

Adaptation of the Children's Kitchen Task Assessment – as an Ecologically Valid Measure of Executive Functions – among Schoolchildren from Different Socioeconomic Situations

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Objective: This study aimed to adapt the Children's Kitchen Task Assessment for Hungarian primary school children and to investigate its relationship with an ecologically valid executive function questionnaire and standard computer-based executive function tasks in the context of socioeconomic status. **Methods:** Our study included 17 children aged 8–12 years, of whom eleven children (64.7%) lived in a town in deep poverty with many families with low socioeconomic status, while the remaining six (35.3%) of the subjects lived in a city in Hungary. Participants completed standard executive function tasks (Go/No-Go, Corsi Block-Tapping Task, and the Wisconsin Card Sorting Task), as well as the adapted version of the Children's Kitchen Task Assessment. In addition, 14 parents and 13 teachers completed the Childhood Executive Functioning Inventory regarding the participating children. **Results:** The Hungarian Children's Kitchen Task demonstrated good interrater reliability ($\kappa = .81$) and acceptable internal consistency ($\alpha = .68$). Performance on the task was found to be significantly related to both standard executive function tasks and the ecologically valid questionnaire. In terms of planning, children from lower socioeconomic backgrounds demonstrated poorer performance ($t(15) = 2.87, p < .02, d = 0.13$), yet they completed the task in a shorter amount of time than their peers with higher socioeconomic status ($t(15) = -2.4, p < .02, d = 1.23$). **Conclusions:** Executive functions measured in ecologically valid settings demonstrated convergence with other executive function assessment methods. Furthermore, our results suggest that socioeconomic status is related to children's executive functions, especially when the executive functions are measured with tasks resembling more to everyday situations. Our findings have implications for interventions.

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INTRODUCTION

Executive functions (EFs) are top-down cognitive processes that enable goal-oriented behaviour (Burgess, 1997), particularly in situations where automatic or habitual responses would be inadequate (Diamond, 2013). Given that EF is an umbrella concept encompassing numerous sub-concepts, a variety of paradigms and measurement tools have traditionally been employed to assess EFs among children. Although these standardized tests are widely used, one of their key limitations is that they show little resemblance to the demands of real-life situations (Gathercole et al., 2008; Graham et al., 2016). Traditional experimental paradigms often oversimplify the complex and dynamic requirements of everyday functioning, which can distort results and lead to misleading conclusions about an individual's actual executive abilities in daily life (Biggs & Pettijohn, 2022; Elkind et al., 2001; Votruba & Langenecker, 2013). Consequently, the need to develop ecologically valid neuropsychological evaluation instruments for children has become increasingly important in recent years (D'Aurizio et al., 2023). However, in order to evaluate such complex constructs as EFs realistically and validly, it is crucial to combine and integrate test scores, self- or family-report and direct observation, even if ecologically valid measures are being used

(Chevignard et al., 2010). Questionnaires that assess EFs through items describing everyday situations have been shown to have higher ecological validity. Another ecologically valid EF assessment is the Children's Kitchen Task Assessment (CKTA), in which children are asked to prepare play dough as independently as possible by following a recipe book (Rocke et al., 2008).

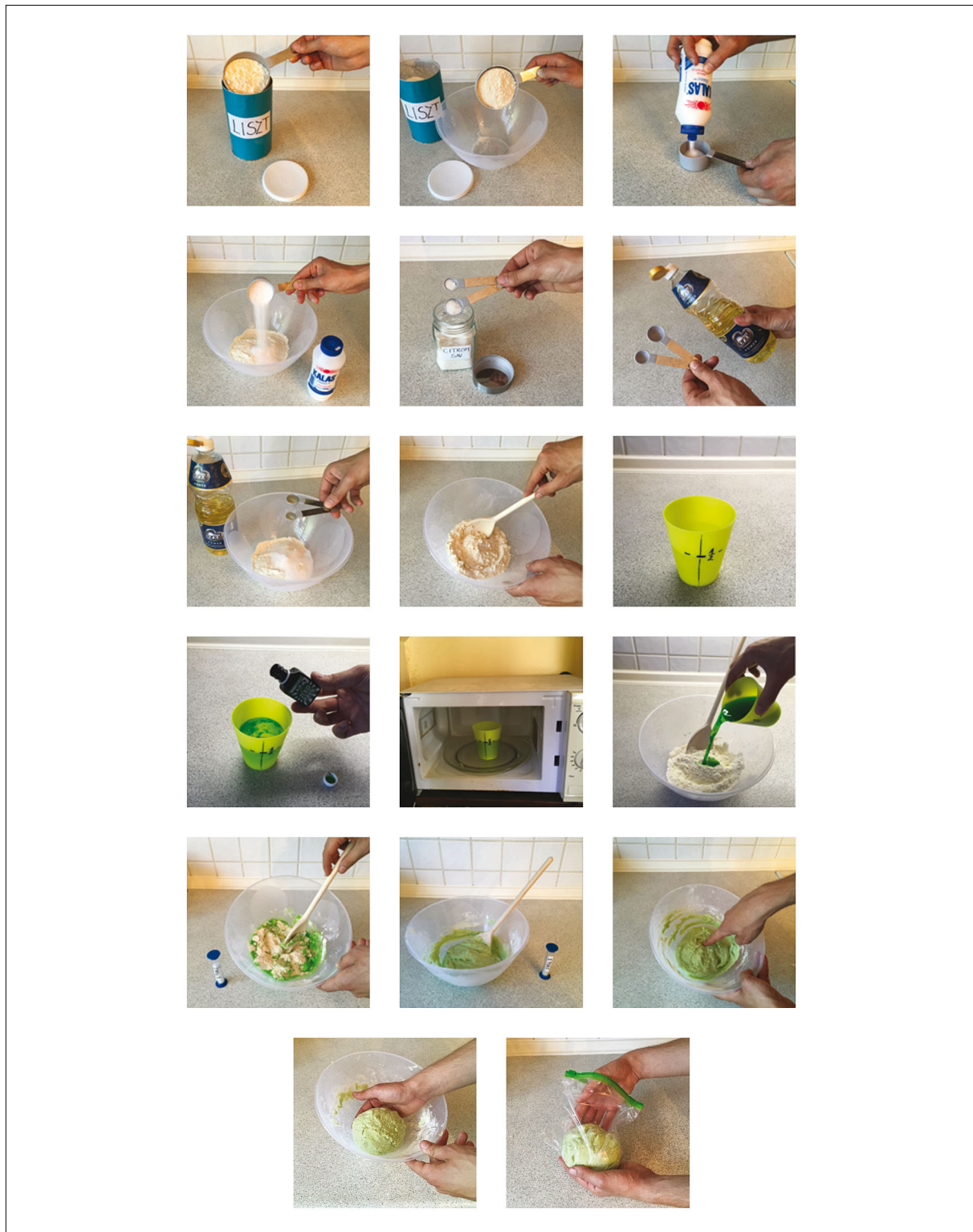
The Children's Kitchen Task Assessment (CKTA; Rocke et al., 2008) is an ecologically valid measure of EFs designed for children aged 8–12 years. It assesses EFs in a familiar, real-life context by asking children to make play-dough following a word- and picture-based recipe (Figure 1). The task evaluates key EF domains—initiation, planning, inhibition, and completion—through the level of assistance required during task performance rather than the child's independent success (Table 1). Ecological validity is further enhanced by the structured cueing process, where the examiner provides graduated prompts (ranging from 0 = no cues to 5 = examiner completes the step) only after a 10-second delay, thereby supporting autonomy while reflecting real-life adult guidance (Berg et al., 2012; Rocke et al., 2008) (Table 2). The total weighted score (range: 0–400) is calculated by summing cues multiplied by their levels, with higher scores indicating weaker EFs. Additional aspects—organization, emotional liability, attention, efficiency, and working memory—are also

