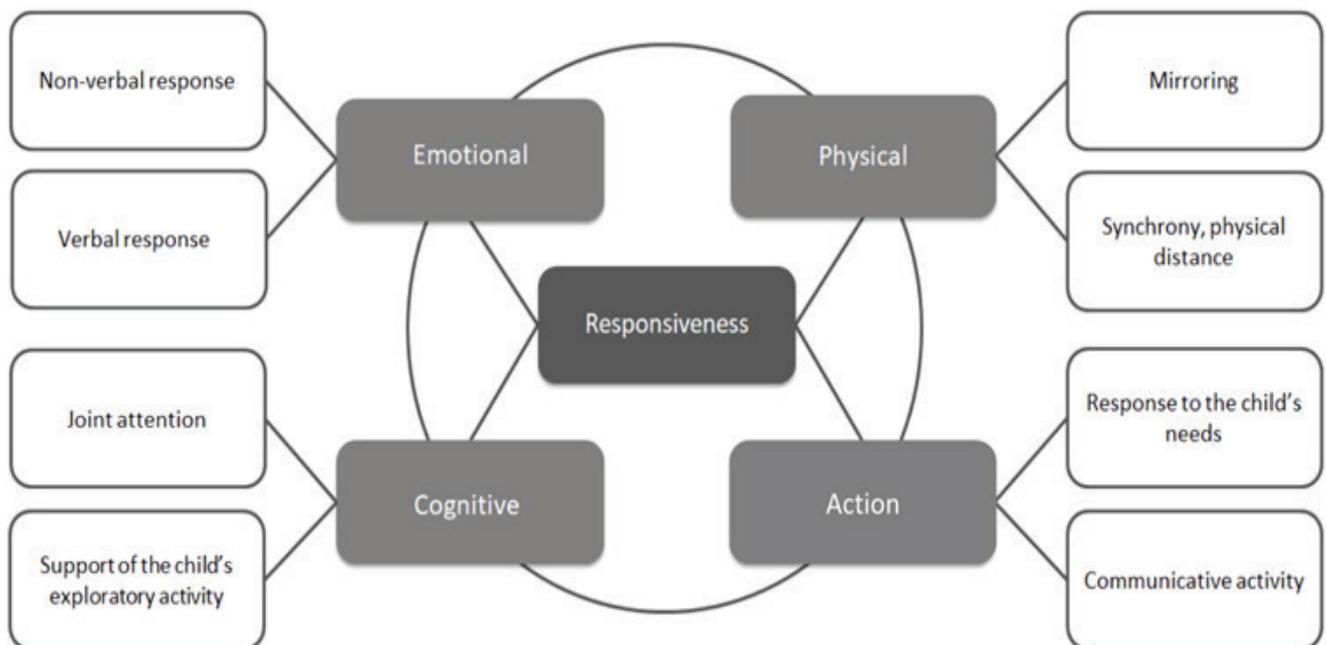


Fig. 1. Qualitative Characteristics of Parental Responsiveness

development [1; 8]. During the child's interaction with an adult, the child's zone of proximal development is defined by the ideal model of development set forth by the social environment [3; 17]. This zone of proximal development could be mastered only with the help of carriers of such competences. M.I. Lisinoy believes that adult behaviour and attitude towards a child as an individual play a decisive role in the occurrence of parent-child interaction.

The following are the elements of the parental responsiveness that have been identified in the process of theoretical analysis of scientific literature and empirically tested using video observations.

Emotional Element (non-verbal and verbal emotional responses)

According to M.I. Lisina, expressive and mimicking means of communication (looks, facial expressions, gestures and expressive vocalizations) reflect the content of parent-child interaction. Their particular significance lies in the fact that no other mean is able to convey this content more fully and effectively: these means reflect the parent's attention, interest in the child and allow the parent to respond to the child's signals in the most sincere language, which is the language of facial expression, gestures and tone of voice. The child learns about himself, his feelings and inner world through an adult who voices not only what is happening in the child's inner world, but also his own feelings and emotions. In other words, the child receives a verbal confirmation from the parent that the parent understands and responds to his emotional state.

Physical Element (mirroring and synchrony)

The child does not only learn about himself, but also evaluates himself through others and with their help. The first mirror a child looks into is a parent or a significant adult. According to M.I. Lisina, this mirror determines the ways a child can use a communication partner for the purposes of self-knowledge and self-esteem [8].

The consistency, speed and frequency of the parent's response to the child's signals have been suggested by various scientists as significant characteristics of the PR [21]. In our proposed structure of the PR, these characteristics of the parent's response to the child's signals are most clearly traced through the physical element, which we analyze with the help of the 'mirroring' indicator, which is the parent's ability to be a mirror reflecting the child's non-verbal behavior (repetition of facial movements), verbal responses (repetition of vocalizations by the parent, the child's words) and movements of large and fine motor skills. Based on the vivid dance metaphors, proposed by researchers to describe the conditions for creating dialogical communication between parents and young children [18; 27], we also use 'synchrony, physical

distance' indicator to analyse the physical element of the PR.

