

ICEEPSY 2016 : 7<sup>th</sup> International Conference on Education and Educational Psychology

## Capacity For Reflection As A Predictor Of Children's Readiness For Elementary School

Milica Tošić-Radev<sup>a\*</sup>, Aleksandra Stojilković<sup>a</sup>, Tatjana Stefanović-Stanojević<sup>a</sup>,  
Snežana Vidanović<sup>a</sup>, Vesna Andjelković<sup>a</sup>

\* Corresponding author: Milica Tošić-Radev, psi736@gmail.com

<sup>a</sup>Faculty of Philosophy, Ćirila i Metodija, 2, Nis, Serbia

### Abstract

Reflective functioning is defined as the ability to explain the behavior of others in terms of their mental states (Fonagy & Target, 2005). This ability is derived before the end of the preschool years and it represents one of the crucial changes in child development. This research was conducted on a sample of 60 six-year old children. Readiness for school was operationalized by the *Readiness for Elementary School Test – POS* (Tolčić, 1986) and children's reflective functioning by one subscale on The Affect task (Steele et al., 1999). Results indicate that children's reflective functioning is a significant predictor of their readiness for school, explaining the 49,4 % of the variance on standardized score of the POS. In detail, results show that children's capacity for reflection explains 63,3% of children's verbal comprehension (beta= ,80), 44% of of variance on logic task (beta= ,67), as 34,9 % (beta=,600) and 37,2% (beta=,619) of the success of children on graphomotor and quantity understanding tasks, respectively. Also, the employment of parents, economic status of a family, higher education of the father and being a firstborn, but not the only child in a the family are factors which are related with children's success on Scholl readiness test. Our results indicate that the system for processing social information is an important predictor of the children's readiness for Elementary school.

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**Keywords:** Reflective functioning; readiness for school; cognitive competences.

### 1. Introduction

Before starting school it is necessary to determine the extent to which the child is ready for school, as well as for different tasks and activities that schooling bears. In this process it is very important to assess the potential strengths and weaknesses of the child, in order to work to strengthen child's capacity to predict or even encourage child's further development (Hasanagić, 2015, p.13).



School readiness is a minimum level of development that allows the child to successfully respond to the demands of school (Lemelin et al., 2007, according to Čudina-Obradović, 2008). School readiness is related with several aspects of child development, like health and physical condition, cognitive, social and emotional development and motivation for school. Smiljanić and Toličić (1976) argue that readiness for school is consisted by following three components: physical, personal and functional. Under physical readiness they include health and physical condition of the child, which should enable the child to, for example: go to school and come back from school, sitting in school and working at home. Personal maturity includes social and emotional maturity of a child. This means that the child is able to leave the parental home and to be separated from parents for a while, to respect the authority of teachers, and to be involve in a work with other children. Functional component is reflected in the children's understanding of the world and it means that child has capacity for realistic understanding and concluding, analysis and synthesis etc.

The term readiness and preparedness for school, as opposed to the concept of maturity for school, it is emphasized the importance of social factors. In fact, school readiness is the product of interaction between the child and the "spectrum of environmental and cultural experiences that stimulate children's development" (Hasanagić, 2015, p.25).

For a long time, cognitive readiness of the child was treated as the most important aspect of its overall readiness for school, because it is consisted of many cognitive competences that are essential for school success (Hasanagić, 2015). But social skills must not be overlooked, because they are necessary to negotiate the classroom environment and they also influence pupil's success in school (Duncan et al., 2007), and a child's later development (Masten et al., 1999).

Theory of mind (ToM) , or reflective functioning, is defined as a capacity to explain behavior of oneself or others by mentalistic terms. In fact, it is ability to elucidate someone's behavior by mental states, for example emotions and intentions of the person. Doing so, this behavior becomes meaningful and predictable to the person (Fonagy and Target, 2005). The basis of reflective functioning is a nerve structure, a system for processing social information or an interpersonal interpretive mechanism. This ability to predict the behavior of a person based on her beliefs about reality, even when it does not correspond to the current reality which is known to the child (Wimmer & Perner, 1983) usually occurs about the fourth year. However, the age in which the child begins to explain other people's behavior by referring to their mental states can vary from two and a half to five years (Wellman et al., 2001). This developmental change can be explained in the context of Piaget's theory as fading of egocentrism at this age, or in the context of Vygotsky's theory as a consequence of internalized perspectives of others in an interpersonal context (Stefanović-Stanojević et al., 2015).