Table 1. Assessed skills and their description in the Children's Kitchen Task Assessment

Assessed skill	Description	Score range
Initiation	Assessment of the participant's ability to start the task independently.	0 - 5
Planning / Sequencing	Assessment of participant's performance of task activities following the appropriate sequence.	0 - 5
Safety judgment / Inhibition	Assessment of the participant's ability to prevent or avoid danger while performing the task.	0 - 5
Completion	Assessment of the participant's ability to finish the task independently and demonstrate this by placing the play dough in the plastic bag.	0 - 5
Organization	Assessment of how organized the participant's work and work area were while performing the task.	1 - 5
Emotional liability	Assessment of how participant's emotions changed while performing the task and how it impacted on completing the task.	1 - 4
Attention / Problem-solving	Assessment of how well the participant changed their attention during the task, solved problems, and how flexibly they completed the task.	1 - 4
Efficiency / Monitoring	Assessment of how carefully the participant worked and how efficiently they corrected their mistakes and completed the task.	1 - 4
Working Memory	Assessment of the participant's ability to remember the ingredients without checking the recipe several times, to follow the steps of the recipe book without forgetting something, and to complete the task.	1 - 4

Note. A higher score indicates poorer performance.

Figure 1. Steps of making the play dough in the CKTA



Note. Pages of the recipe book. Each page shows a different step in making the play-dough, including a picture and a simple sentence related to the activity. From left to right: 1. picture: Measure 1 cup of flour, 2. Put flour in bowl, 3. Measure $\frac{1}{4}$ cup of salt, 4. Put salt in bowl, 5. Measure $1\frac{1}{2}$ teaspoon of cream of tartar, 6. Put crème of tartar in bowl, 7. Measure $1\frac{1}{2}$ teaspoon of oil, 8. Put oil in bowl, 9. Mix with a spoon, 10. Measure $\frac{1}{2}$ cup of water; STOP! Do not put water into bowl! 11. Add 3 drops of food coloring into the water, Do not put water into bowl!, 12. Put the water into the microwave and heat for 1 minute, 13. Put the water into the bowl, BE CAREFUL! THE WATER IS HOT! 14. Mix for 1 minute. Use the timer, 15. Let play dough sit for 1 minute. Use the timer, 16. Make sure the play dough is safe to touch, 17. Mix the play dough with your hands. Make into a ball, 18. Put the play dough in a bag. You are done!

Table 2. Description and examples of cues on each level in the CKTA (Rocke et al., 2008)

Cueing level	Description	Example
no cues (0)	The participant is capable of completing the step independently.	Participants perform the task by themselves. The examiner gives no cue.
verbal guidance (1)	The participant requires prompting with an open-ended question or an affirmation that will facilitate their progression.	The examiner may ask: "What should you do now?" "What else do you need?"
gesture guidance (2)	The participant requires the use of gestures as a form of prompting. Thus, the examiner makes a gesture that mimics the action that is necessary to complete the subtask.	The examiner points to the necessary item.
direct verbal instructions (3)	To proceed, the participant requires a direct phrase. Thus, the tester delivers a one-step command, thereby cueing the participant to take the action.	The examiner may say: "Look at the recipe" "Put the salt into the bowl"
physical assistance (4)	The tester provides physical assistance to the participant.	The examiner holds the bowl while the participant adds the ingredients.
complete the step for the participant (5)	The participant is unable to complete the task. Thus, the examiner performs the step for the participant.	The participant is unable to do the task. The examiner measures the water for them.

rated (1–5 or 1–4 scales, with higher scores reflecting poorer performance). The CKTA is freely available in the public domain and includes pre- and post-task questions, behavioural ratings, and detailed scoring guidelines. Importantly, the CKTA is not designed to measure task competence per se, but rather the level of support required for successful task completion, offering an ecologically valid window into children's everyday executive functioning.

The development of EFs is strongly influenced by both age and socioeconomic status (SES): environmental disadvantages associated with low SES—such as chronic stress (Kassai et al., 2022; Merz et al., 2018), limited stimulation (Hackman et al., 2015), and poor housing conditions (Fatima & Sheikh, 2014)—can hinder cognitive growth and the maturation of executive abilities (Fatima & Sheikh, 2014; Ursache et al., 2016). Since EFs develop progressively throughout childhood (Best & Miller, 2010; Diamond, 2013; Diamond & Lee, 2011), it is essential to use ecologically valid assessment tools that accurately reflect the real-life performance of children from diverse age groups and socioeconomic backgrounds.

The first aim of the present study was to adapt the CKTA into Hungarian among schoolchildren in order to measure executive functioning in a situation closer to real-life tasks. Moreover, another aim was to examine the relationship between the CKTA and standard EF tasks in the light of SES.

METHODS

Participants

A total of 17 children living in Hungary from different socio-economic backgrounds without a clinical diagnosis were included in the study. Both parents and teachers of the children filled out questionnaires regarding the child. The children's sample age ranged from 8 to 12 ($M = 10.80$ years, $SD = 0.79$ years). Both parents and teachers of the children filled out questionnaires regarding the child. Fourteen parents filled out the questionnaires, of whom 12 (85.7%) were mothers. Of the teachers, 13 filled out the questionnaires (Table 3).