Cognitive element (joint attention, support for exploratory activity)

We designated this component of the PR as Cognitive, meaning not so much the child's learning in the process of interaction, though learning occurs during any interaction between an adult and a child, but the learning by the parent, who learns about the child's inner world in the process of communication with the child. The parent's ability to share the child's attention on an object of interest for a long time (joint attention) serves as an important indicator of the PR. Since our study focuses on the parent-child interaction during early childhood, it is important to keep in mind that one of the emerging elements during this period is the initiation and development of child's speech [3]. To date, research suggests that children whose parents follow the direction and focus of their child's attention on an object of interest, register greater increase in language in the future. The opposite relationship has also been identified: when parents distract their child's attention from what presents an interest to him, the child's ability to connect the parent's words to his own activity decreases [20]. The ability of the parent to observe and support exploratory and research activity of the child helps the child to discover the meaning of objects and the child's actions with them [10] and to pave the way to the acquisition of 'shared meaning' during parent-child interaction.

Action element (response to the child's needs, communicative activities)

The Action element in the analysis of the PR considers the communicative activity of the parent that responds to the child's communicative needs. When an adult treats a child as an individual and a preferred communication partner, the child's communicative activity flourishes [8]. The child's natural survival needs such as the needs for food and warmth serve the basis of the child's communicative needs. However, communicative needs are not limited to these natural needs. The child's inherent interest in new experiences [1] is of great importance, and an adult becomes the most information-rich resource in the baby's world. At the Action element, we analyze the parent's response to or ignorance of the child's basic needs, the need for active exploration, recognition and support, maternal care, love [2; 28] and affection [16]. Thus, to analyze the communicative activity as a component of the PR, the following characteristics of the parent's behavior are considered: the parent's verbal responses to the child's activities (comments on child's actions); demonstration of respect for child (not a directive position), confidence in the child's abilities (sincere praise) as

opposed to criticism of the child's actions; formal praise; parent's directive behavior as a negative indicator of the PR.

Free play as a condition for the assessment of parent-child interaction during early childhood

Free play as opposed to didactic games (pedagogical tools created by adults to develop a child's ability) has been chosen as a set up for analyzing parent-child interaction during early childhood. The main difference between free play and didactic game lies in that during the later a child performs duties, while in free play solves one's own tasks. During free play, the child himself initiates learning of what he does not yet know [7]. For our research, this understanding of free play is of great importance. The PR during free play serves a psychological foundation for the formation and development of the child's self-knowledge and self-reflection, and, consequently, the child's understanding of his inner world. In addition, free play provides the parent with a significant amount of information about the child's abilities and needs, and as a result, the parent gets to know one's child as a communication partner better. Parent's focus solely on teaching to the detriment of free play deprives the parent of the possibility to obtain deeper knowledge about the child's inner world and to develop responsiveness to his communicative signals. Meanwhile, according to L.S. Vygotsky, L.I. Bozovic, the child's emotional experience is considered central in his mental development, as it uncovers his needs: the child learns from the surrounding reality only what meets his immediate needs [1, p. 159].

The theoretical indicators of behavior that have been developed to characterize the PR lay out the basis of the empirical analysis presented in this work.

Research purpose and hypothesis

The purpose of the study: to operationalize the psychological construct the Parental Responsiveness (PR) and to build an explanatory model of the PR dynamic functioning.

Research aims:

1. to highlight the integral indicators characterizing the behavior of the parent when interacting with the child during early childhood;
2. to build the PR profile for this set of indicators;

3. to build a dynamic model of the PR that allows the analysis of parent-child interaction as a process.

Research hypotheses:

- parental behavior during interaction with young child can be analyzed based on the PR indicators that have been identified above;
- PR as a categorical construct suggests the possibility of building a profile, which reflects the prevailing type of parent's behavior when interacting with a child;
- the PR during the parent's interaction with the child can be considered as a process that could be described by a dynamic model;
- on the one hand, the PR indicators are stable over time, on the other hand, they are interconnected.

Sample description

The study involved 55 mothers with children born on time and normally developing. At the time of the study, the age of children ranged from 2.4 to 3.3 years ($M = 2.9$; $SD = 0.4$). The living standard of families was defined by the participants as equal or above average in Russia. All participants live in large cities of Russia (Moscow, Yekaterinburg, Salikhard). Demographic data is shown in Table 1.

Table 1

Sample Demographics

Age	
Mother	From 24 to 47 y.o. ($M=32,6$; $SD=5,3$)
Child	From 2.4 to 3.3 y.o. ($M=2.9$; $SD=0.40$)
Mother's level of education	
High school	5
College degree and above	50
Marriage status	
Married	46
Single	4
Divorced	10
Child's gender	
Girls	30
Boys	25

The participants received an invitation to take part in the study through announcements made on the Moscow State University of Psychology and Education (MSUPE) website and other Internet resources, announcements in perinatal centers and early childhood development centers in Moscow. Those who showed interest in the study and provided their coordinates received an explanation of the process of the study. An ethical consent was signed with each parent, which allows the results of the study to be shared with the professional community.

Research method

The PR was assessed using the Evaluation of Child-Parent Interaction (ECPI) method [4; 5]. This technique has passed a professional examination [6] for the consistency of the assessment of the parent's behavior by the professionals who carried out the video coding. The analysis of data from video observations was carried out using the Observer XT-14 software, which allows the visualization of the dynamics of the behavioral characteristics of the participants. The indicators of parent's behavior developed during the previous studies were used to code the video cases [4; 5]. Each of the PR indicators can manifest itself in behavior both with a positive (positive indicator) or with a negative score (negative indicator). The analysis also includes periods of time when indicators of parental responsiveness are absent (have neither negative nor positive score). In this case, the indicator is conventionally called 'neutral'. The coding system for parental responsiveness, including 18 behaviour indicators, is presented in Appendix 1, Table. 1.

