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BASIC PSYCHOMETRIC VALIDATION OF THE DEVELOPMENTAL MILESTONES FOR CHILDREN'S PLAY IN CHILDREN AGED FROM FOUR TO SEVEN YEARS

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ABSTRACT

Children's play is an important activity, which reflects overall children's development. There is small number of studies that dealt with developmental milestones of children's play, especially those of children aged up to four years. Therefore, we have conducted a study on 839 children, aged from four to seven years. The main objective of this research is to investigate psychometric characteristics of the three scales for assessing the forms and content of the children's play (based on developmental milestones for children's play), from five to seven years of age, by determining the gender differences in the milestones and their correlations with the age of the child. The instrument is called ''Milestones Development of Children's Play" (MRDI), which consists of three scales (checklists), suitable for the following age groups: 4-5 years (MRDI45), 5-6 years (MRDI56) and 6-7 years (MRDI67). Results show a satisfactory factor validity of two, from the three rating scales that contains MRDI, with a low but solid reliability of MRDI67, very low but still satisfactory reliability of MRDI45 and unsatisfactory reliability of MRDI56. In the age groups 4-5 and 5-6 years, statistically significant gender differences were found, in the direction of the better performance of girls. The correlations between children's age and their overall scores on three scales of MRDI are very low but statistically significant only

for the oldest age group. The possibilities of potential improvements to these instruments (especially those in the age group 5-6 years), with the purpose of increasing their reliability, but also discrimination, are indicated.

Keywords: children's play, construct validity, developmental milestones, differences, reliability

INTRODUCTION

Children's play is very often mentioned as an important factor that is "mirroring" the children's development, especially in his/her early preschool years. The main scope of this article is to determine basic milestones of child development that reflect the stage of children's play at an early age.

One of the outcomes of the institutional preschool educational system in Croatia is to follow, to evaluate and to stimulate psychosomatic development of the children (National Curriculum Framework, 2010). Child's parents and family members are intrinsically motivated to improve physical, medical, social and psychological wellbeing of the child. Therefore, they should have an active role during the phases of child's development (State Board of Education, 2007).

Developmental milestones as indicators of children's development

Developmental milestone is a skill, acquired within certain time framework (Developmental milestones, 2014). In other words, developmental milestones are sets of functional skills, or specific tasks that the majority of the children of the certain age can complete (Sindik, 2012). Developmental milestones (hereinafter DMs) are easily recognizable skills that can be obvious in child's the behavior. In other words, DMs are the "atoms" of more complex psychosomatic characteristics of the child (Maggi and associates, 2005). In order to evaluate these children's characteristics, the need for having more sophisticated measuring instruments, constructed by the professionals, appears as the necessity. The process of standardizing these instruments is very expensive and time consuming. DMs are easily recognizable by both laymen and the professionals (for example "Child can draw a square", "Child can stand on one leg for at least 5 seconds") (Sindik, 2012).

In the available literature, there is a large number of developmental lists for estimation of the developmental status of the preschool children. These lists include a number of child characteristics, classified by using different terms: competencies, developmental characteristics, abilities, skills, etc. (Developmental milestones, 2014). On the other hand, a huge number of books and manuals include contents with the list of children activities (plays). These plays are mainly roughly classified on the different levels of specificity, depending on aspects of child's psychosomatic development: e.g. motor control, social competency, control of the speech, etc. However, as far as we know, there

is no information in the available literature how to link directly educational outcomes (what the child is capable to learn, such as DMs), with the ways how to achieve these outcomes (how to stimulate development of certain DMs more directly).

It could be only assumed that child's teachers in the kindergartens and his/her parents may have very intuitive, but not always accurate perception of child's "developmental levels" (Maggi et al., 2005). However, their estimations can be biased, which could cause decreasing the objectivity and reliability of this estimation, with the consequence on less valid evaluation of the developmental level for certain child. Nevertheless, the simplicity and easy practical usability of DMs, could enable their implementation as the indicators of children's development (Sindik, 2001, 2002, 2008; Sindik, Štrukelj, Barać, 1999). Therefore, the lists of DMs could be extremely useful tool for the professionals (children's teachers) who are involved directly in the Croatian preschool educational system (mainly in public and private kindergartens).

