

# הרשות למחקר ולהערכה והמרכז לקידום ההוראה



## סימפוזיון אקונוירוביולוגיה והתפתחות המוח בהקשרי למידה בקרב תלמידים

יושבת ראש הסימפוזיון: ד"ר ראניה חוסין פראג'

משך הסימפוזיון: 90 דקות

### מבנה הסימפוזיון

הסימפוזיון מורכב מארבע הרצאות העוסקות בגורמים הסביבתיים המעורבים בהתפתחות המוח בהקשרי למידה בקרב תלמידים. אלה הן ההרצאות:

1. ההשפעה של העדפת המזון על הביצועים הקוגניטיביים של ילדי הגן
2. השפעות הליכה ללא מאמץ והליכה עם מאמץ על היכולת הקוגניטיבית של ילדים בבית הספר היסודי
3. השפעת משחקי מחשב על יכולות קוגניטיביות של תלמידים

הרצאה ראשונה

### ההשפעה של העדפת המזון על הביצועים הקוגניטיביים של ילדי הגן

## The effect of food preference on cognitive performance among kindergarten children

מר ניבאל ג'דעון, מר ריהאם מנסור, ד"ר ראניה חוסין פראג, גב' שיר שאנס, גב' ספיר כהן, ד"ר ראיד מועלם

קבוצת המחקר של אקונוירוביולוגיה, מכללת אורנים

This study investigates the dietary impact on cognitive and social development among 68 kindergarten-aged children from two Arab communities, focusing on traditional versus processed foods during their "10 AM meal." The research unfolds in three parts: evaluating memory and concentration 90 minutes post-meal using computerized tasks; observing behavioral changes non-participatively; and measuring neural activity through QEEG, with each child serving as their own control.

Findings indicate that children took an average of 125.69 seconds to complete memory tasks after consuming processed foods, such as chocolate. However, this time was reduced by 28.3% following the intake of olive oil-rich traditional foods. Even more, switching from processed

sausage to traditional Labneh led to a 42.8% decrease in completion time, marking a significant enhancement in memory.

Concentration was assessed through an 8-piece puzzle game, with traditional, olive oil-based breakfasts improving performance by 30%. Replacing processed sausage with Labneh resulted in a 23.5% faster completion time, underlining the benefits of traditional diets on focus. Overall, traditional meals cut down the time needed for cognitive tasks by 35.9% for memory and 35.4% for puzzles compared to processed foods.

Social competence, evaluated via scores from behavioral statements, improved by 46.12% in children consuming traditional foods, demonstrating better communication and instruction adherence.

QEEG analysis revealed substantial increases in alpha and gamma brain wave activity after traditional food consumption, pointing to enhanced mood, cognitive processing, and learning capabilities, essential for academic engagement.

In conclusion, the study highlights the negative effects of processed foods on brain wave strength and cognitive functions, promoting the vital role of a traditional diet in fostering brain development and cognitive flexibility. Emphasizing parental education on the cognitive benefits of traditional foods and engaging children in meal preparation is crucial for their educational and social advancement.

**Keywords:** Nutrition; Cognition; Gut-brain axis; Early childhood

הרצאה שנייה

**השפעת הליכה ללא מאמץ והליכה עם מאמץ על הביצועים האקדמיים של תלמידים  
בבית הספר היסודי**

## **The Impact of Effortless Walking and Walking with Effort on the Academic Performance of Elementary School Students**

**גב' שירין רוסתום, ד"ר ראניה חוסין פראג, גב' שיר שאנס, ד"ר ראיד מועלם**

קבוצת המחקר של אקורניורוביולוגיה, מכללת אורנים

This study investigates the influence of effortless walking versus strenuous exercise on academic achievement of schoolchildren. A questionnaire and tests based on Bloom's taxonomy were used to assess concentration, recall, knowledge, understanding, analysis, application, and evaluation in 50 schoolchildren (26 male, aged 9-10 years) who underwent 10 minutes of easy walking outside, 30 minutes of strenuous sporting activity, and no intervention at all on three separate occasions over two weeks. The data show that the level of concentration at rest was  $16.33 \pm 1.64$  (scores out of 20). This climbed by 255% after easy walking. Strenuous exercise had no significant effect on focus, although it did reduce concentration considerably (57.6%) when compared to effortless walking. The recorded value of recall or memory at rest was  $5.96 \pm 0.82$ . This increased by 54.3% after easy walking and reduced memory by 34.3% when compared to effortless walking. The baseline knowledge score at rest was  $16.66 \pm 1.07$ . This rose by 28.6% after ten minutes of easy walking. After 30 minutes of strenuous activity, there was no significant change in knowledge score compared to the resting score.

The understanding score recorded at rest was  $10.00 \pm 2.96$ , and it improved by 42% after 10 minutes of effortless walking. Strenuous exercise did reduce scores considerably by 25.3% when compared to effortless walking.

The application of knowledge score increased by 33% as a result of effortless walking. Strenuous exercise led to a decrease by 21.1% when compared to effortless walking. The analytical skill scores increased by 66% after effortless walking. The evaluation skill score at rest was  $10.60 \pm 0.91$ . These scores rose by 44.3% after effortless walking. Strenuous exercise led to a decrease by 35.4% when compared to effortless walking.

The study concludes that integrating simple, cost-effective physical activities like walking during school hours can significantly boost learning, aligning with evidence that educational success is closely linked to health and social advancement. The findings advocate for the inclusion of such activities during the school day to promote better academic outcomes.

**Keywords:** education; effortless walking; strenuous exercise; cognition; memory

הרצאה שלישית

## השפעת משחקי מחשב על יכולות קוגניטיביות של תלמידים

### The Impact of Computer Games on Cognitive Performance in pupils

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קבוצת המחקר של אקדמיית רובינולוגיה, מכללת אורנים

This research explored how varying the types of video games played by adolescents impacts their cognitive functions, specifically their attention, memory, and higher-order problem-solving skills. The cohort consisted of 63 individuals aged 12 to 13 years. To evaluate attention, the "source and imitation" game was utilized; memory was assessed through the "Simon-flashing detection" game; and complex mathematical tasks were used to appraise problem-solving abilities.

The outcomes revealed that a brief 15-minute engagement with the game Fortnite led to a marked enhancement of about 43.4% in concentration levels. Similarly, a session of Solitaire boosted memory performance by 74%. Additionally, the research delved into advanced learning aptitudes in mathematics, with a special focus on analytical prowess and mathematical discernment. Results indicated that the time taken to resolve mathematical problems post-Fortnite play diminished by 41.5% following a Solitaire session, suggesting an increased proficiency in tackling complex mathematical issues.

The findings underscore a significant amelioration in cognitive capacities when adolescents played intellectually demanding games as opposed to those with violent content. The data implies that participation in cognitively challenging games substantially augments cognitive functions. The observed leap in the efficiency of solving intricate mathematical problems could be ascribed to the fortified memory and attention faculties in children who engaged in mentally stimulating games. Consequently, the study advocates for a recalibration of adolescents' gaming habits: decreasing the time spent on violent games and promoting intellectually enriching and challenging gaming experiences to foster a more beneficial impact on cognitive development.

**Keywords:** cognitive abilities; Computer games; concentration; memory