Measures

Childhood Executive Functioning Inventory (CHEXI)

The Hungarian version of the CHEXI (Józsa & Józsa, 2020) was used to measure the children's executive functioning from both the parent's and teacher's point of view (Thorell & Nyberg, 2008, Cronbach's $\alpha = 0.85-0.96$; Józsa & Józsa, 2020, Cronbach's $\alpha = 0.87$). In our sample, Cronbach's alpha was excellent with $\alpha = 0.72-0.97$. (Thorell & Nyberg, 2008, Cronbach's $\alpha = 0.85-0.96$; Józsa & Józsa, 2020, Cronbach's $\alpha = 0.87$).

Table 3. Demographic characteristics of the sample (N=17)

Demographics		n (%)
Gender	Female	12 (70.6)
	Male	5 (29.4)
Residency	City	6 (35.3)
	Town in poverty	11 (64.7)
Nationality	Hungarian	11 (64.7)
	Hungarian Roma	6 (35.3)
Mother's level of education	High-level (college/ university degree)	6 (35.3)
	Medium level (high school)	5 (29.4)
	Low-level (Elementary school or lower)	6 (35.3)
Father's level of education	High-level (college/ university degree)	6 (35.3)
	Medium level (high school)	3 (17.6)
	Low-level (Elementary school or lower)	8 (47.1)
Mother's economic activity status	Employed	13 (76.5)
	Other	4 (23.5)
Father's economic activity status	Employed	15 (45.5)
	Other	2 (11.8)
Perceived financial status	Above than average	3 (17.6)
	Average	11 (64.7)
	Below than average	3 (17.6)
Relationship status	Married	8 (57.1)
	In relationship	3 (21.4)
	Other	3 (21.4)
Number of books	200-600 or more books	5 (29.4)
	50-200 books	2 (11.8)
	10-50 books	4 (23.5)
	Lower than 10 books	6 (35.3)
The child has their own books	Yes	12 (70.6)
	No	5 (29.4)
The child has their own room	Yes	8 (47.1)
	No	9 (52.9)
The child has their own desk	Yes	15 (88.2)
	No	2 (11.8)
Number of children	One	2 (12.5)
	Two	7 (43.8)
	Three	6 (37.5)
	Four (or more)	1 (6.3)

Note. N = 17

Standardized EF tasks

Go/No-Go Task

As a standardized measurement of children's EFs, we used the Go/No-Go task (Donders, 1969), which is available in a computer-based version on the Psytoolkit website (Stoet, 2010, 2017; Hungarian version for children: Losonczy, 2024). This task was designed to measure primarily response inhibition (Donders, 1969).

Corsi Task

In our study, we used a computer-based Corsi Test to measure visuospatial working memory. It is available in a free-to-use version on the Psytoolkit website (Stoet, 2010, 2017; Hungarian version for children: Losonczy, 2024).

Wisconsin Card Sorting Task

The Wisconsin Card Sorting Test (WCST) is a standardized tool used to assess cognitive flexibility and shifting (Berg, 1948; Milner, 1963; Nelson, 1976). The test is also available on the website Psytoolkit (Stoet, 2010, 2017; Hungarian version for children: Losonczy, 2024).

Children's Kitchen Task Assessment (CKTA)

To measure children's executive functioning based on their performance, we used the Children's Kitchen Task Assessment (CKTA, Rocke et al., 2008) as a novel, ecologically valid, and age-appropriate task. The original version showed moderate internal validity (Cronbach's $\alpha = 0.68$) and good inter-rater reliability (ICC = 0.98). In our study, we aimed to adapt this measurement tool on a Hungarian sample.

Before the data collection, we translated the CKTA into Hungarian. Two psychology students translated it independently and then, based on feedback from a lecturer, we developed a single version (Appendix A). We read the Hungarian version aloud to an eight-year-old and incorporated their suggestions into the translation to ensure that the task would be understandable for the targeted age group. Then, we asked Hungarian students who had not read the original version to translate it back into English. We then sent it to the authors, and they gave us permission to use the tool. Following the original recipe book, we

made our own translated recipe book using exactly the same items that were in our toolkit.

PROCEDURE

Our study was conducted in accordance with the approval of the Research Ethics Committee of Eötvös Loránd University (registration number 2024/272). Data were collected between June 2024 and March 2025. Participants were recruited from a socioeconomically disadvantaged town and supplemented with average-SES children from Budapest using convenience and snowball sampling. Twenty-five parental consent forms were distributed, and participation required written consent from both parents and children, who received oral and written information regarding the study and data handling. Children completed a demographic form, three standardized executive function tasks (Go/No-Go, Corsi, WCST), and the CKTA in 60-90-minute sessions under examiner supervision. Parents and teachers completed the CHEXI questionnaire. CKTA sessions were videotaped to ensure coding accuracy and interrater reliability; recordings were securely stored and accessible only to authorized coders. All data were anonymized and handled confidentially, with paper questionnaires and consent forms stored separately in locked cabinets and identifying information restricted to the principal investigator. Data management information sheets were also provided in printed form to children, parents, and teachers.

Statistical analysis

Data were analysed using IBM SPSS Statistics (Version 26). We used independent samples T-tests to assess the scales' mean differences based on dichotomous demographic variables (e.g., gender). Then we used a series of one-way ANOVAs to assess mean differences in scale caused by categorical variables and Chi-squared tests to compare categorical variables with each other. Pearson correlations were used to examine associations between age and scale scores, as well as intercorrelations among the scales. Socioeconomic status (SES) was determined via two-step cluster analysis, based on parental education, employment, perceived financial status, number of books, and home resources (e.g., own desk/room).