There are evidences that faster rates of ToM progress among typically developing children are linked with variations in social circumstances (e.g., number of siblings; Perner et al., 1994) and life experience (e.g., richness of maternal mental state conversation (Ruffman et al, 2002;) or secure attachment (Stefanović Stanojević et al. 2105). Results show that children with brothers or sisters are aware of mental states sooner than only children (McAlister & Peterson, 2007). Regular exposure to language and conversations about mental states is a crucial environmental variable for theory of mind development (Dunn and Brophy, 2005). Accordong to Ruffman (Ruffman et al., 2002) children show

earlier awareness of mental states, if their mothers talk with them about thoughts and feelings. Parents' propensity to talk about the mind is the most well-documented environmental influence on children's mind reading – the more frequently parents discuss and explain what they and others feel, want, and think, the better their children understand those concepts (Slaughter, 2015). When it comes to siblings, they are a constant source for learning about others' mental perspectives. In the daily course of teasing, instructing, comforting, disagreeing, playing tricks, and arguing, brothers and sisters provide exposure to others' mental states. This is the reason why so many results indicate that having brothers or sisters improve children's capacity for reflection. But, in some samples from other than Western cultures those results did not always supported. For example, in an experiment in a group of Iranian children from various socioeconomic backgrounds no significant correlation was found between the number of siblings or playmates these children had and their ToM (Shahacian, 2015). Not only having the sibling, yet some other demographic or family variables can also be related to ToM. Family size may be important because of providing increased opportunities for social interaction. Studies have confirmed that such opportunities (e.g., for play) do lead to a ToM advantage (Ruffman et al., 2002). Although girls are usually favored in ToM in studies which report gender differences (Thompson & Thornton, 2014, Charman et al., 2002), there are also some research results that indicates there are no gender differences in ToM (for example, Wright & Mahfoud, 2012).

Because this developmental change in capacity for reflection occurs at the age when children are in preschool, and because it's connections with both, cognitive and social domain, the theory of mind is very important competence of preschoolers (Hughes & Ensor, 2007, according to Kolnik, 2010). It is found that school readiness may be enhanced by having a theory of mind and that theory of mind development is further enhanced by schooling (Homer & Tamis-LeMonda, 2005). Astington and Pelletier (2005) suggest that child's capacity to mentalize allow him to understand the need and process of learning. Also, this skill may affect the socio-emotional domain, which also has it's own impact on later academic learning. Children learn through play and interaction with teachers and peers, so children with poor prosocial skills may have fewer opportunities to learn from this forms of interactions with others (Kolnik, 2010). Shortly, higher skill level in a socio-cognitive domain, like reflective functioning is important part of readiness for school after kindergarten. Many studies show that theory-of-mind development has consequences for children's social functioning and school success. Children with more developed theory of mind are more socially competent, they are better in communication and in resolving conflicts with peers, as well as they are more popular with friends (Dunn, 1996). On the other side, in the cognitive domain, their teachers rate them as and their school work is more advanced in some ways (Astington & Pelletier, 2005).

## **2. Problem statement**

The problem of the study is to to investigate possibility of prediction children's readiness for Elementary School based on their capacity for reflection.

### 3. Research questions

We expect that children's higher level of mentalization will be correlated with better success on cognitive maturity tests. Also, we expect that the children's reflective functioning will predict their success on the subscales and total score of School readiness test.

Finally, we expect that some of the socio-demographic variables (gender, age and birth order of the child, number of children, completeness of a family, education and employment status of both parents and financial status of the family) will be correlated with children's success on School readiness test.

### 4. Research methods

The sample of respondents was comprised of 60 preschool children (mean age 6.5 years), from 4 schools located in Southeast Serbia, equable by gender. Most of them live in complete families, with both parents (85%). When it comes to their economic status, 63,3 % of the sample estimates it as average. Majority of the parents are employed (55% and 53%, respectively), with secondary school degree (55% and 46,7%).

Children's reflective functioning was measured by one subscale on *The Affect Task* and Children readiness for school by the *Readiness for Elementary School Test*.

*The Affect Task* (Steele et al., 1999) is test that contains drawings of basic and complex emotional expressions and a set of cartoon strips which represent some story that includes interactions with significant others. Children are shown the 12 cartoons. All the scenes culminate in some unexpected turn of events, the end of each story is surprising and causes emotional reactions of the child that is main character. All cartoons end with a panel showing an absence of facial expression on one or more characters. The child is asked to answer how the presented character feels and why, and for each response gets a score from 1 to 4.

Children's readiness for school is operationalized by the *Readiness for Elementary School Test – POS* (Tolčić, 1986). The POS has five subscales that measure graphomotor skills, logical reasoning, understanding quantities, and verbal comprehension. The total score is in the range from 0 to 60. Based on that score, for every child is calculated the standardized C score which shows success of a child in comparison with other children of the same age.

