

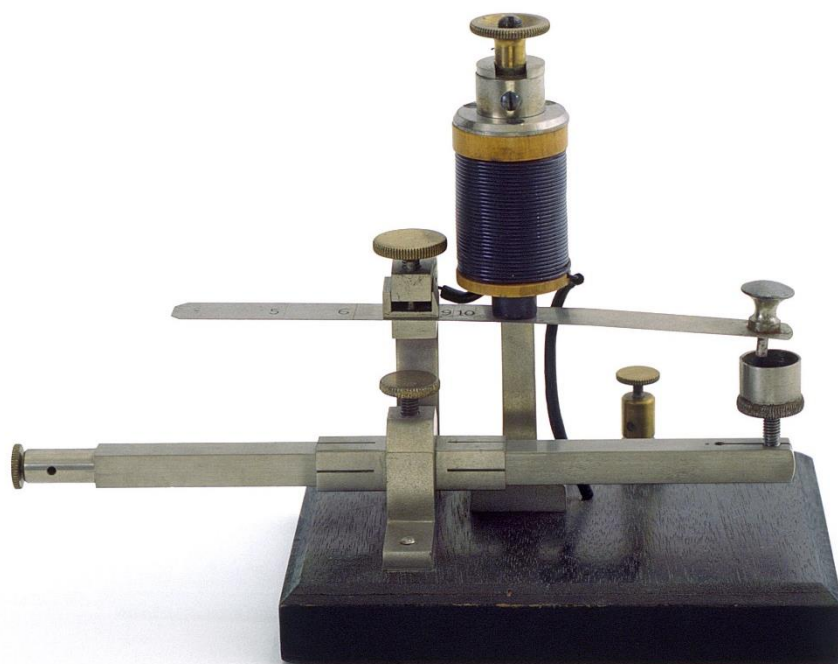
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# Early Childhood Development Stimulation: One Way of Measuring

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## Abstract

Supportive, warm, and psychologically stimulative interactions between caregivers and children are very important factors of the child's development and represent an indicator of care quality. However, there are no direct or self-reported instruments for estimating the quality of early childhood stimulation in Serbia. This research aims to (1) determine psychometric and descriptive properties of the constructed instrument, and (2) investigate the correlation between the frequency of these activities, socioeconomic status, and the developmental status of the child. Based on the Early Learning and Developmental Standards for children in Serbia, the Inventory of Stimulative Activities for Child Development (ISCAD) was constructed. The obtained results indicate good psychometric characteristics of the new instrument. A significant correlation with the developmental status of the child is observed. No significant correlations were found with the mother's education or economic status.

**Keywords:** early childhood development, care quality, stimulative activities, ISCAD questionnaire

## Introduction

Early childhood development (from birth to 6 years) is widely recognized as a critical period due to the intensive development and high plasticity of the brain (Shonkoff, 2003). Reaching this period milestones provides the foundation for later development and success in academic and professional life (Shonkoff et al., 2009). Research has shown that the development in this period is highly dependent on the interaction with the caretakers. That interaction follows "the serve and return pattern" (National Scientific Council for Developing Child, 2004) – the child sends signals (crying, smiling, bubbling, moving...) and the caretaker answers and stimulates further communication. If this pattern occurs regularly, the new neural connections are developed while the olds are stimulated (Shonkoff, 2003). Additionally, the lack or inconsistency of proper interaction during early age may lead to the loss of the neural connections vital for normal functioning (Shonkoff, 2003). There are several current attempts to define all aspects of care quality that parents need to provide for child's optimal and thrive development. One of those attempts is Nurturing

Care Framework for Early Childhood Development (WHO, 2018). In this framework responsive care and frequency of learning activities are positioned as a starting point and prerequisite for health, security and nutrition. However, this way defined the care quality is challenging to measure. Researchers and practitioners mostly use observational measures, which can be expensive, time consuming and difficult to use and score. Self-report measures are far less available, to our knowledge.

The aim of this research is to construct an instrument to assess the frequency of the stimulative activities in child's environment and to determine its psychometric properties. The correlation between the frequency of the stimulative activities in the child's environment and the developmental status of the child was investigated.

Besides that, this study aims to investigate the correlation between the frequency of these activities and socioeconomic status. Research shows that concerning percent of children who live in low- and middle-income countries don't have optimal supportive environment and don't achieve their full developmental potential (Black et al., 2017; Grantham-McGregor et al., 2007). Studies also suggested that parent's lower income and lower educational level can contribute to lower quality of interaction with the child (Gilkerson et al., 2017; Weisleder & Fernald, 2013).

## Method

### Sample

The sample consisted of 1388 parents (90% mothers) of children aged from 1 to 60 months (53% boys and 47% girls). Parents were examined in 22 Serbian districts, out of a total 24. The number of parents per district was determined to be proportional to the total number of young children. The education level of the sample was relatively high - 41% of parents had secondary education, 39% had higher education. Assessments of economic status in relation to other people living in Serbia were also relatively high - on a scale from 1 to 10, the average score was 6.28.