Table 4. Descriptive Statistics, Cronbach's alphas, and bivariate relationships (Pearson's correlation coefficients) of the scales

	Min	Max	Mean	SD	Skewness	Kurtosis	α	1	2	3	4	5	6	7	8	9	10	11	12	13
1 Age	8	12	10.47	1.01	-0.74	1.09	-	—												
2 CKTA Plan	2	17	8.47	4.52	0.44	-1.01	-	-.07	—											
3 CKTA Time	10.28	20.04	15.29	2.92	-0.23	-0.99	-	-.65*	-.12	—										
4 CKTA Sum	7	26	17.12	6.30	-0.09	-1.30	.68	-.14	.92*	-.11	—									
5 T_CHEXI WM	9	32	20.30	7.01	0.32	-0.18	.93	-.36	-.15	.23	-.03	—								
6 T_CHEXI PL	4	15	9.40	3.53	0.17	-0.71	.87	-.27	-.10	.13	-.10	.96*	—							
7 T_CHEXI REG	9	23	14.10	4.61	0.82	0.10	.91	-.20	-.32	.30	-.29	.90*	.91*	—						
8 T_CHEXI INH	10	21	14.70	3.95	0.43	-1.13	.79	-.16	-.30	.36	-.10	.80	.73	.78	—					
9 T_CHEXI SUM	33	89	58.50	18.06	0.38	-0.56	.97	-.28	-.22	.27	-.11	.98*	.96*	.95*	.87*	—				
10 P_CHEXI WM	10	33	22.00	5.95	-0.32	0.56	.81	-.49	.27	.37	.30	.80	.79	.78	.72	.82	—			
11 P_CHEXI PL	4	14	8.57	2.95	0.39	-0.72	.72	-.33	.61	.08	.62*	.64	.63	.58	.40	.61	.73*	—		
12 P_CHEXI REG	10	25	16.43	4.54	0.45	-0.16	.93	-.78*	.33	.58	.39	.62	.57	.53	.66	.63	.76*	.66	—	
13 P_CHEXI INH	9	22	15.54	4.31	0.04	-1.25	.79	-.40	.42	.28	.40	.42	.41	.30	.45	.42	.56	.58	.75*	—
14 P_CHEXI SUM	35	83	62.54	15.94	-0.33	-1.00	.94	-.60	.47	.42	.49	.70	.68	.63	.64	.70	.91*	.85*	.91*	.81*

Note. N = 17, Min = Minimum, Max = Maximum, M = Mean, SD = Standard deviation, α = Cronbach's Alpha, CKTA Plan = Planning-Sequencing subscale in Children's Kitchen Task Assessment, CKTA Time = Time required for the child to succeed the Children's Kitchen Task Assessment, CKTA Sum = Total Score in Children's Kitchen Task Assessment, T_CHEXI = teacher report of the Childhood Executive Functioning Inventory, P_CHEXI = parent report of the Childhood Executive Functioning Inventory, CHEXI WM = Working memory subscale of Childhood Executive Functioning Inventory, CHEXI PL = Planning subscale of Childhood Executive Functioning Inventory, CHEXI REG = Regulation subscale of Childhood Executive Functioning Inventory, CHEXI INH = Inhibition subscale of Childhood Executive Functioning Inventory, CHEXI SUM = Total Score of Childhood Executive Functioning Inventory

*p < .004 (.05/14 using Bonferroni correction)

RESULTS

We estimated interrater reliability by Cohen's Kappa, which showed an excellent consistency with the value of $\kappa = 0.81$. The internal consistency of the CKTA, as determined by Cronbach's alpha, was found to be moderate with a value of $\alpha = 0.68$ on our sample (Table 4).

CKTA and the standardized EF tests

According to an independent samples T-test, there was a strong significant difference in WCST performance according to the CKTA's Emotional liability variable in our sample. The group with low emotional liability demonstrated a significantly higher incidence of perseverative errors on the Wisconsin Card Sorting Task compared to the group with high emotional liability. Furthermore, the participants with low liability showed a higher reaction time than the group with high liability, characterized by a strong effect size (Table 5).

Additionally, Pearson's Chi-squared test results indicated a strong positive association between the Corsi span and better Working Memory and Initiation performance on the CKTA, and a positive, moderate relationship between the Corsi span and a better score on the CKTA Attention/Problem-Solving subscale (Table 6).

CKTA and the CHEXI questionnaire

The Planning subscale of the parent-reported CHEXI showed a strong positive correlation with the total score of the CKTA (Table 4). This result suggests that children who performed better on the CKTA were evaluated by their parents as having fewer difficulties with planning in everyday life.

The results of the one-way ANOVA indicated a significant difference in the mean of the Parent-reported Planning subscale in CHEXI based on the CKTA Attention/Problem-solving. Tukey post hoc analysis revealed a significant difference in the mean

Table 5. Independent sample T-test results of WCST and Emotional liability of CKTA

	high liability		low liability		t(15)	p	Cohen's d
	M	SD	M	SD			
WCST pers%	19.92%	8.20%	32.50%	7.59%	-2.72*	.016	1.59
WCST Time	2678.89 ms	549.56 ms	3550.40 ms	364.05 ms	-2.94*	.010	1.87

Note. N = 17. WCST pers% = Perseveration errors of the Wisconsin Card Sorting Task, WCST Time = Mean of the reaction time on the Wisconsin Card Sorting Task, high liability= evaluated a score of 1 at the Emotional liability scale in Children's Kitchen Task Assessment, low liability = evaluated a score of 2 at the Emotional liability scale in Children's Kitchen Task Assessment

*p < .025 (.05/2 using Bonferroni correction)

Table 6. Crosstabulation of Corsi Span and CKTA

		Corsi span			χ^2	Cramer's V
		3	4	5		
CKTA WM	1	2	3	8	8.99*	.66
	2	0	4	0		
CKTA Att	1	1	1	6	12.05*	.52
	2	1	5	0		
	3	0	1	2		
CKTA Ini	0	1	3	8	8.26*	.61
	1	1	4	0		

Note. N = 17. CKTA WM = Working Memory in Children's Kitchen Task Assessment, CKTA Att = Attention/Problem-Solving in Children's Kitchen Task Assessment, CKTA Ini = Initiation in Children's Kitchen Task Assessment

*p < .02 (.05/3 using Bonferroni correction)

Table 7. One-way ANOVA of Parent-reported CHEXI in relation to CKTA Attention/Problem-solving

	1		2		3		F(2, 14)	η^2
	M	SD	M	SD	M	SD		
P_CHEXI WM	18.17	5.78	25.20	2.49	24.33	7.51	2.81	
P_CHEXI PL	6.17	1.60	11.00	2.55	9.33	2.08	7.63*	.58
P_CHEXI REG	13.17	3.13	19.40	3.44	18.00	5.29	4.18	
P_CHEXI INH	13.83	4.45	18.00	4.18	14.50	2.12	1.44	
P_CHEXI SUM	51.33	13.31	73.60	8.73	68.50	20.51	4.46	

Note. N = 14

*p < .01 (.05/5 using Bonferroni correction)

Table 8. Number of clusters and their item size

Clusters	n (%)
1	6 (35.3)
2	11 (64.7)

Note. N = 17

of the Planning score of CHEXI between the group with value 1 and the group with value 2 (Table 7).