We also used a questionnaire for assessing socio-demographic characteristics: gender and age of the child, a number of children in the family, birth order, completeness of the family, financial status of the family, education and employment of the mother and father.

## 5. Findings

In table 1 we presented average results achieved by six year old children on the Affect task and POS test.

**Table 1.** Results achieved by six year old children on the Affect task and POS test (descriptive statistics)

	<b>Scale</b>	<b>Mean</b>	<b>Standard Deviation</b>
<b>Affect task</b>	<b>Reflective Functioning</b>	3.08	.95
<b>POS</b>	Verbal comprehension	10.20	3.90
	Logic	6.60	3.27
	Graphomotor skills	9.53	5.70
	Understanding quantities	7.97	3.10
	Standardized	4.37	2.43

As we can see in Table 1, our results indicate that preschool children in Serbia have high degree of mentalization. Also, the results on School readiness test suggest that six old children are much better in verbal comprehension than in logical tasks.

In Table 2 we presented correlations between children’s reflective functioning and their success on the five subscales on POS test, as well as the correlation correlations between children’s reflective functioning and total score of children in the mentioned skills.

**Table 2.** Correlation coefficients between the children’s reflective functioning and their success on School readiness Test

		<b>Affect task</b>
		<b>Reflective Functioning</b>
<b>Test cognitive</b>	Comprehension of verbal instructions	.788**
	Logic	.661**
	Graphomotor skills	.585**
	Understanding quantities	.602**
	Standardized C score	.697**

Note. \* -  $p < .05$  level, \*\* -  $p < .005$  level

The correlations in table 2 indicate that preschool children with higher reflective functioning are also better in all (verbal, logical, graphomotor skills and ability to understand quantities) cognitive tasks on Readiness for school test.

Also, we wanted to check whether the reflective functioning of the child can explain, to some degree, success on tasks of the School readiness test. First of all, our results show that children’s reflective functioning explains almost a half, or precisely 49,4% of the variance of a child’s standardized S score on the POS test (Table 3) ( $F(1, 58) = 58.61, p < .000, R^2 = .503, R^2_{Adjusted} = .494$ )

**Table 3.** Linear regression analyses relating emotional competences and children's readiness for school

	Scale	Standardized C score				
		B	SE(B)	$\beta$	T	P
Affect task	Reflective functioning (RF)	1.83	.24	.709	7.66	.000

Note. R Squared Adjusted= .494\*\*\*;  $p < .000$

R<sup>2</sup>- R Square; B – Unstandardized coefficient; SE- Std. Error;  $\beta$ - Standardized coefficient

In detail, capacity for reflection explains a large percentage of the variance of the success on both each type of tasks separately and aspects of readiness for school as follows: verbal comprehension ( $F(1, 58) = 102,95, p < .000, R^2 = .640, R^2_{Adjusted} = .633$ ), logical thinking ( $F(1, 58) = 47.32, p < .000, R^2 = .449, R^2_{Adjusted} = .440$ ) graphomotor skills ( $F(1, 58) = 32.69, p < .000, R^2 = .360, R^2_{Adjusted} = .349$ ) and understanding quantity ( $F(1, 58) = 35.97, p < .000, R^2 = .383, R^2_{Adjusted} = .372$ ). In other words, children's capacity for reflection explains 63,3% of children's score on verbal comprehension ( $\beta = .80$ ), 44% of of variance on logic tasks ( $\beta = .67$ ), 34,9 % ( $\beta = .600$ ) and 37,2% ( $\beta = .619$ ) of the success on graphomotor and quantity understanding tasks, respectively (Table 4).

**Table 4.** Linear regression analyses relating reflective function and children's success on cognitive aspects of readiness for school

	Scale	Reflective functioning				
		B	SE(B)	$\beta$	T	P
Affect task	Verbal comprehension	3.32	.33	.800	10.15	.000
	Logic	2.32	.34	.670	6.88	.000
	Graphomotor skills	3.63	.64	.600	5.72	.000
	Understanding quantities	2.03	.34	.619	5.99	.000

Note.

B – Unstandardized coefficient; SE- Std. Error;  $\beta$ - Standardized coefficient

Finally, when the studied socio-demographic variables are in question, results showed that boys and girls are not different from each other by the degree of development of reflective functioning and by success on the School readiness test. Marital status of the parents and completeness of a family do not make any difference for a child's competences that we tested. Also, it has been indicated that the number of children in the family, the economic status of the family and education of the father are significantly correlated with the children's capacity for reflection on one side, and their readiness for school, on other side (Table 5).