Moreover, the interaction between DMs from different aspects of child´s psychosomatic development, shows the complexity of the preschool children development phenomena, in the different age groups. In other words, in different age groups, DMs from different aspects of development are mainly linked between each other. For example, different aspects of motor, speech and cognitive development are closely linked, especially in early preschool age (infancy). The information about links between DMs in different aspects of development can offer a further insight in the structure of child's developmental processes, as well as the information about child´s personality and his/her anthropological characteristics as a whole.

It has been demonstrated that for the professionals (i.e. preschool teachers), the approach based on the DMs is very easy to use, while evaluating developmental status of the children (Sindik, 2001). At the same time, teachers are familiar with the DMs, because the children´s behavior that is described with the DMs could be easily recognizable in everyday practice of the educational work with children, independently on their previous professional experience.

Children's play and its interaction with development

Children's play is a complex psychosocial phenomenon, which reflect the different aspects of their development: socio-emotional, cognitive and physical (including neurophysiological changes and psychomotor development) (Duran, 2003). Therefore, the children's play can be used as an indicator of the degree of their maturity, development abilities, skills, habits and other behavioral patterns. Children's play is not only the issue of the study for developmental psychologists, but also teachers, social psychologists, cognitive psychologists, pediatricians, and professionals in the field of neuroscience. By studying children play using DMs, it could be evaluated (to some extent) whether the development of the child takes place in ordered direction and in a regular speed. However, children's development is not continuous: in fact, it is sometimes "jumping" and sometimes stagnating (Aly, Taj, Ibrahim, 2010).

Children's play has five key features. In the background of the play is a feeling of

pleasure that follows the intrinsic motivation of the child, while the child is embarked in the play voluntarily. The game is not literal (literal understanding of toys and their functions), but play requires the active participation of the child (Rubin, Fein, Vandenberg, 1983). Children benefit from their play in large extent. The benefits of the play are: cognitive (development of creativity can encourage convergent and divergent ways of coping with problems); emotional and behavioral (play is reducing anxiety, fear and stress, simultaneously reinforcing the child's self-esteem, encouraging child's flexibility, versatility, resistance, flexibility and feeling of pleasure); social (play is stimulating empathy, development of nonverbal skills, commitment and maintain attention, assisting in the adoption of gender roles) and physical (by affecting the improvement of the coordination, balance, increasing overall energy level of the body, having a beneficial effect on the immune, cardiovascular and endocrine systems) (e.g. State Board of Education, 2007; Goldstein, 2012; White, 2012; Petrović-Sočo, 2014).

There are several types of children's play: sensory play (child examine the objects around them, in a way that child puts these objects in the mouth, spins, turns, throws, etc.) and functional play (child is fascinated by particular feature of the object, but this object is not used in a meaningful way) (Hwang, Nilsson, 2000). During role-playing (pretending that child is another person), children begin to use one form of symbols. In early stages of the development, children tend to play by themselves (in a way to pretend to be someone else), while later they are sharing the roles with other children (such as: playing doctor, pilot, teacher, etc.). After this stage, they play constructing games (children build real objects, which is a purposeful activity), as well as the games with the rules (within the framework of these types of games, the children invent a system of rules or take it from available sources of socialization: television, family, etc.) (Hwang, Nilsson, 2000).

The purpose of children's games, based on their use of symbolic activity (conversion, role playing, etc.) is not only the attribution of sense experiences that children daily gain (which was considered by Piaget), nor exercising a tendency that cannot be realized under normal circumstances (as considered by Vygotsky) (Göncü, Gaskins, 2011). Symbolic play is a direct reflection of the sociocultural milieu in which the child belongs, as well as of child's individual characteristics. The play can also be seen as a means of communication or conversation that child frequently use with pleasure (Göncü, Gaskins, 2011). In spite that children in their preschool age very often tend to propose a play by themselves, they are often organizing the play with the help of other children, or their teachers (Mahmutović, 2013). They easily accept a role in a game that is being assigned to them by other children, always respecting the rules of the game, aligning their own ideas for a play with ideas of their peers (Mahmutović, 2013).