EF tests and SES

A cluster analysis was conducted with the SES variables. The analysis was performed using a two-step cluster procedure, which suggested the distinction of two clusters based on the lowest value of the Bayesian information criterion (BIC = -23.82) (Table 8). We referred to Cluster 1 as the low SES group and Cluster 2 as the average SES group (Table 9).

CKTA and SES

According to an independent samples T-test, there was a significant difference in CKTA's Planning and Time according to socioeconomic status. The relationship between CKTA Time and SES had a strong effect size; however, the connection between CKTA Plan and SES showed a very small effect size. The group with low SES demonstrated a significantly higher score (poorer performance) and less time spent with the CKTA compared to the group with average SES (Table 10).

DISCUSSION

We estimated interrater reliability by Cohen's Kappa, which showed an excellent consistency. The internal consistency of the CKTA, as determined by Cronbach's alpha, was found to be moderate in our sample. These findings are consistent with the results of Berg and colleagues' (2012) and Rocke and colleagues' (2008) studies. Based on the good interrater reliability, the Administration and Scoring Guideline of CKTA was adequate to avoid rater bias in Hungarian. Regarding internal consistency, it is worth noting that the subscales of the CKTA are considered relatively short. Given that Cronbach's alpha is dependent on the number of items, shorter subscales may be able to achieve a lower alpha without decreasing reliability (Taber, 2018; Vaske et al., 2017). Furthermore, the test measures

five different subtypes of EFs simultaneously, encompassing a heterogeneous set of abilities, and this can also lead to a decreased alpha value (Berg et al., 2012). Therefore, a lower alpha value does not necessarily indicate poor reliability but rather reflects the nature of the measurement (Berg et al., 2012; Taber, 2018; Vaske et al., 2017).

Our results demonstrated a significant difference in cognitive flexibility, assessed by perseverative errors on the WCST, based on emotional liability observed during the CKTA. Children with higher emotional liability during the CKTA showed more perseverative errors on the WCST, indicating poorer cognitive flexibility, whereas children with stable emotions exhibited fewer perseverative errors and longer reaction times, suggesting more controlled processing. This pattern of findings can be interpreted through the lens of the hot and cool executive function framework (Zelazo & Carlson, 2012). According to this framework, the WCST primarily engages cool EF processes, while the CKTA may elicit hot EF demands due to its socially evaluative and intrinsically motivating nature (Blair & Ursache, 2011; Doebel, 2020; Doebel & Munakata, 2018). This association supports Pessoa's (2009) view that hot and cool EF components are interdependent rather than distinct systems, particularly in ecologically valid situations. Overall, the findings support the idea that EFs involve both cognitive and emotional processes and emotional regulation difficulties may negatively impact cognitive flexibility in ecologically valid contexts (Costa-López et al., 2023; Pessoa, 2009).

Our results demonstrated a strong positive association between Corsi span scores and better performance on the CKTA Working Memory and Initiation subscales, as well as a moderate positive association with the Attention/Problem-Solving subscale, suggesting that visuospatial working memory supports multiple aspects of real-life executive functioning. This indicates that higher visuospatial working memory capacity contributes not only to working memory in ecologically valid contexts but also to more effective task initiation, sustained attention, and problem-solving. These findings align with previous research demonstrating that traditional laboratory tasks, such as the Corsi test, correlate with ecologically valid measures when they assess the same cognitive construct (Chaytor & Schmitter-Edgecombe, 2003). Furthermore, this association supports the view that visuospatial working memory plays a critical role in maintaining

Table 9. Descriptive statistics of the clusters

	Average SES			Low SES			Predictor importance
	M	n (%)	SD	M	n (%)	SD	
Mother's educational level	high-level	6 (54.5)		low-level	6 (100)		1.00
Number of books	200-600	5 (45.5)		fewer than 10	6 (100)		0.85
Child's own book	yes	10 (90.9)		no	4 (66.7)		0.51
Child's own desk	yes	11 (100)		yes	4 (66.7)		0.37
Father's economic activity status	employed	11 (100)		employed	4 (66.7)		0.37
Father's educational level	medium-level	6 (54.5)		low-level	5 (83.5)		0.35
Number of earners	0.44 person		0.13	0.30 person		0.20	0.26
Number of rooms	0.66 room		0.21	0.54 room		0.10	0.18
Perceived financial status	average	6 (54.5)		average	5 (83.3)		0.13
Child's own room	yes	6 (54.5)		no	4 (66.7)		0.11
Mother's economic activity status	employed	9 (81.8)		employed	4 (66.7)		0.09

Note. N = 17. Number of earners = Number of people living in the household with income per person, Number of rooms = Number of rooms in the household per person

Table 10. Independent sample T-test results of CKTA regarding SES

	low SES		average SES		t(15)	p	Cohen's d
	M	SD	M	SD			
CKTA Sum	20.67	6.86	15.18	5.33	1.84	.086	
CKTA Plan	12.00	4.90	6.55	3.01	2.87*	.012	0.13
CKTA Time	13.27	2.48	16.39	2.60	-2.40*	.030	1.23

Note. N = 17

*p < .02 (.05/3 using Bonferroni correction)

goals and adapting to multistep tasks in everyday contexts (Chevignard et al., 2010; Logie, 2011).

The Planning subscale of the parent-reported CHEXI showed a strong positive correlation with the CKTA total score, indicating that children who performed better on the CKTA were perceived by their parents as having fewer planning difficulties in everyday life. This convergence suggests that ecologically valid performance-based tasks and parental reports capture similar aspects of children's executive functioning, supporting the ecological validity of both measures, in line with previous research (Conesa et al., 2023). Furthermore, these findings imply that planning difficulties are observable in naturalistic contexts and that parents serve as reliable informants of children's executive functioning in daily life.

Our findings revealed a significant difference in parent-reported CHEXI Planning scores based on CKTA Attention/Problem-Solving performance, with children demonstrating higher attention and problem-solving abilities on the CKTA being rated by parents as having fewer everyday planning difficulties than those with poorer CKTA performance. This suggests that planning difficulties are observable in real-life contexts and are closely linked to attention maintenance and problem-solving, as what parents report as planning problems may reflect underlying challenges in attention shifting and problem-solving. These findings further support the ecological validity of both the CKTA and CHEXI, as parent ratings and behavioral performance measures converge (Conesa et al., 2023). Overall, the observed associations

between the CKTA, standardized computerized EF tests, and questionnaires demonstrate convergent validity in our sample.