**Table 5.** Correlation coefficients between the socio-demographic characteristics and children’s emotional and cognitive competences

	Scale	Number of children	Economic status of a family	Father’s education	Mother’s education
<b>Affect task</b>	Reflective Functioning	-.316*	.409**	.533***	.189
	Comprehension of verbal instructions	-.238	.399**	.589***	.189
<b>Test kognitivni</b>	Logic	-.209	.363**	.451***	.175
	Graphomotor skills	-.304*	.359**	.445***	.195
	Understanding quantities	-.191	.348**	.533***	.166
	Standardized values in relation to the population	-.243	.394**	.583***	.174

Note. \* - p< .05 level; \*\* p< .005 level; and \*\*\* p< .000 level

Namely, the results suggest that education of the father and economically favorable subjective assessment of the financial situation are positively correlated with the child’s skill to recognize and label mental states, as well as with the success of children on majority cognitive tasks: logical, verbal, and even graphomotor and understanding quantities. On the other hand, our results indicate that education of the mother is not correlated with children success on those competences. Finally, children from larger families and with more siblings demonstrated lower level of mentalization and poorer graphomotor ability.

Also, children of employed and unemployed parents, both mothers and fathers, differ from each other in their capacity to mentalize, as well as in the standardized, and all specific scores on the School readiness test (Table 6).

**Table 6.** Children’s emotional and cognitive competences and employment of parents (t-test)

	Scale	Employed mother (AS)	Unemployed mother (AS)	t-statistic	Sig (two-tailed)	Employed father (AS)	Unemployed father (AS)	t-statistic	Sig (two-tailed)
<b>Affect task</b>	Reflective Functioning	3.39	2.72	2.79	.008	3.45	2.55	3.44	.002
	Comprehension of verbal instructions	11.28	8.96	2.30	.026	11.70	8.14	3.29	.002
<b>POS</b>	Logic	7.88	5.14	3.53	.001	7.70	5.05	3.11	.003
	Graphomotor skills	11.66	7.11	3.34	.001	11.42	6.67	3.24	.002
	Understanding quantities	9.16	6.61	3.39	.001	9.06	6.05	3.54	.001
	Standardized C score	5.31	3.29	3.51	.001	5.33	2.90	4.14	.000

Note. \* - p (sig two-tailed) < .05 level; \*\* p< .005 level; and \*\*\* p< .000 level  
AS- Mean

There are also differences among children depending on birth order. Variance analysis reveals that children who are different by the order of birth are also different according to reflective functioning ( $F= 6.43$   $p< .001$ ), as well as capacity of verbal understanding ( $F= 3.23$ ,  $p< .029$ ), graphomotor skills ( $F= 3.94$ ,  $p< .013$ ) and understating quantities ( $F= 4.91$ ,  $p< .004$ ). A more detailed analysis shows that the best scores are achieved by firstborn children (Table 7). A firstborn compared with an only child has better understanding of verbal tasks on the cognitive skills test ( $t= -2.14$ ,  $p< .040$ ). Compared with second children, firstborns are not different according to their performance on cognitive tasks, but they are statistically significantly more successful in the capacity to reflect ( $t= 2.43$ ,  $p< .023$ ), while they are significantly more successful than third children in all competences except for understanding quantities. Second and only children achieve poorer results and there are no statistically significant differences between them. Only children are not statistically different from third children who achieve the poorest results, however, third-born children are statistically significantly less successful than second-born children in reflective functioning ( $t= 2.30$ ,  $p< .030$ ) and understanding verbal material ( $t= 2.43$   $p< .023$ ).

**Table 7.** Children's emotional and cognitive competences and birth order (t-test)

	Scale	Only child		Firstborn child		Second born child		Third born child	
		AS	SD	AS	SD	AS	SD	AS	SD
Affect task	Reflective Functioning	2.92	1.08	3.55	0.45	3.02	0.89	2.09	1.12
	Comprehension of verbal instructions	8.82	4.26	11.55	2.99	10.84	3.95	6.88	3.68
	Logic	6.00	2.72	7.41	3.40	6.95	2.99	4.38	3.62
POS	Graphomotor skills	9.00	5.16	11.18	5.28	10.58	5.74	3.25	3.24
	Understanding quantities	8.36	4.18	8.36	2.77	7.84	3.02	6.62	2.56
	Standardized C score	3.91	2.26	5.09	2.27	4.68	2.50	2.25	1.98

Note. AS – Mean; SD-Standard deviation

## 6. Conclusions

The problem of the research is to relate investigate relation between reflective functioning of the children and their achievements on tests of the cognitive maturity for School, as well as possibility for prediction.