It should be noted that when teaching coders to identify each behavioral indicator, we draw their attention to the fact that some indicators require an understanding of the interaction context. While some indicators are easy enough to recognize (non-verbal expressions, synchrony), others require a consideration of a combination of indicators. For example, the physical distance between the mother and the child is recorded positively if it 'brings pleasure to both', which we determine by the presence of positive non-verbal indicators both on the part of the parent and on the part of the child at this very moment, as well as the absence of tension at the physical level in both participants during their interaction, which can be observed through stiffness, mismatch between parent-child movements.

Research procedure

Video recording of the parent-child interaction was carried out in accordance with the ECPI methodology [4; 5]. The duration of each interaction (session) lasted 15 minutes, during which the parent was instructed to play with the child as she does at home. The parent's behavior was assessed using 18 indicators (see Appendix 1, Table. 1). The video recordings were coded by two coders. The measurements between the two coders are consistent, which suggests the objectivity of the proposed indicators and the developed assessment procedure.

After each of the video files was coded, each 15 minute session was divided into 1000 time points. For each of the 18 indicators, a point is characterized by a unit (1) if at this moment in time this indicator,

according to the experts, is present in the parent's behavior, and zero (0) if the opposite is true. Thus, 18 time series were obtained, with 1000 measurements in each. All 1000 measurements were divided into 4 periods of 250 measurements. Within each period, for each indicator, the percentage of indicator occurrences was calculated, that is, the duration of the parent's behavior corresponding to this indicator in a given period. As a result, for 18 indicators, their values were calculated in each of the four periods of the session. They constituted data with the following structure: for each parent-child dyad there are four lines (one line for each period). All 18 columns contain the percentage of indicator occurrences for a given dyad in a specific time period.

Results

The analysis of the research results was carried out in four stages.

Stage 1: Selection of the PR scales and description of their qualitative characteristics

During the first stage, measurements from 18 columns (18 PR indicators) and 220 rows (55×4) was used as primary data. To reveal the generalizing categories characterizing the PR, the principal component analysis (PCA) with orthogonal rotation (Varimax) was used. As a result, four principal components determining parent's responsiveness were identified: they cumulatively explain 54.3% of the total variance. Table 2 contains a rotated component matrix of loadings that specifies each principle component. The content of the indicators that had the highest loadings for each component defined their names: Dominance, Apathy, Sensitivity, Support. Hereinafter, the identified factors-categories will be called the PR Scales.

The data obtained allows us to describe each of the principle components (PR scales) in a meaningful way.

Scale 1. Dominance

The parent-child interaction is based on a didactic game, which entails the use of guidance and instructions by the parent. The parent dominates and does not follow the child's attention, instead attempts to switch the child's focus to objects that the parent considers important for the child's learning. The high scores on this scale suggest that the child's exploratory behaviour is not encouraged by the parent. Moreover, the parent often criticizes the child's actions, and the praise is rather formal in nature without emotional coloring. There is a lack of complementarity in the dyad movements (synchrony indicator with a negative sign). The high scores on this scale suggest the Imposing PR Style

Rotated component of PR matrix with % of variance explained

Indicator №	Indicator name	Dominance	Apathy	Sensitivity	Support
	Contribution of each component to total variance	16.5%	15.1%	14.0%	8.7%
10	Joint Attention -	0.899	0.033	-0.032	-0.103
18	Play -	0.887	-0.030	0.014	-0.108
16	Communicative activity -	0.590	0.148	-0.150	0.079
12	Support of exploratory activity -	0.582	0.106	0.034	0.069
08	Synchrony -	0.445	0.185	-0.074	0.039
06	Mirroring -	0.040	0.940	-0.052	0.024
04	Verbal -	0.050	0.914	-0.035	0.024
14	Parent's responses to the child's needs -	0.193	0.745	0.068	-0.045
02	Non-verbal -	0.179	0.557	-0.108	-0.293
07	Synchrony +	-0.087	-0.076	0.815	-0.081
17	Play +	-0.338	0.018	0.629	0.095
09	Joint attention +	-0.330	-0.044	0.595	-0.062
13	Parent's responses to the child's needs +	-0.217	0.121	0.594	0.082
03	Verbal+	0.198	0.024	0.484	0.157
05	Mirroring +	0.116	-0.090	0.465	-0.009
11	Support of exploratory activity +	0.248	-0.091	0.360	-0.231
15	Communicative activity +	-0.047	-0.026	-0.148	0.830
01	Non-verbal +	0.155	-0.174	0.305	0.806

Note:* Significant loadings are in bold.

that does not tolerate objections. The child must obey the instructions.

Scale 2. Apathy

The parent demonstrates reserved non-verbal behaviour: the parent does not voice the child's emotional state and does not verbalize his own emotional state. High scores on this scale indicate that the parent is not sensitive to the child's needs (basic needs, need for affection, activity, etc.). The emotional background of such interaction is generally negative. There are negative indicators on Mirroring, which often means that the parent demonstrates emotions of the opposite sign in response to the child's emotional reactions and ignores the child's feelings and needs.