Our hypothesis that the Hungarian CKTA would show a stronger association with executive functions measured by the CHEXI questionnaire than with traditional EF tasks was not supported, as we found large effect sizes between the CKTA and the WCST, moderate-to-strong associations with the Corsi span, and a similarly strong association with parent-reported CHEXI scores. No relationship was observed between the CKTA and teacher-reported CHEXI, which may be due to parent bias or limited observation of children in autonomous, multi-step tasks, as well as the fact that CHEXI evaluates only four EF domains, while the CKTA captures additional components such as organization (Berg et al., 2012; Thorell & Nyberg, 2008). These findings may be explained by the fact that previous studies using cooking tasks were conducted primarily with clinical populations (Berg et al., 2012; Chevignard et al., 2010; Fogel et al., 2020), whereas in typically developing children, such tasks may not differentiate executive function performance as distinctly, resulting in patterns more similar to those observed with standardized tests. Additionally, the CHEXI's 2-factor model (Catale et al., 2015) was not tested in our sample, which may have influenced the observed associations.

The age of the children showed a strong negative correlation with CKTA completion time, indicating that older children completed the task faster than younger participants. However, overall CKTA performance was not significantly associated with age in our sample, likely due to the limited age variability, as our participants had a smaller age range ($SD = 0.79$) compared to the study on which our hypothesis was based ($SD = 1.52$; Berg et al., 2012). This restricted variability may have reduced the statistical power to detect age-related differences. Additionally, age alone may not accurately represent EF development, as factors such as anxiety or IQ can influence task performance (Best et al., 2011; Blair & Raver, 2012). It is also important to note that cooking experience did not affect CKTA performance, as this variable was controlled for.

There was a significant difference in CKTA Planning and Time scores based on SES, with the low-SES group showing poorer performance scores but completing the task faster than the average-SES group. Standard EF tests and questionnaires did not detect SES-related differences, suggesting that ecologically valid tasks such as the CKTA may be more sensitive to SES-

related variations in EF performance. This pattern may indicate that low-SES children are not less skilled in EF, but rather tend to prioritize speed over accuracy, potentially due to a preference for immediate rewards (Delgado et al., 2022). Consequently, their faster task completion may reflect performance style rather than underlying cognitive deficits.

Implications

The main implication of our research is that a novel measure has been adapted on a Hungarian sample, which measures EFs in a situation closer to real life, can be applied to children from low SES backgrounds, and may also be suitable for assessing SES differences in EFs. Parental feedback suggests that the difficulties captured by the tool are consistent with those observed in the home, supporting its real-life applicability. In addition, the task's ability to assess multiple domains of executive function may provide a basis for targeted interventions in both educational and clinical settings. To develop more effective interventions, we suggest further investigation into the mediating and moderating effects between SES and VF.

Strengths and limitations of the study

Strengths include: successful inclusion of children from low SES backgrounds using an engaging, ecologically valid measure (CKTA) suitable for diverse literacy levels, along with multi-informant (parent, teacher) and multi-method EF assessment, enhancing ecological and convergent validity, alongside the creation of the Hungarian adaptation of the CKTA.

Limitations include: a small sample size, reliance primarily on maternal reports, limited rater blinding with potential bias, and a cross-sectional design in which only convergent validity was assessed, restricting causal interpretation and highlighting the need for further validation and longitudinal research.

CONCLUSION

Our findings indicate that EFs measured in performance situations with higher ecological validity are correlated with both questionnaires with higher ecological validity and standard computer-based EF tasks. Furthermore, our results suggest that SES is related to children's EFs, especially when the EFs are measured using methods that are closer to everyday life. Our results have implications for interventions.

LIST OF ABBREVIATIONS

CHEXI – Childhood Executive Functioning Inventory

CKTA – Children's Kitchen Task Assessment

EF – executive function

SES – socioeconomic status

WCST – Wisconsin Card Sorting Task

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APPENDIX

The Hungarian translation of the Children's Kitchen Task Assessment

Gyermek Konyha Feladat (CKTA)

A feladat előkészítése:

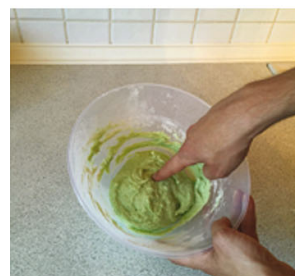
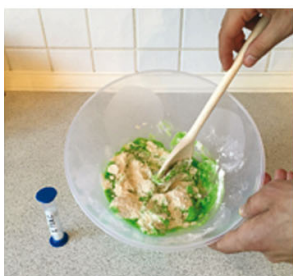
Az utasításokat kártyákra írjuk, mindegyiket egy-egy fotó kíséri.

Írja ezt a mondatot egy kártyára: **Mérj ki 1 pohár lisztet!**

Kérdezze meg a gyermektől, hogy el tudja-e olvasni ezt a mondatot, továbbá kérdezze meg, hogy mit csinálna akkor, amikor ezt olvassa.

A feladat utasításai, melyek a receptkönyvbe kerülnek:

1. Mérj ki 1 pohár lisztet!
2. Tedd bele a lisztet a tálba!
3. Mérj ki $\frac{1}{4}$ pohár sót!
4. Tedd bele a sót a tálba!
5. Mérj ki 1 és fél teáskanálnyi citromsavat!
6. Tedd bele a citromsavat a tálba!
7. Mérj ki 1 és fél teáskanálnyi olajat!
8. Öntsd bele az olajat a tálba!
9. Keverd össze egy kanállal!
10. Mérj ki fél pohár vizet
ÁLLJ!
Ne öntsd bele a vizet a tálba!
11. Önts 3 csepp ételfestéket a vízbe!
Ne öntsd bele a vizet a tálba!
12. Tedd a vizet a mikróba 1 percre!
13. Öntsd bele a vizet a tálba!
LÉGY ÓVATOS!
A VÍZ FORRÓ!
14. Kevergesd 1 percig!
15. **Használd a homokórát!**
16. Hagyd 1 percig állni a gyurmát!
Használd a homokórát!
17. Győződj meg róla, hogy a gyurmához biztonságosan hozzá lehet érni!
18. Gyúrd össze a gyurmát a kezeddal!
Csinálj belőle egy labdát!
19. Tedd a labdát egy zacskóba!
Készen vagy!
Ügyes voltál!