In the study about the play of the children in age groups from three to seven years, a play in heterogeneous age groups of children (more than play in homogeneous age groups), more often encourages cooperation, mutual encouragement, cooperative learning, expression of needs and emotions in an acceptable manner. Moreover, in heterogeneous age groups, children more often showed flexibility, empathy, tending to easier and faster adopt the proposed rules of the game (Jurčević-Lozančić, 2014). The personality traits of their teachers in kindergarten have an influence on the children's

play, too (Ivon, Sindik, 2008). Children with more imaginative and empathic educators, more often play imagination games (especially those that belong to the symbolic play), with an emphasized prosocial behavior. On the other hand, in children's groups with moderately imaginative teachers, sports games are the most often represented, as well as social games and didactic games with rules (Ivon, Sindik, 2008).

Lillard and associates (2013) have presented a review of studies, aimed to determine whether there is a causal relationship between play of pretending on either cognitive or social development of a child. They found that there is a positive correlation between these types of play and two previously mentioned aspects of children's development. However, when considering pretend play, as an influence on faster and more successful cognitive and social development, the research results are not very clear (Lillard and associates, 2013).

Therefore, it seems that there is some interaction between children's play and their development. Hence, it can be assumed that more complex content of the play (with more creativity) is more common for the gifted children (intellectually and socially). Moreover, it can also be hypothesized, that frequent and meaningful play could stimulate children's regular development or make this development faster.

The scope of this study is to find representative DMs of children's play, in children's age from five to seven, with a practical purpose to help their teachers and parents that easily recognize some features of the developmental status of children. By recognizing these features, they could be able to consider actions that are more efficient in their educational work. They can also purposefully direct children to play certain types of games, which can stimulate specific aspects of their development.

Therefore, the main objective of this research is to investigate psychometric characteristics of the developmental scale for assessing the forms and content of the children's play (based on DMs for children's play), from five to seven years of age, by determining gender differences in these DMs and their correlations with the age of the child. In accordance with the general objective of this study, we have defined the following hypotheses:

1. Each of the scales (for children from 4 to 5, from 5 to 6 and from 6 to 7 years of age) is unidimensional. In other words, the principal components analysis will reveal one interpretable latent dimension, for each of the scales.
2. No statistically significant gender differences in total scores at each of these scales will be found.
3. The correlation between children's age and their overall scores on three scales of MRDI will not be statistically significant.

METHOD

Participants

The study involved 839 children, included in the regular educational program of Croatian kindergartens. The sample is chosen as combined purposeful sample (at the level of selected institutions) and stratified sample (children belonging to specific age groups within a particular institutions). The age range of the examined children varied in range from the fourth to the seventh year of life. The study included children in the kindergartens: „Trnoružica", „Duga", „Maksimir" and „Šumska jagoda" (Zagreb); „Maslačak" (Zaprešić) and „Ivanić" (Ivanić grad) (Zagreb County); „Cvit Mediterana" (Split, Split-Dalmatia County); Kindergartens of Dubrovnik (Dubrovnik-Neretva County); „Čakovec" (Međimurje County); „Bjelovar" (Bjelovar-Bilogora County); „Slavonski Brod" (Brod-Posavina County); „Katarina Frankopan" (Krk, Primorsko-Goranska County); „Tratinčica" (Koprivnica); „Zvončić" (Našice) (Osijek-Baranja County); „Požega" (Požega-Slavonia County); „Municipal kindergartens of Šibenik" (Šibenik-Knin County); „Radost" (Zadar, Zadar County).

In the subsample of children aged 4 to 5, there were 284 children (i.e., 33.8% of the sample); 257 children (30.6%) was the second sub-sample (age group 5-6 years old), while the 298 participants (35.6%) were in the age range from 6 to 7 years old.

By subsamples, in the first group (age 4-5 years old), was 138 girls (48.6%) and 146 boys (51.4%), while in the second age group (5-6 years old) was slightly more boys (129 or 50.2%) than girls (n = 128, i.e., 49.8% of the mentioned sub-samples). Finally, in the third age group (subsample aged from 6 to 7) were 154 boys (51.7%) and 144 girls (48.3%).