Scale 3. Sensitivity

The parent-child interaction is based on free play. During play, the parent gives the child the opportunity to play freely, follows his attention, encourages and supports the child's exploratory behaviour and reacts sensitively to the child's signals: mirrors his emotions and movements, voices his own emotions and the child's emotions. The parent responds to the child's needs in a timely and appropriate manner. Synchrony of movements is observed in the dyad. However, the high scores on this scale suggest symbiosis, which could be a sign of an extreme form of interdependence (up to complete merger), in which the individuality of both participants in the interaction is lost.

Scale 4. Support

The parent maintains a positive attitude during the interaction, demonstrates non-verbal positive reactions, complements the child's actions with posi-

tive comments without criticism and often praises the child and refers to him/her by the name. The high scores on this scale are registered when the parent is involved in the process of interaction with the child.

Thus, the parent's behavior is determined by a set of scores on each of the scales specified above. We can say that when each indicator changes from average to high, the psychological meaning of the parent's behavior changes. Thus, the average scores on the Dominance scale reflect the parents' focus on teaching the child and guiding his activities; while the high scores on this scale reflect an imposing nature of the parent's behaviour. The average scores on the Apathy scale are interpreted as lethargy and emotional restraint, while the high scores on this scale speak of ignorance in the parent's behaviour. On the Sensitivity scale, the average scores are reflective of the parent's sensitivity to the child's communication signals, however, the high scores present a danger of the development of symbiosis, the psychological fusion of the parent and the child. On the Support scale, the average scores reflect parent's emotional support, while the high scores reflect parental involvement in the child's activities. Low scores on the scales indicate weak trends.

Stage 2: The analysis of the dynamic characteristics of the PR scales

As a result of factorization, each observation (row) received a factor score for four principle components. At the qualitative level, this means that each parent received a score on each of the PR

scales at each point in time. Fig. 1—4 shows the dynamics of scores on the scales during the session.

The following general pattern can be noted for all four PR scales: there are no significant changes in the average level of scores the first three periods of the session. In three out of four scales, that is, for all scales except for the Apathy scale (see Appendix 2), there is a significant decline in the corresponding type of activity in the last period, which can be interpreted as a sign of parental fatigue.

The dynamics of scores in the Apathy scale differs from the other three scales. There are no significant differences in scores in the sample throughout the session, however, the variance of scores changes (see Appendix 2, Fig. 2). On this scale, we can assume the heterogeneity of the sample, which is especially noticeable in the second time period: there are parents who have adapted to the situation and demonstrated a decrease in the ignoring behavior, and there are those whose behavior in the second period becomes even more ignoring.

In the third period, we observe a decrease in the variability of scores on the Apathy scale, i.e. parents level their behavior in this aspect to the average (or, in a certain sense, generally accepted). The minimal scatter of scores in the fourth period indicates that in a situation of general fatigue, all parents behave in a very similar way.

Stage 3: Building the Parental Responsiveness Profile

Having analyzed the stability of each scale during three quarters of the session, we can determine

the style of parenting behavior on each of the PR scales. To do so, we obtain the PR indicator during this part of the session for each of the 18 indicators and calculate the average for each scale based on indicators that have the highest factor loadings on this scale (see Table 1). Since the score of all indicators lie in the range from 0 to 1, their averaged — scale indicators also lie in the range from 0 to 1.

All primary scale scores have been standardized and transformed into Stens, which allows:

1. Comparison of indicators on different scales in one case;
2. Compare scores on the same scale in different cases.

The stens lie in the range from 1 to 10. The range in which the score is considered average, not too high, but not too low, is called the normal corridor, which ranges from 3.5 to 7.5 in stens.

The results obtained for each parent make it possible to build a profile of one's behavior, including scores for each scale. For the visualization purpose, this profile can be represented as a quartagon (see Fig. 2, 3). The higher the scale score, the farther from the center is the top of the profile on the corresponding scale, and vice versa, if the parental behavior corresponding to this scale was not registered, then this point is close to the center. The norm corridor is shown in dotted lines on the quartagon.

Below are two profiles of parental responsiveness of the participants in our study, which clearly reflect the qualitative characteristics of the PR (Fig. 2, 3).

The video case of each participant was assessed by the experts and was given a metaphorical name.