Fényképek, melyek az utasítások mellé a receptkönyvbe kerülnek:

Gyermek Konyha Teszt – Előteszt

Dátum: _____

„A” Rész

Résztevő kódja: _____ Vizsgálatvezető monogramja: _____

FORGATÓKÖNYV

(Olvassa fel hangosan a dőlt betűs szöveget)

„A tevékenység során arra foglak kérni, hogy te magad csinálj gyurmát egy recept alapján. Mielőtt elkezdjük, lenne egy pár kérdésem. A legjobb tudásod szerint válaszold meg őket.”

1. [Mutasson meg egy kártyát, ami a recept egy lépését írja le]

a) *Fel tudnád ezt olvasni nekem?*

__Igen __Nem Megjegyzések: _____

b) *Hogyan hajtanád végre ezt az utasítást?* _____

2. Szoktál főzni? __Igen __Nem

Ha igen, hogyan?

0 - Egyedül

1 - Valaki megmondja mit csináljak főzés közben

2 - Együtt szoktam főzni valakivel

3 - Nem tudok

Mit szoktál főzni? _____

Ha nem: Miért nem? _____3. *Használtál már valaha mikró (mikrohullámú sütőt)?*

__Igen __Nem Megjegyzések: _____

4. *Csináltál már valaha gyurmát?*

__Igen __Nem Megjegyzések: _____

5. *Szerinted mennyi segítségre lesz szükség a gyurma elkészítéséhez?*

0 - Semennyire 1 - Egy kis segítségre 2 - Valamennyi segítségre 3 - Sok segítségre

Gyermek Konyha Teszt

Dátum: _____

„B” Rész

Résztevő kódja: _____ Vizsgálatvezető monogramja: _____

A feladat kezdete:

„Ahogy már korábban is említettem, azt szeretném, ha magadtól, egyedül készítenéd el a gyurmát. Ezért most nem fogok sokat beszélgetni veled. Ha valami gondod van, próbáld magadtól megoldani. Kövesd a receptkönyv utasításait [Mutasson a receptkönyvre]. A gyurma elkészítéséhez szükséges kellékek és hozzávalók a dobozban vannak [Mutasson rá a dobozra]. Víz a csapból tudsz engedni, a mikró pedig a pulton van. [Mutasson rá a vízcsapra és a mikróra]. Van bármilyen kérdésed? Ha készen állsz, kezdheted is!”

** Kezdje el mérni az időt közvetlenül azután, ahogy azt mondja: *„Ha készen állsz, kezdheted is!”***

Vizsgálatvezető, kérjük vegye figyelembe: A 7. lépésben, amely úgy szól „*keverd össze az összes hozzávalót*”, Önnek kell szemrevételezéssel megállapítania a gyurma állagát, hogy megbizonyosodjon a végeredmény minőségéről. Figyelje a gyermeket a keverésnél, ha a gyurma túl nedves vagy leveses, adjon hozzá lisztet, amíg el nem éri a megfelelő állagot. Előfordulhat, hogy a gyermek túl kevés lisztet vagy túl sok vizet adott hozzá, ezért Önnek kell korrigálnia. Csak mondja azt, hogy „*hozzáadok egy kis lisztet a gyurmához*”. Ezt aközben tegye, miközben a gyermek kever... Ne szidja ezért le a gyermeket.

Gyermek Konyha Teszt - Gyurma Értékelőlap Dátum: _____

„B” Rész

Résztevő kódja: _____ Vizsgálatvezető monogramja: _____

Összes igényelt segítség száma: _____ Idő: _____ Összpontszám: _____

Igényelt segítség legmagasabb foka: _____ Szervezettségi pontszám: _____

Gyermek Konyha Teszt – Utóteszt Dátum: _____

„C” Rész

Résztevő kódja: _____ Vizsgálatvezető monogramja: _____

Kérdezze meg a következőket a résztvevőtől:

1. *Mennyi segítségre volt szükséged a gyurma elkészítéséhez?*
0 - Semennyire 1- Egy kis segítségre 2 - Valamennyi segítségre 3 - Sok segítségre
2. *Szerinted mennyire sikerült jól megcsinálni a gyurmát?*
__Rosszul __Egész jól __Jól __Tökéletesen
3. *Mit gondolsz, van olyan dolog, amit máshogy kellett volna csinálni?*
__Nem __Igen
El tudnád mondani kérlek, hogy mit? _____

„Köszönöm szépen, hogy részt vettél, nagyra értékelem az időt és a munkát, amit beletettél a feladatba! Haza-viheted a gyurmát, ha szeretnéd. Van bármilyen kérdésed? Köszönöm még egyszer, hogy részt vettél.

A feladatvégzés nyomon követése:

1. Érzelmi kiszámíthatóság:
 - a) A résztvevő érzelmei nem változtak a feladatvégzés közben.
 - b) A résztvevő ideges lett a feladat során, de ez nem befolyásolta a feladatvégzést.
 - c) A résztvevő ideges vagy frusztrált lett a feladat során és ez hatással volt a feladatvégzésre.
 - d) A résztvevőnek érzelmi kitörése volt a feladat során, és nem tudta befejezni a feladatot.
2. Figyelem/Problémamegoldás:
 - a) A résztvevő képes volt a feladat közbeni figyelmi váltásra, problémamegoldásra, és rugalmasan tudott váltani a feladat során. Képes volt hatékonyan elvégezni a feladatot.
 - b) A résztvevőnek nehezebbre esett a feladat közbeni figyelmi váltás, rugalmatlanul váltott és/vagy nehézsége adódott a problémamegoldással, de ez nem befolyásolta a feladat elvégzésére való képességét.
 - c) A résztvevőnek nehézségei voltak a figyelmi váltással, a problémamegoldással és/vagy rugalmatlan volt a váltások során. A résztvevő nem volt hatékony a feladat végrehajtásában.
 - d) A résztvevőnek nehézségei voltak a figyelem módosításával, a problémamegoldással, és rugalmatlan volt a váltások során. A résztvevő nem tudta végrehajtani a feladatot.