Variables and procedure

Two kindergarten teachers have been evaluated children (by achieving consensus in assessing certain characteristics, i.e. milestones), regarding their development status within the researched area, taking into account the ethical principles of conducting research with participants in this age group (informed consent of children's parents and headmasters of the institutions, and with the approval of Ministry of Science, Education and Sports of the Republic of Croatia from year 2010). All the data were collected in the second half of the year 2012.

For the purposes of this study, the initial check-lists were composed (list of labelling), which contained one sentence that described certain DMs of the children. DMs theoretically corresponded to the following age groups of children: from 4 to 5 years old, from 5 to 6 years old, and between 6 and 7 years old (Starc and associates, 2004). If a child accomplished the specific developmental task/achievement that is described by certain DM, evaluators had to enter one point ("1") next to the description of given milestones.

Otherwise, the child got zero point ("0") for the same DM. Data collected by such labelling lists can be analyzed at the level of each item (i.e. each DM), and it is possible to calculate cumulative (total) scores, or the average number of points in all DMs in certain age group. The formulations and content of the items are composed in accordance with the available and relevant literature in this field, mentioned in the introductory part of the article. The complete checklist is named *Developmental milestones of children's play* (MRDI). Each of the three forms of the list got the acronym, which indicates the age group of children (e.g. MRDI45 is a check-list adapted to children from the fourth to fifth year).

Checklist for the age group 4-5 years old (MR45) consisted of the items described in Table 1. List of labelling for the age group 5-6 years old (MRDI56) contained the items presented in Table 2. Checklist for the age group of children 6-7 years old (MRDI67) includes the items described in Table 3 (Starc et al., 2004). The reliability of these three instruments is shown in the chapter Results, together with information on the construct validity in belonging tables.

Statistical analysis

The data were collected, encoded and entered in the database of the statistical software SPSS for Windows 20.0. Data were analyzed using the parametric statistics methods. The key analyses that is conducted were the *Principal Components Analysis* (PCA), with corresponding indicators of construct validity, with the measures of *internal consistency* reliability (Cronbach's alpha coefficient). Chi-square tests were performed to determine gender differences in the scores on particular items related to the play, in all three age groups of the children. T-tests were used to determine the gender differences in total scores (sum of all items, expressed in regression factor scores) for the entire checklist in certain age group of the children. Pearson's correlations were calculated between children's age and their total scores in all three scales of MRDI, separately for gender and overall.

RESULTS

Developmental milestones of children's play among children aged 4 to 5

List of DMs of children's play for children this age (*MRDI45)* consisted of four items. One of items (*Game of hiding and seeking*) had low communality, so it has not been included in PCA (Table 1).

Table 1. Descriptive values of the items related to the play the children aged from 4 to 5 years with results of the Principal Component Analysis and reliability coefficients

	All			Boys			Girls		
Items	r	h^2	M±SD	r	h^2	M±SD	r	h^2	M±SD
Child builds complex structures (house, farm, road, and castle).	.655	.429	.824 ± .382	.709	.502	.877 ± .330	.656	.430	.768 ± .424
During the game, accepts the assigned roles and the division of functions.	.701	.492	.859 ± .348	.685	.470	.822 ± .384	.710	.505	.899 ± .303
Interrupts the game to agree as "how to behave" in a certain role.	.823	.677	.651 ± .477	.805	.649	.596 ± .492	.841	.707	.710 ± .455
Plays the game of hiding and seeking	-	-	.789 ± .407	-	-	.740 ± .440	-	-	.841 ± .367
Kaiser-Meyer-Olkin Measure / Bartlett's test of Sphericity Eigenvalue / Variance explained	.566 79.756* (df = 3) 1.598 53.267			.597 45.924* (df = 3) 1.621 54.024			.555 40.589* (df=3) 1.642 54.727		
Reliability (Cronbach's Alpha)	.559			.568			.576		

Legend: r = correlation between the variable and the principal component; h^2 = communality, * p < .001.

All presumptions for conducting PCA for three (sub)samples of participants for this age group of children were satisfied (for all participants: KMO = .566, $\chi 2 = 79.756$, df = 3, p < .001; boys: KMO = .597, $\chi 2 = 40.589$, df = 3, p < .001; girls: KMO = .555, $\chi 2 = 45.924$, df = 3, p < .001).