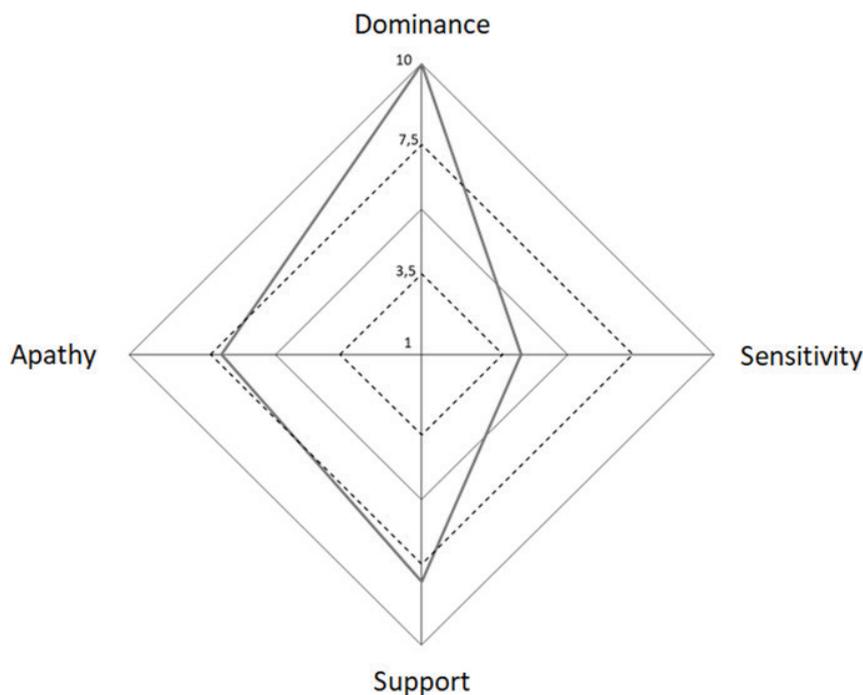


Fig. 2. 'A Strict Teacher' Parental Responsiveness Profile

For example, the PR profile shown in Fig. 2 was built for a case called ‘A Strict Teacher’”. The mom scores high on two scales: Dominance reflecting authority, and Support reflecting engagement. These scales, as we noted above, are represented by primary indicators that are semantically opposite to each other. The combination of both scales with high scores in the profile is the exception rather than the common parenting behavior. During the session, on the one hand, the mother demonstrated her ability to support the child’s free play, to praise him, create a positive emotional environment, and to organize didactic game, focusing on those objects that are interesting to the child, which is why the scores on these scales lay beyond the norm corridor. At the same time, during the periods when the mother taught the child or tried to control the knowledge already acquired by him, the parent voiced multiple categorical instructions that the child had to follow, otherwise, his actions were criticized. When asking questions, the mother did not give the child time to answer (the pace of the parent’s activity does not match the pace of the child’s activity). The child’s reaction at the end of the session was interesting. The child stopped listening to instructions and threw toys around.

In Fig. 3 the PR profile registers high scores on the Dominance scale suggesting the Imposing PR style, and on the Apathy scale suggesting ignorance. The mother’s behavior clearly shows the fear of letting the child out of sight. The child receives a large number of guidelines and instructions, prohibitions to move in an absolutely safe

space where the video was recorded. The parent ignores the child’s need for activity, exploration in a new space and, accordingly, the need for new experiences. The child is allowed to sit in the mother’s arms and play with the toys offered by her. This case was named the Overseer. Despite the fact that the mother during the entire session tries to create a positive emotional environment for interaction, the scores on the Support and Sensitivity scales fell significantly below average. The parent suggests the child different types of activity, however, any such activity remains under the parent’s strict control, and throughout the entire session the child strives to free himself from the parent’s directive behaviour.

4th stage: The Parent Responsiveness Model Development

The fourth stage of data analysis uses multivariate autoregression (EQS 6.2). We set the task to assess the relationship between the four scales of parental responsiveness, both synchronous (at the same stage) and prospective (when some type of activity at one stage determines the same or another activity at subsequent stages) and build a model of parental responsiveness. When constructing a model where the connections between all the Scales were hypothetically allowed and the interactions among the scales were assessed (Fig. 4.), we proceeded with the following hypotheses:

– A measured variable from a previous period can predict a measured variable in a subsequent period.

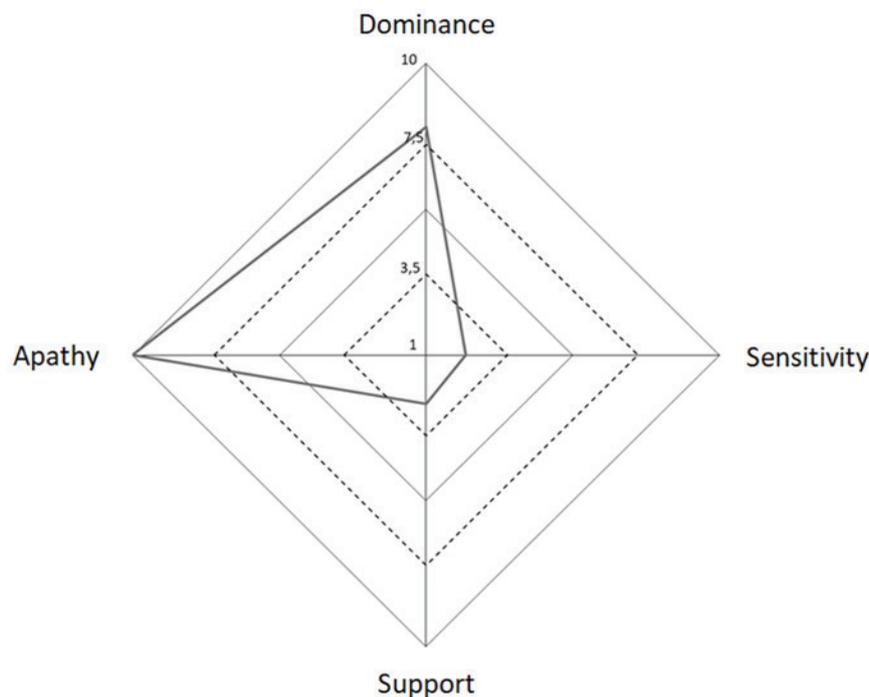


Fig. 3. The Imposing PR Style

- The measured variable of the subsequent period cannot predict the variable of the earlier period.
- Variables of errors (residual terms) from different periods can neither predict each other, nor correlate with each other.
- Variables of the same period can correlate with each other.
- Variables of the same period cannot predict each other.