3. Hatékonyság/Monitorozás:
 - a) A résztvevő gondosan dolgozott. Nem rohant végig a feladaton, hogy hamarabb befejezze. A résztvevő kijavította esetleges hibáit.
 - b) A résztvevő gyorsan dolgozott. Nem ellenőrizte vagy javította ki a hibáit. Ennek ellenére is sikerült teljesítenie a feladatot.
 - c) A résztvevő gyorsan és hanyagul dolgozott. Nem ellenőrizte a mértékeket vagy a receptet. A résztvevő nem javította ki a hibáit. Ez befolyásolta a résztvevő képességét, hogy hatékonyan elvégezze a feladatot.
 - d) A résztvevő gyorsan és hanyagul dolgozott. Nem javította ki a hibáit, amelyeket a gyurma készítése közben vétett. A résztvevő nem tudta sikeresen teljesíteni a feladatot.
4. Munkamemória
 - a) A résztvevő képes volt megjegyezni a hozzávalókat, nem kellett folyamatosan ellenőriznie a receptet. A recept lépéseit tudta követni. Sikerült teljesítenie a feladatot.
 - b) A résztvevőnek nehezebbre esett a recept lépéseire emlékezni. Több alkalommal is újra bele kellett pillantania a receptbe. A résztvevő így is sikeresen teljesítette a feladatot.
 - c) A résztvevő számára nehézséget okozott a feladat teljesítéséhez szükséges információk megjegyzése. Számos alkalommal ellenőriznie kellett az információkat. A résztvevő nem teljesítette hatékonyan a feladatot.
 - d) A résztvevő képtelen volt a feladat elvégzéséhez szükséges információk megjegyzésére. Újra és újra kellett ellenőriznie a receptet több alkalommal. Elfelejtette, hogy melyik lépésnél tart. Nem tudta elvégezni a feladatot.

Kiegészítő megjegyzések: _____

Gyermek Konyha Teszt

Szervezettség pontozása

- 1 = magasan szervezett: az egyes hozzávalók kimérése után becsukja a tárolókat, visszateszi a tárolókat a nagy tároló dobozba, előre elolvassa a receptet, hogy előre tudja, mire lesz szüksége, rendezetten és tisztán tartja a munkaterületét, rendrakásra használja a kettő 1 perces mérési szünetet, az összes anyagot alaposan átnézi, a leghatékonyabb eszközöket használja
- 2 = beszél magában, a hozzávalók dobozait a munkaterület szélére rakja, amikor már nem kellene, de nem zárja vissza a fedelüket, összezavarodik és mindkét mérőedényt teletölti liszttel vagy az egyik edényből a másikba önti a lisztet, mielőtt a tálba tenné
- 3 = a szervezett és szervezetlen keveréke: a szervezetlenség nem akadályozza jelentősen a munkavégzést, nyitva hagyja a dobozokat, de körülöttük dolgozik, zsúfolt a munkaterülete, de ennek ellenére el tudja végezni a feladatot
- 4 = a munkaterület szervezetlen: az alany a munkafolyamat során átnyúl a nyitott tárolókon vagy a nagy tároló dobozon, átlép a földre helyezett nagy tárolódoboz felett, megbotlik a mikro kábelében, használat után nyitva hagyja a mikrot, az anyagokat felhalmozva elárasztja a teljes munkafelületet (vagy talál egy másik felületet, ahol dolgozhat), azt mondja, magában fog számolni vagy hogy tudja, mikor jár le az egy perc, kiönti az olajat, azt a benyomást kelti, hogy csak végigrohan a feladaton, mindent egyszerre távolít el, teáskanállal keveri össze a száraz hozzávalókat, nem találja az elemeket a nagy tárolódobozban, kihagy egy receptoldalt, ha túl sokat tölt az olajból vagy a sóból, megpróbálja visszaönteni a tárolóba, a recept közepénél kezdet mos, a feladat teljesítése helyett a tésztával játszik, széket keres, hogy leülhessen, a recepttel a padlón kezd el foglalkozni, ahol a nagy tárolódoboz van, a receptet rossz oldalon nyitja ki, de megtalálja a helyes oldalt, nehezen találja meg a homokórát a dobozban
- 5 = gyenge szervezőképesség: szüksége van a vizsgálatvezető fizikai segítségére, a vizsgálatvezetőnek meg kell igazítani a tárgyakat a biztonság érdekében (tál az asztal szélén), az alany a nyitott lisztesdoboz felett önti az olajat, becsukja a receptkönyvet minden egyes oldal elolvasása után, elveszíti az eszközöket a lisztárolóban, az elemek leesnek az asztról, fejjel lefelé fordítja a lisztárolót a liszt kiméréséhez

A Gyermek Konyha Teszt – mint ökológiailag érvényes végrehajtó funkciókat mérő eszköz - adaptálása különböző szocioökonómiai státuszú kisiskolások körében

Célkitűzés: A kutatás célja a Gyermek Konyha Teszt hazai adaptálása volt magyar kisiskolások körében. Vizsgáltuk továbbá a Gyermek Konyha Teszt, egy ökológiai érvényességet mutató kérdőív és standard végrehajtó funkciókat mérő feladatok kapcsolatát a szocioökonómiai státusz tükrében. **Módszer:** A vizsgálatban 17, 8–12 éves gyermek vett részt. Közülük 11-en mélyszegénységben élő településen, hatan városi környezetben éltek. A gyerekek elvégezték a Gyermek Konyha Tesztet, valamint több standard számítógépes végrehajtó funkciókat mérő feladatot (Go/No-Go, Corsi terjedelem, Wisconsin Kártyaszortírozási Feladat). Emellett 14 szülő és 13 pedagógus töltötte ki a gyerekekre nézve a Gyermekkori Végrehajtó Funkció Kérdőívet. **Eredmények:** A Gyermek Konyha Teszt interrater reliabilitása ($\kappa = .81$) és belső konzisztenciája ($\alpha = .68$) megfelelőnek mutatkozott. A Gyermek Konyha Teszt eredménye összefüggést mutatott mind a standard számítógépes végrehajtó funkciókat mérő feladatokkal, mind az ökológiailag érvényes kérdőívvel. Az alacsony szocioökonómiai státuszú gyerekek gyengébben teljesítettek a Konyha Teszten ($t(15) = 2.87, p < .02, d = 0.13$), azonban rövidebb idő alatt végeztek a feladattal, mint átlagos szocioökonómiai háttérrel rendelkező társaik ($t(15) = -2.4, p < .02, d = 1.23$). **Következtetések:** Eredményeink alapján a magasabb ökológiai érvényességű helyzetekben mért végrehajtó funkciók összefüggenek más végrehajtó funkciókat mérő eljárásokkal. Továbbá eredményeink arra utalnak, hogy a szocioökonómiai státusz kapcsolatban áll a gyermekek végrehajtó funkcióival, különösen akkor, ha azokat a mindennapi élethez közelebb álló helyzetekben mérjük. Eredményeink gyakorlati implikációkkal rendelkeznek.

Kulcsszavak: végrehajtó funkciók, Gyermek Konyha Teszt, ökológiai érvényesség, szocioökonómiai státusz