In all three groups, according to Kaiser-Guttman and Scree Plot criterions, at least one factor was extracted. Eigenvalues of these factors (components) are: for all participants $\lambda = 1.598$ (total variance explained, i.e. TVE, accounted 53.267%); for subsample of boys $\lambda = 1.621$ (TVE is 54.024%) and for subsample of girls $\lambda = 1.642$ (TVE is 54.727%). The item *„Interrupts the game to agree "how to behave" in a certain role."* has the highest factor saturation in all three groups (in ranges from r = .805 to .841). Reliabilities for *MRDI45* checklist (expressed in form of Cronbach's Alpha coefficients), varied in range from $\alpha = .559$ (entire group of children) to $\alpha = .576$ (subsample of girls). The boys were the most positively estimated on the item: *„A child builds a complex structures (house, farm, road, castle)"*, while the girls the best completed the task expressed with the item: *„During the game, child accepts the assigned roles and the share of functions"* (Table 1).

Table 2. Gender differences (Chi-square test) in the scores on the items related to the play of 4-5 years old children

Items	Estimation	Gender		Total	χ^2
		Male	Female		
Child builds complex structures (house, farm, road, and castle).	No Yes	18 128	32 106	50 234	5.768**
During the game, child accepts the assigned roles and the share of functions.	No Yes	26 120	14 124	40 244	3.443
Interrupts the game to agree "how to behave" in a certain role.	No Yes	59 87	40 98	99 185	4.078*
Plays the game of hiding and seeking.	No Yes	38 108	22 116	60 224	4.330*

Legend: χ^2 = values of chi-square statistics; * $p < .05$; ** $p < .01$

As shown in Table 2, there is certain gender difference between the estimation on item „*A child builds complex structures (house, farm, road, castle)*" ($p < .01$), in the direction of better scores for boys, as compared with girls. More girls than boys „i*nterrupt the game to agree as "how to behave" in a certain role*" ($p < .05$), while more girls „*play a game of hiding and seeking*", than boys ($p < .05$).

Table 3. Gender difference (t-test) in total scores in MRDI45 for the children aged from 4 to 5 years

Gender	N	M	SD	SE_M	ΔM	$SE_{\Delta M}$	t	df	p
Male	146	-.050	1.015	.084	-.103	.119	-0.868	282	.386
Female	138	.053	0.985	.084					

Legend: SE_M = standard error of the mean; ΔM = difference between the means; $SE_{\Delta M}$ = standard error of the difference between means

Statistically significant gender difference is not found between total scores on check-list *MRDI45* ($p > .05$) (Table 3).

Table 4. Descriptive values of the items related to the play the children aged from 5 to 6 years with results of the Principal Component Analysis and reliability coefficients

	All			Boys			Girls		
Items	r	h^2	M±SD	r	h^2	M±SD	r	h^2	M±SD
Talking about the game and the game planning is important to child, as much as the game itself.	.753	.568	.688 ± .464	.765	.585	.594 ± .493	.731	.534	.781± .415
Child plays the game in accordance with the previously known rules and restrictions.	.691	.477	.848 ± .360	.721	.520	.789 ± .410	.652	.425	.906±.293
Child likes games that require the participation of a larger number of adults and children.	.565	.319	.750 ± .434	.417	.174	.711 ± .455	.674	.454	.789±.410
Kaiser-Meyer-Olkin Measure / Bartlett's test of Sphericity Eigenvalue / Variance explained	.554 25.799*** (df = 3) 1.364 45.463			.520 8.577* (df = 3) 1.279 42.618			.584 15.025** (df = 3) 1.413 47.094		
Reliability (Cronbach's Alpha)	.392			.392			.392		

Legend: r = correlation between the variable and the principal component; h^2 = communality; * p < .05; ** p < .01; *** p < .001

Developmental milestones of children's play among children aged 5 to 6

As shown in Table 4, all presumptions for conducting PCA for three (sub)samples of participants for this age group of children were satisfied (varied in range from: KMO = .520-.584, χ^2 = 8.577-25.799, df = 3, while each value of Chi-square test is significant at least on level of p < .05). According to Kaiser-Guttman and Scree Plot criterions, one-factor solutions appeared as the most convenient in each of analyzed groups. Eigenvalues (TVE) for *MRDI56* were: for the entire group of children aged 5 to 6, λ = 1.364 (45.463%); for boys λ = 1.279 (42.618%); and for girls λ = 1.413 (47.094%). Internal consistency reliability sizes (Cronbach's alpha) were low, with values varied from α = .309 (subsample of boys) to α = .432 (subsample of girls).