## Instruments

*Inventory of Stimulative Activities for Child Development (ISCAD)*. An expert group of developmental psychologists formulated activities that would be supportive for child development based on the Early Learning and Developmental Standards for children in Serbia. After the pilot study, the Inventory of stimulative activities for child development (ISCAD) was designed for 8 age intervals (from 1 to 60 months). The parents indicated how frequently (on the five-point scale from never to almost every day) in the past 15 days they were involved in the listed activities with the child. The number of items on each age interval ranged from 13 to 29. In order to create comparable scores across the age intervals, the total score on each scale was calculated by dividing the sum score by the number of items.

*Ages and stages questionnaire® (ASQ-3)* is a parent-completed screening questionnaire measuring the developmental status of a child in 5 domains: communication, gross motor, fine motor, solving problems and personal social skills. The whole instrument consists of 21 questionnaires covering age intervals from 2 to 66 months. Every domain is covered by 6 items, on which parents assess if the child is doing activity regularly, sometimes, or not yet, in order to represent the child's ability to perform a task. The questionnaire is scored by calculating the sum of items at each domain or summing domain scores. The instrument was standardized for the Serbian population (Lozanović et al., 2021).

## Procedure

Pediatricians were instructed to give the instrument to the first parent who meets child age criteria and comes for a regular examination, regardless of his/her education, cooperation, or child characteristics. In the most cases, the instrument was assigned during regular pediatric checkups. Parents were informed about the study and they assigned informed consent. Each parent got a set of questionnaires which contained the ISCAD and ASQ-3.

## Results

### Internal consistency of ISCAD

As can be seen from the Table 1, internal consistency measured by Cronbach's Alpha coefficient is from below 0.8, which is acceptable (on two lowest age intervals) to above 0.9 which is excellent.

Table 1: Internal consistency of ISCAD

Age interval	No. of items	Cronbach's Alpha
2 months	13	0,77
4 months	13	0,78
6 months	21	0,90
10 months	27	0,88
12 months	27	0,83
14 months	26	0,87
18 months	26	0,91
24 months	29	0,88
30 months	27	0,95
36 months	27	0,95
42 months	24	0,97
48 months	24	0,96
60 months	24	0,91

## Descriptive statistics

The minimal score on ISCAD, on the total sample, was 0.96 and the maximal 5. The mean score of the total was 4.10 (SD=0.55). The distribution was skewed towards higher scores. According to obtained data, a relatively small number of children live in a non-stimulating environment, but still, 14% of the children are below one standard deviation, and 2.5% of children are below two standard deviations.

The mean scores of the ISCAD scales ranged from 3.70 to 4.65. The lowest mean scores for scales were on the age interval of 14 (M=3.76, SD=.40) and 18 months (M=3.76, SD=.46), 42 (M=3.70, SD=.73), 48 (M=3.65, SD=.80), 60 months (M=3.72, SD=.56).

The lowest mean scores on individual items (mean score below 3.0) were at age intervals of 14 and 18 months: How often did you encourage the child to use the crayons and colour on the paper? (for 10 months: M=2.14, for 12 months: M=2.74) How often did you play with the child pretending to be a cop, doctor, baker, hair stylist, grandma...? (for 10 months: M=2.30, for 12 months: 2.50, for 14 months: M=2.45).

## Correlations between ISCAD and ASQ

Table 2 presents correlation results between ISCAD total score and ASQ-3 domains. Obtained correlations are positive which provides support for the conclusion that children whose parents stimulate their development through different activities have higher scores on ASQ domains. The correlations are significant for all age range except for 30 and 42 months.

Table 2: Significant correlations with ASQ-3 domains

Age	1	2	3	4	5
2	.292		.301	.296	
4	.305		.282	.290	.263
6	.276	.224	.310	.320	.230
10	.415	.211		.375	.396
12	.362				.264
14	.361	.392	.353	.420	.306
18				.259	.213
24	.346		.362	.310	.330
30					
36					.286
42					
48	.258		.271	.299	
60	.430		.502	.302	.498

1-communication, 2-gross motor, 3-fine motor, 4-problem solving, 5-personal social skills

### Correlations with education and economic status

Neither mother's educational level, nor her economic status was associated with the ISCAD score. The only exception was at 14 months, where the correlation was significant and positive (mother's education level:  $r=0.275$ ,  $p<.01$ ; economic status:  $r=0.278$ ,  $p<.01$ ).