Fig. 4 shows the final result of the model. All insignificant correlations and determinations have been removed.

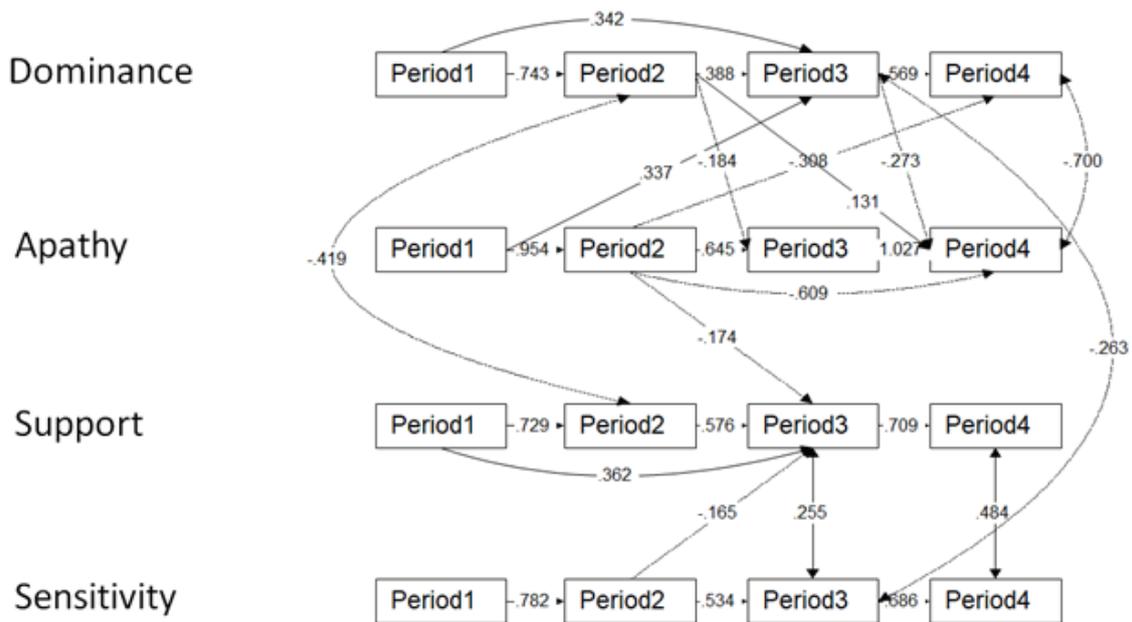
The indices of the resulting model (CFI = 1.0; RMSEA = 0.0) demonstrate a high level of its agreement with empirical data. In most cases, the established relationships correspond to our theoretical concepts, which can be interpreted as model validation. Based on the model we have developed, all scales are stable. The occurrence of an indicator on a certain scale at the moment of time N determines its occurrence at the moment of time N + 1 and in some cases at the moment of time N + 2. Indeed, according to our hypothesis, the occurrence of the PR in one aspect or another reflects the parent's internal attitudes, and therefore should not significantly vary in the behavior of one person without any reason.

The results allow us to state that in most cases the Dominance Scale is more closely related to the Apathy Scale, and the Support Scale to the Sensitivity scale. The fact that the Dominance scale is negatively related to the Support scale is quite expected, since the former is characterized by such indicators as directiveness, strict control, and the

parent's imposition on the child of an activity that, from the parent's point of view, is most useful to the child. The Support scale contains opposite indicators of the parent's behavior. At the center of this scale is the parent's evident interest in what the child is doing and encouragement of his activity.

Among the expected relationships is a negative relationship between the Apathy scale and the Support scale. A mother who does not notice the child's needs, demonstrates clear negative emotional expressions during interaction, which is reflected in the behavioral indicators of the Apathy scale, a priori cannot demonstrate interest in the child's activities, which is one of the main indicators of the Support scale. A negative determination between the Dominance and Sensitivity scales in the third period is predictable, since at the Dominance scale a didactic game is a basis of parent-child interaction, while the Sensitivity scale indicators reflect the parent's behavior, which encourages the child's exploratory activity, follows his attention, and participates in the child's free play.

It should be noted that in a number of cases the nature of the obtained relationships between the scales looks somewhat unexpected. For example, the Apathy scale in the first period is positively related to the Dominance scale in the third period. This phenomenon can be explained by the fact that the parent, who ignored the child's needs at the beginning of the interaction, tries to compensate for the lack of attention to the child by more intensive teaching in the future. However, the Apathy scale in the second period is negatively related to the Dominance scale. Taking into account the fact that in the second pe-



$\chi^2 = 86.760, df = 93, p = 0.66, CFI = 1.0, RMSEA = 0.0$

Fig. 4. Dynamic multidimensional autoregressive model of Parental Responsiveness

riod the sample becomes heterogeneous on the Apathy scale (see Appendix, Fig. 2), we can assume that a parent who demonstrates high degree of neglect of the child's needs in the second period will no longer exhibit behavior of active involvement that entails teaching, but will continue to ignore the child's expressions, which is characteristic of the Apathy scale.