In all three analyzed groups, the item *''Talking about the game and the game planning is important to child as much as the game itself"* showed the highest correlation with extracted factor (in ranges from r = .731 to .765). In all three groups, the most satisfactorily children completed the task expressed with the item „*Child plays the game in accordance with the previously known rules and restrictions*".

Table 5. Gender differences (Chi-square test) in the scores on the items related to the play of 5-6 years old children

Items	Estimation	Gender		Total	χ^2
		Male	Female		
Talking about the game and the game planning is important to child as much as the game itself.	No Yes	52 76	28 100	80 176	10.473*
Child plays the game in accordance with the previously known rules and restrictions.	No Yes	27 101	12 116	39 217	6.806*
Child likes games that require the participation of a larger number of adults and children.	No Yes	37 91	27 101	64 192	2.083

Legend: χ^2 = values of chi-square statistics; * $p < .01$

More girls than boys have better completed the task expressed with the item: *''Talking about the game and the game planning is important to child as much as the game itself"* ($p < .01$), as well as with the item*: ''Child plays the game in accordance with the previously known rules and restrictions.*" ($p < .01$).

Table 6. Gender differences (t-test) in total scores in MRDI56 for the children aged from 5 to 6 years

Gender	N	M	SD	SE_M	ΔM	$SE_{\Delta M}$	t	df	p
Male	128	-.231	1.050	.092	-.462	.122	-3.795	254	.000
Female	128	.231	0.893	.079					

Legend: SE_M = standard error of the mean; ΔM = difference between the means; $SE_{\Delta M}$ = standard error of the difference between means

Results shown in Table 6 suggest that average total score in *MRDI56* in girls is statistically significant higher than total score of boys ($p< .01$).

Table 7. Descriptive values of the items related to the play the children aged from 6 to 7 years with results of the Principal Component Analysis and reliability coefficients

	All			Boys			Girls		
Items	r	h^2	M±SD	r	h^2	M±SD	r	h^2	M±SD
Games last for long time (sometimes more than half an hour).	.859	.738	.826 ± .380	.863	.745	.799 ± .402	.855	.731	.854 ± .354
Collaborative play in a meaningful and structured way.	.859	.738	.903 ± .297	.863	.745	.903 ± .297	.855	.731	.903 ± .297
Kaiser-Meyer-Olkin Measure / Bartlett's test of Sphericity Eigenvalue / Variance explained	.500 75.740* (df = 1) 1.475		73.775	.500 41.694* (df = 1) 1.490		74.525	.500 33.996* (df = 1) 1.462		73.107
Reliability (Cronbach's Alpha)	.631			.639			.626		

Legend: r = correlation between the variable and the principal component; h^2 = communality; * $p < .001$

Developmental milestones of children's play among children aged 6 to 7

In Table 7 is obvious that all presumptions for conducting PCA for three (sub) samples of participants for this age group of children were satisfied (Kaiser-Meyer-Olkin Measure of Sampling Adequacy (KMO) = .500, in all three cases; Bartlett's Test of Sphericity (with ranges: $\chi^2 = 33.996\text{-}75.740$, df = 1, $p < .001$).

According to Kaiser-Guttman and Scree Plot criterions, one-factor solutions were again the most convenient in each of the analyzed groups. Eigenvalues (TVE) for *MRDI67* varied in range from $\lambda = 1.462$ (73.107%) for the subsample of girls, to $\lambda = 1.490$ (74.525%) for the subsample of boys. Having on mind that the checklist *MRDI67* consisted only two items, internal consistence coefficients are satisfying ($\alpha = .626$ for girls, and $\alpha = .639$ for boys). In all three groups of participants, the most of the children were the most positively estimated on the item: *"Collaborative play in a meaningful and structured way"* (M = .903).