### Discussion and Conclusion

The frequency of the stimulative, learning activities is one of the important aspects of child care quality. However, to our knowledge, there is a lack of self-report measures that could provide reliable data. Parental care quality at early children's age is mostly assessed with observational measures (e.g. Home Observation for Measurement of Environment (HOME) Inventory, Bradley & Caldwell, 1984). Our study aimed to construct a new self-report measure of the frequency of simulative activities between children and parents (*Inventory of simulative activities for child development-ISCAD*) and to determine the validity (ASQ used as a criteria variable), internal consistency (Cronbach) of this instrument. Our results provide support for the conclusion that the constructed instrument has good psychometric properties. Each of the age-appropriate scales shows acceptable to excellent internal consistency. Results indicated that parents in Serbia relatively frequently engage with children in developmentally supportive activities. However, the obtained results also suggest that approximately one of seven children lives in an environment that is not supportive enough. The lowest scale mean scores were obtained regarding the following age intervals: 14, 18, 42, 48 and 60 months. Item analysis suggests that parents of younger children (14 and 18 months) least frequently engage the child in activities that include role play and using crayons. When it comes to later age (42, 48 and 60 months) it seems that parents avoid teaching children how to use a

computer, cellphone or toys with remote control. This result could be interpreted in light of the fear that children would excessively use modern technologies and screens. Further refinement of the instrument will be based on the results of the Rach model and the use of the logit scale for express item difficulty. Special attention will be paid to the age range 30 and 40 months in which correlations with ASQ were not obtained.

Even though earlier research assumed that the mother's education and family's economic status would be associated with the frequency of developmentally stimulating activities, our results didn't support that. One explanation may be related to the measurement method of economic status. We used a scale from 1 to 10, and parents assessed their position relative to other parents in Serbia. The main weakness of this type of measure is its objectivity because most of the parents don't want to answer honestly, or they are not sure where they stand relative to others (Gershoff et al., 2007). Further research should incorporate more complex measures of economic status, such as DHS Wealth Index (Rutsein & Johnson, 2004).

The correlation of the ISCAD scores was correlated with ASQ domains on every age interval, which suggest that ISCAD is a useful self-report measure of care quality which has an effect on a child's developmental status.

### References

- Black, M. M., Walker, S. P., Fernald, L. C., Andersen, C. T., DiGirolamo, A. M., Lu, C., ... & Lancet Early Childhood Development Series Steering Committee. (2017). *Early childhood development coming of age: science through the life course. The Lancet*, 389(10064), 77-90. [https://doi.org/10.1016/S0140-6736\(16\)31389-7](https://doi.org/10.1016/S0140-6736(16)31389-7)
- Bradley, R. H., & Caldwell, B. M. (1984). The HOME Inventory and family demographics. *Developmental Psychology*, 20(2), 315. <https://doi.org/10.1037/0012-1649.20.2.315>
- Gershoff, E. T., Aber, J. L., Raver, C. C., & Lennon, M. C. (2007). Income is not enough: Incorporating material hardship into models of income associations with parenting and child development. *Child development*, 78(1), 70-95. <https://doi.org/10.1111/j.1467-8624.2007.00986.x>
- Gilkerson, J., Richards, J. A., Topping, K. J. (2017). The impact of book reading in the early years on parent-child language interaction. *Journal of Early Childhood Literacy*, 17(1), 92-110. <https://doi.org/10.1177/1468798415608907>
- Graham-McGregor, S., Cheung, Y. B., Cueto, S., Glewwe, P., Richter, L., Strupp, B., & International Child Development Steering Group. (2007). Developmental potential in the first 5 years for children in developing countries. *The Lancet*, 369(9555), 60-70. [https://doi.org/10.1016/S0140-6736\(07\)60032-4](https://doi.org/10.1016/S0140-6736(07)60032-4)
- National Scientific Council on the Developing Child (2007). *The Science of Early Childhood Development: Closing the Gap Between What We Know and What We Do*.

- Retrieved from [www.developingchild.harvard.edu](http://www.developingchild.harvard.edu).
- Rutstein, S.O. & Johnson, K. (2004). The DHS Wealth Index. DHS Comparative Reports No.6. ORC Macro
- Shonkoff, J. P. (2003). From neurons to neighborhoods: old and new challenges for developmental and behavioral pediatrics. *Journal of Developmental & Behavioral Pediatrics*, 24(1), 70-76.  
<https://doi.org/10.1097/00004703-200302000-00014>
- Shonkoff JP. (2009). *Investment in early childhood development lays the foundation for a prosperous and sustainable society*. In: Tremblay RE, Boivin M, Peters RDeV, (Eds.) *Encyclopedia on Early Childhood Development* [online], pp. 1-5, Centre of Excellence for Early Childhood Development and Strategic.
- Lozanović, D., Milidrag, M., Bogdanović, R., Sokal-Jovanović, L., Videnović, M., & Stepanović-Ilić, I. (2021). Why and when is it important to use the standardized questionnaire 'Ages & Stages Questionnaires' (ASQ-3)-'Age & development of the child', for assessment and monitoring of children's development in early childhood?. *Timočki medicinski glasnik*, 46(3), 129-131.  
<https://doi.org/10.5937/tmg2103129L>
- Weisleder, A., & Fernald, A. (2013). Talking to children matters: Early language experience strengthens processing and builds vocabulary. *Psychological science*, 24(11), 2143-2152.
- World Health Organization (2018). *Nurturing care for early childhood development: a framework for helping children survive and thrive to transform health and human potential*.

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