It is worth noting the reverse relationship between the Dominance and Apathy scales in the fourth period. The dominating parent cannot completely ignore the child's needs, since one of the qualitative characteristics of this scale is a didactic game that requires teaching. The high severity of scores on this scale in the second period will most likely lead to lower scores on the Apathy scale in the third time period. That is, a mother who uses didactic game is less likely to show ignorance during the consequent period, but in one period she may get tired, and her behavior will correspond to the behavioral indicators of the Apathy scale.

The negative determination between the Support scale in the third period and the Sensitivity scale in the second period seems to be interesting. It can be assumed that parents who demonstrate excessive sensitivity to the needs of the child and focus their attention only on how the child is feeling limit their contact with the child, reducing their ability to be involved in his activities. If excessive sensitivity that transforms into symbioticity leads to a certain decrease in engagement in the future, in one-time points we can observe strong positive correlation between these scores (see stage 3 and stage 4).

Conclusions

1. The literature review of domestic and international studies has shown that parental responsiveness (PR) to the child's communicative signals affects the child's general mental development during early childhood, the emergence and development of speech, communicative needs and is a necessary condition for the formation of the child's personality, consciousness and self-awareness.

2. The PR as a psychological construct is defined by four scales: Dominance, Apathy, Sensitivity, and Support. Each scale is defined by a set of positive / negative indicators of the parent's behavior when interacting with the child.

3. The behaviour of each parent reveals a certain combination of the intensity of the PR scales, on the basis of which a PR profile can be constructed. This makes it possible to visually represent the integral characteristics of the parent's behavior in the process of interaction with the child.

4. The dynamic multivariate autoregressive model of the PR allows to consider the behavior of the parent as a process of interaction with the child.

The PR is characterized, on the one hand, by the stability of the indicators, and on the other hand, by their certain dynamic relationship, which fade away by the end of the session.

5. In a situation of general fatigue (exhaustion), parents, regardless of their characteristic PR profile, behave in a similar way: expressions of dominance, sensitivity and support decrease, while apathy remains at the same level. This pattern can be compared with the phenomenon of maternal depression as a consequence of general fatigue.

Study limitations include quantitative and qualitative characteristics of the sample. The number of sample participants was 55 mother-child dyads. Fathers and other close relatives (grandparents) who may play a significant role in the development of the child were not involved in the study. The studies were carried out in specially created laboratory conditions, which could affect the behavior of the parent when interacting with the child. We did not set ourselves the task of investigating this effect. However, after the video recordings, we asked the parent "How much, in their opinion, their interaction during the study differed from the way they communicate with the child at home." The parents noted that at the beginning of the video recording, they felt a certain tension, but then interacted with the child freely, as they usually do at home. The objectivity of the research results depends on the subjective assessment of the behavior of the experts, who completed video analysis in accordance with the developed methodology. This leads to time investments spent on coding experts training, video recording, recording and result analysis. The limitations of the study can also include the need to use expensive special equipment: video cameras, a server for storing video recordings, The Observer XT software.

Future research

In our future studies we aim to expand the sample, balanced by gender, age, education level and inclusion of parents raising differently able children; specifications of PR indicators in relation to other age periods of ontogenesis; study of cross-cultural features of PR in interaction with young children that require a longitudinal approach. It is also interesting to study the differences of parental responsiveness towards boys and girls, since it is known that from infancy, parents interact differently with children of opposite genders. Our article presents data on a sample of 55 mothers. We are continuing our research, and fathers are also taking part in it, although their number is still much smaller than of mothers. We plan to conduct a comparative analysis of parental responsiveness between mothers and fathers. At this point, we can say that the construct of parental responsiveness has a structure adequate for both genders.

Qualitative Characteristics of Behavioural Indicators of Parental Responsiveness

№	Positive parental responsiveness indicators	Features	№	Negative parental responsiveness indicators	Features
1	Non-verbal reactions +	Positive emotional response expressed by a facial expressions, looks, voice alternations and gestures	10	Non-verbal reactions -	Negative emotional response expressed by facial expressions, looks, voice alterations and gestures
2	Verbal responses +	Emotional alterations, statements congruent to the parent's emotions (commenting on one own emotional states / commenting on the child's emotional states)	11	Verbal responses -	Criticism of the child's emotional state, verbal responses and alterations non-congruent to the child's emotional state or the parent's own emotional state
3	Mirroring +	An instant mimicking of the child's reactions: facial expressions, sounds, words, gestures (gross and fine motor)	12	Mirroring -	Opposite emotional reactions (a child is crying - a parent is laughing); teasing of a child
4	Synchrony, physical distance +	Movements of a child and a parent are harmonious, synchronous, the distance is pleasant for both a child and a parent	13	Synchrony, physical distance -	Asynchronous movements in a dyad; the parent forces the child's hand movements in an attempt to teach how to use an object; the parent's movements are excessively constrained; excessively small distance; manipulations aimed at decreasing the distance
5	Joint attention +	The parent follows the child's attention	14	Joint attention -	The parent formally focuses one's attention on the child's object of interest; imposes the child's attention of the object that she considers more important
6	Support of the child's exploratory behaviour +	The parent gives the child an opportunity to explore objects; praises the child's imagination. When asking questions or giving instructions, the parent takes a pause to obtain the child's reaction.	15	Support of the child's exploratory behaviour -	The parent constrains the exploratory behaviour of the child; the parent's actions tempo does not correspond to that of the child
7	Response to the child's needs +	The parent shows sensitivity to the child's physical needs, need for love and other activities.	16	Response to the child's needs -	The parent ignores the physical needs of the child, the need for love, activity and other
8	Communicative activity +	Benevolent attention, parent's verbal expressions that show interest in the child's activities (action comments); the parent shows respect to the child (not a directive position), demonstrating confidence in his abilities (sincere praise)	17	Communicative activity -	Criticism of the child's actions; formal praise; parent's directivity
Interaction conditions assessment – free play					
9	Play +	Joy from the process of play; positive game scenario	18	Play -	Substitution of free play with didactic game; negative game scenario