Table 8. Gender differences (Chi-square test) in the scores on the items related to the play of 6-7 years old children

Items	Estimation	Gender		Total	χ^2
		Male	Female		
Games last for long time (sometimes more than half an hour).	No Yes	31 123	21 123	52 246	1.589
Collaborative play in a meaningful and structured way.	No Yes	15 139	14 130	29 269	0.000

Legend: χ^2 = values of chi-square statistics

There were no statistically significant gender differences between in two DMs (items) that represent *MRDI67* (Table 8).

T-test to compare scores of boys and girls on the checklist *MRDI67* was not conducted, because the means of their total scores were completely equal. Therefore, no gender difference in total scores in MRDI67 are found.

Children's age and their total scores at MRDI45, MRDI56 and MRDI67

Low statistically significant correlations are found between total scores in MRDI67 and children's age in third group of children (6 to 7 years), for all children in this age group ($p < .01$), in boys ($p < .01$), as well as in girls ($p < .01$).

In the group of children aged 5 to 6, no significant correlations between age and total scores in MRDI56 are found, in any of three groups of participants.

Finally, in the first group (children aged from 4 to 5 years), the correlation between age and total scores in the entire group on MRDI45 was low, positive and statistically significant ($p < .05$), but not in boys and for girls in this age group (Table 9).

Table 9. Pearson's coefficients of correlations between children's age and their total scores in MRDI

Age groups of children								
4 – 5 years			5 – 6 years			6 – 7 years		
All	Boys	Girls	All	Boys	Girls	All	Boys	Girls
.120*	.067	.156	.096	.129	.066	.227***	.182*	.282**

Legend: * $p < .05$; ** $p < .01$; *** $p < .001$

DISCUSSION

The first of the main findings of the study is the fact that only one interpretable principal component is found, in all three MRDI scales, for the total sample of participants, as well as when it is stratified by children's gender. These unique principal components explain the variance varied in range from 45% (MRDI56) to 73% (MRDI67) of the total possible variance. Therefore, it could be assumed that in general the results obtained show a satisfactory construct validity of all three scales of MRDI. However, when considering the reliabilities of certain scales of MRDI, the results revealed that low but still satisfactorily reliability is found for the scale MRDI67, while very low but still satisfactorily reliability is found for the scale MRDI45. Nevertheless, the reliability for the scale MRDI56 is too low and has to be estimated as unsatisfactorily (in all three subsamples). These psychometric characteristics are very probably linked with already small number of items that are initially preliminarily defined for all three scales of MRDI. Hence, with minor changes, it is very likely that the DMs that are used in this study, could be used in the future as very good measuring instruments, especially by increasing the number of the DMs for children's play, perhaps following the frameworks of Piaget's or Vygotsky's conceptualizations of the children's play (Göncü, Gaskins, 2011), or by adding directly new DMs from available sources (Developmental milestones, 2014). Adding new items for each scale, especially for MRDI56 (currently unsatisfactorily reliable), should probably improve both reliability and construct validity of the scales.

Statistically significant gender differences were found in the age groups of 4-5 and 5-6 years, mainly in the direction of the better performance of girls. No statistically significant gender differences are found in the age group of 6-7. However, the rhythm of the development is "jumping" (Aly, Taj, Ibrahim, 2010), different for each individual, as well as for certain age group and gender of the child (Sindik, 2001). In several phases during the process of the development, girls are faster in their development than boys (Hwang, Nilsson, 2000). Therefore, this gender difference in speed of development in certain age, could be also reflected in their advanced play skills.

The correlations between children's age and their overall scores on three scales of MRDI are very low but statistically significant only for the oldest age group (and only for overall scores for the youngest age group). However, these correlations (in spite of their positive direction and statistical significance) are very low, without practical importance. In fact, in all three groups, the age range is very low, while the variation of the overall results of the MRDI is influenced by the limited variation of scores on the particular items (reflected in standard deviations). Moreover, variables / scores were dichotomous (binary) type, with a consequence of limited possibility for precise differentiations. Although, it is a fact that the play gradually (depending on the individual differences), but very clearly reflects the general psychosomatic development of each child.