Results confirm our research questions, suggesting that children who are better in reflection are also more successful in all competences in the cognitive domain. The hypothesis of the possibility of prediction of success on cognitive tasks on the basis of the degree of the development of reflective function has also been confirmed. Success on each of the types of tasks on the School readiness test

can be predicted by capacity for mentalization or children's ability to understand and label the mental states of oneself and others, as well as to use them for interpreting and predicting behaviors.

Because the ability of reflection develops simultaneously and parallel with cognitive development, it is logically that mentalization influence success on cognitive tasks that measure readiness for school. Similar results can be found in previous studies, suggesting that more intelligent children are more sensitive for emotions and more empathetic (Stefanović-Stanojević et al., 2015). All this suggest that good emotional and social competences give the child possibility to be effective and to use their cognitive capabilities, while children who not govern their emotions, remain focused on them and not capable for learnig or thinking (Goleman, 2009). In the book "The Development of Social Cognition and Communication" (Homer & Tamis-LeMonda, 2005), authors indicate that during the early school years, language and development of reflection have big influence on learning: reading, narrative understanding, scientific thinking and socio-emotional competences. Relaying on this, they suggest that the relation between theory of mind and language is "at the origin of children's developmental readiness for school and continues to set a framework for ongoing school success" (p. 222).

It can be concluded that cognitive aspect of School readiness can be enhanced by fostering and encouraging the development of mentalization. Our result suggest that lacking the influence from one group of factors, important for achieving readiness for school, can be compensate with increased activity of other group of factors. Relying on the findings which found that talking in the family improve children's social understanding (e.g. Dunn, 1996), as well as mothers' asking their children to reflect on mental states in disciplinary situations (Ruffman et al., 1999), and behave toward to their children as to individuals with minds (Meins & Fernyhough, 1999), our results indicate that mothers in early childhood indirectly influence cognitive abilities that are necessary for schooling, through her affect on the development of children's capacity for reflection.

Our final hypothesis refers to the possibility that variables from the socio-economic domain are correlated with the dependent research variables. The findings tell us that the employment of parents, economic position of the family, higher education of the father and the status of being the firstborn, but not the only child in the family, are factors that are correlated with better emotional and cognitive competences of children.

It is possible that the employment of parents and the favorable economic status of the family contribute to more relaxed occupation with the child, but also to the possibility for a child to grow up in a stimulating cultural niche, which potentially takes the child into the zone of proximal development. It is interesting finding that the degree of the father's education is significantly correlated with the development of competences of children, while the mother's not. This can be explained with previous findings showed that while mother is more important figure for the health status of children, while nonmother caregiver (father, for example) can be more important for emotional and cognitive competences (Van IJzendoorn & Sagi, 1999).

The differences among children dependent on having siblings or not, as well as birth order can also be explained by the fact that the firstborn children are surrounded by attention and care of probably a larger number of caregivers and therefore they are in a situation to develop their capacities more successfully. Firstborn children are significantly more successful than only children. This supports our conclusion about importance of interaction with others for developing TOM and other abilities, including brothers and sisters. On the other hand, the worst competences found in third children can be related with the fact that there is a larger number of children in families with lower socio-economic status, which do not have enough energy for dedicating themselves to the third child. Our results are similar to previous results that reported that children with siblings passed false-belief tests up to a year before children without siblings (Perner et al., 1994), but in some manner our results complicate the “sibling effect”, indicate that third child in family have lower capacity for reflection than other children, including and children without siblings. This finding maybe can be in accordance with more recent studies of working-class children have failed to replicate the sibling effect (Cutting & Dunn, 1999) and suggest a later onset of false-belief success in impoverished children (Holmes, Black, & Miller, 1996). This should be checked on a larger sample and it is our recommendation for future research. At the end it is justified to confirm that the phenomena of theory of mind and readiness for school are interrelated. Our results indicate that capacity for reflection, as the system for processing social information that lies in the basis of reflective functioning, is an important predictor of the children readiness for Elementary school.

Since various of effective training programs have been developed to improve ToM in children (Hofman et al., 2016), maybe we can benefit from them also by using them to improve children’s readiness for school. This is an interesting hypothesis for a future researchers to explore. But, except of formal interventions, there is also an easier way to improve children’s mindreading capacities: parents should discuss feelings and thoughts with their preschool children as much as they can.

### Acknowledgements

The study is funded by Ministry of Education, Science and Technological Development of the Republic of Serbia within the framework of the 179002 project.

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