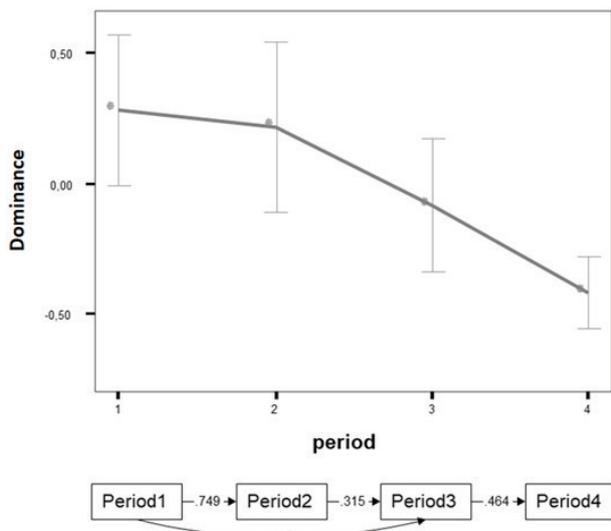


Fig. 1. Dynamics of the PR scores on the Dominance Scale [1st scale], indicating 95% confidence intervals in each period

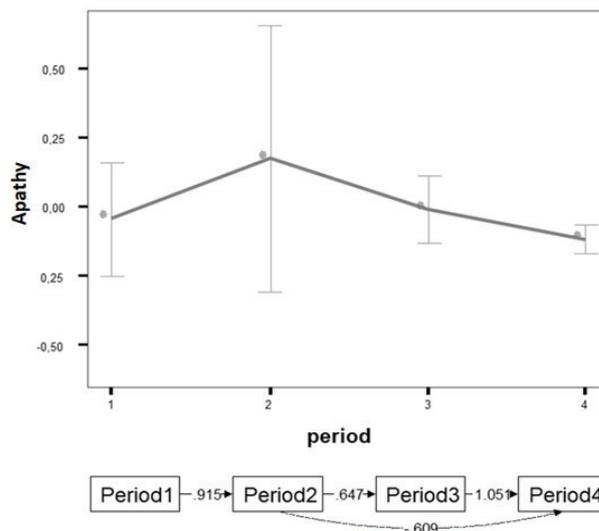


Fig. 2. Dynamics of the PR scores on the Apathy Scale [2nd scale]

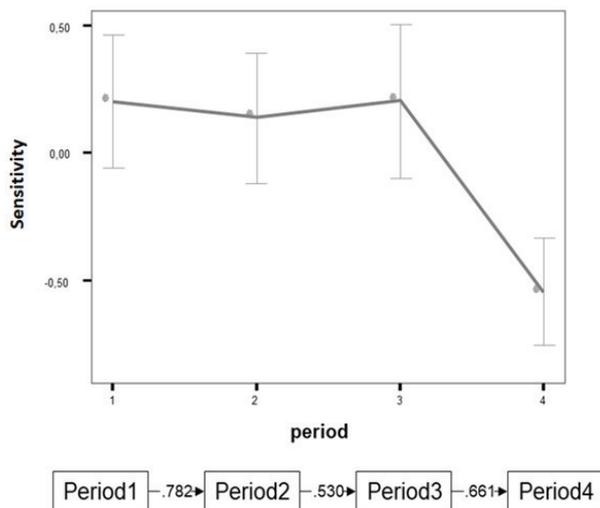


Fig. 3. Dynamics of the PR scores on the Sensitivity Scale [3rd scale]

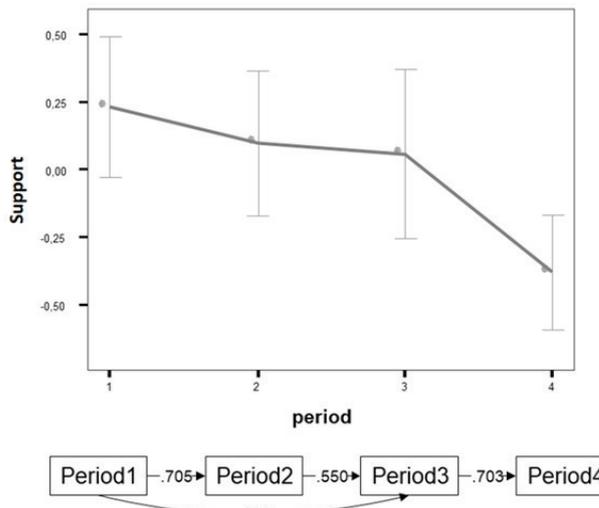


Fig. 4. Dynamics of the PR scores on the Support Scale [4th scale]

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