The main advantage of this study is probable "pioneering" attempt to determine the latent features of children's play at an early age, using a list of DMs, established to maintain the developmental achievements of the children in the certain age (Starc and associates, 2004), by the application of multivariate analysis. Checking the reliability

and construct validity enables the operationalization of the measuring instruments, that combine patterns of children's play in a certain age group of children. These instruments could be extremely useful for the practical work of the teachers in kindergartens. In fact, based on a relatively small number of indicators of children's play, which can be evaluated in a short time, it is possible to get a rough guide to change approach to some methodical elements in practical work with children. Namely, following these changed directions, a teacher can change access to any child or to the group of children. The main shortcoming of this instrument is very low (or unsatisfactorily) reliability internal consistency for some of scales of the MRDI (in this case MDI56).

A further flaw of this study is the small number of participants. In addition, we did not take into account the potentially relevant socio-demographic data, such as the exact age of the child (in days), as well as age and (un)employment status of children's parents, the integrity of the child's family, the level of educational status of child's parents (Garibotti and associates, 2013). One possibility in the future research is focusing on the characteristics of children's play and educational procedures, for children's parents and their teachers in the kindergartens separately.

By including more relevant variables in future studies, the better insight in the factors related to the status of children's play, could be obtained. In addition, longitudinal research could determine the information how the play is changing by child's maturation, but also within the same age group (Göncü, Gaskins, 2011). Likewise, it would be useful to study whether the child-rearing practices differ by different personality characteristics of teachers and their parents. Moreover, the consideration if parents and educators similarly assess the same characteristics of children's play in various age groups, could provide very fruitful insights.

Practical application of the results obtained can emphasize the need for coordinated efforts of the parents and children's teachers in kindergarten, to stimulate the children's development in a systematic way. A successful parenting is seeking the good enough form for the treatment of children, with the purpose to help the children to grew up as a quality person, while there is no universal form to conduct successful parenting in modern reality. In parents, the focus of their attention has to be removed from problem solving (in the situation when problems are already generated) to the daily treatment and establishing their quality relationships with children, what can be reflected already in children's play. Namely, it turned out that, even if the teachers should have more knowledge than children's parents, they act like parents very often, having similar prejudices about the education (Rubin and associates, 1983).

A series of communicative parental meetings could be organized by teachers (with children's parents), in order to consider the topics related to child's play. In direct working with children, the small educational projects could be initiated, which could be conducted within educational groups of children in kindergartens, that include elements associated with children's play (Ivon, Sindik, 2008). Hence, the effects of meaningful education and supporting activities with children could be studies in the future research. Namely, before and after these purposeful activities, we can evaluate both educational practices of their teachers / parents and the characteristics of children's play. Afterwards,

we can determine whether this form of education can have an influence on better educational corrective actions, as well as the development of "advanced" features of the children's play.

Additionally, with the careful analysis of teacher's statements and comments during this research, the researchers could obtain an insight on how to establish a link between DMs (as precisely defined developmental outcomes) and chosen activities (plays) with children, as a tool for their achievement. Actually, that is a direct connection between aims and methods, i.e. precise elementary developmental outcomes and the tools (ways how to achieve these outcomes).

CONCLUSIONS

Only one interpretable principal component explains from 45% (MRDI56) to 73% (MRDI67) of the total possible variance explained. The results show a satisfactory construct validity of all three scales of MRDI, with a low but solid reliability of MRDI67, very low but still satisfactory reliability of MRDI45 and unsatisfactory reliability of MRDI56. Therefore, the first hypothesis could be estimated as generally confirmed.

In the age groups 4-5 and 5-6 years, statistically significant gender differences were found, mainly in the direction of the better performance of girls. No statistically significant gender differences are found in the age group of 6-7. Therefore, initial hypothesis could be rejected in the age groups 4-5 and 5-6 years, while for the age group of 6-7, it could be supported.

The correlations between children's age and their overall scores on three scales of MRDI are very low, but statistically significant only for the oldest age group. Therefore, only for this age group, second hypothesis could be rejected.

The possibilities of potential improvements of these measuring instruments (especially those in the age group 5-6 years), with the purpose of increasing their reliability, are necessary. Moreover, discrimination characteristics could be improved by increasing the number of the items in all three scales of the MRDI**.**

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