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The importance of using board games for neurolearning

Juliane Tatiane Pereira Pimentel[1], Isis Akemi Katayama[2]

[1]Ludens Spirit, Santo André/SP, Brasil.
[2]Faculdade de Medicina, Universidade de São Paulo, São Paulo/SP, Brasil.

ABSTRACT

OBJECTIVE

To analyze the use of modern board games not only as a resource to work on socio-emotional skills, but also to improve learning performance.

METHOD

This is an integrative literature review, carried out through research at Scielo, Scholar Google, PubMed databases, and Virtual Health Library with articles published from 2014 to 2021. The descriptors were board games, learning and neurolearning. The evidence found was analyzed following the identification, selection, eligibility and inclusion path.

RESULTS

Thirty-eight publications were located, and only 7 met the inclusion criteria for this study. It was noted that most of the articles deal with the importance of games in the learning context. One study described the relevance of board games for aspects related to neurolearning only.

CONCLUSION

Board games have been used as an important learning tool for individuals of different ages seeking to work on different skills.

KEYWORDS

Board games; Learning; Neurolearning.

Corresponding author:
Isis Akemi Katayama
Faculdade de Medicina, Universidade de São Paulo, São Paulo/SP
Av. Dr. Arnaldo, 455 - Cerqueira César, Pacaembu - SP, 01246-903.
E-mail: isis_katayama@hotmail.com.
ORCID ID: https://orcid.org/0000-0002-9336-6583

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INTRODUCTION

Games have been present in human life since ancient times and serve a variety of functions. A game is understood as any activity aimed at competition, entertainment, or amusement, either in a group or individually, and may be associated with play. Games also allow participants to demonstrate skill, dexterity, or ingenuity. These concepts are often associated with children; however, nowadays, adults and adolescents also seek this tool as a means of distraction, socialization, and escape from reality.[1]

There are various types of games that can be played using different materials and rules. Notable examples include card games, such as numerical decks with diverse mechanics; imagination games, such as role-playing activities developed by children from an early age; sports games, which require balls and similar resources; and board games, such as the classic chess, mancala, and monopoly. Board games have undergone transformations over the years, evolving beyond traditional mechanics, such as harvest-themed games, to incorporate themes aligned with civilizational progress[2].

Board games allow participants to experience small-scale realities through problem-solving situations that hypothetically simulate everyday life challenges. These games encourage players to analyze their actions, reassess their decisions, and critically evaluate their strategies[3].

From a neurolearning perspective, games integrate cognitive, emotional, and social aspects to foster effective learning. Thus, the way individuals learn is not solely dependent on neural circuits and connections but also on how experiences are structured. Positive learning experiences tend to yield superior results[4].

Cognitive neuroscience aims to understand and explain the relationships between the brain, mental activities related to cognition, and human behavior. This young subdivision of neuroscience investigates the connection between neurological functioning and psychological activity, focusing on behavioral analysis as the final manifestation of central nervous system activity. It explores complex cognitive processes that facilitate learning and how they occur[5].

Studies in this field are closely related to neuroplasticity, which is the brain's ability to reprogram and reorganize itself to compensate for injuries and dysfunctions, both anatomically and functionally[6].

For a healthy and functional regulation of emotional and cognitive abilities, executive functions play a crucial role. These functions coordinate daily activities and integrate the neurofunctional spectrum of learning[6].

Efficient executive functioning is essential for human performance. Like a conductor managing an orchestra, it oversees all cognitive and behavioral resources to plan and regulate goal-oriented actions, including reasoning, logic, decision-making strategies, and problem-solving, both in cognitive and socioemotional contexts[7].

Executive functions directly influence emotional regulation and coordinate key cognitive skills essential for learning, such as working memory, inhibitory control, attentional regulation, and cognitive flexibility[6].

Recognizing that learning involves the social, emotional, and cognitive triad, it becomes clear how games can facilitate this process. According to Macedo (1992)[8], games create privileged situations in affective, social, and cognitive dimensions. In the affective domain, games foster self-regulation concerning competitiveness, goal achievement, frustration management, and delayed gratification. Socially, games involve interaction with others, requiring communication through spoken language or symbolic codes and adherence to predefined rules. Cognitively, games enable continuous development of new and improved methods for understanding contexts, identifying mistakes, and devising strategies to overcome obstacles, thereby fostering self-awareness and strategic planning in the short, medium, and long term.

Thus, this study aimed to analyze the use of modern board games not only as a tool for socioemotional skill development but also as a means to enhance learning outcomes.

METHODS

This study is an integrative literature review. Research was conducted in databases such as SciELO, Google Scholar, PubMed, and the Virtual Health Library, analyzing articles published between 2014 and 2021. The search descriptors included "board games" "neurolearning", and "learning". The inclusion criteria encompassed articles that aligned with the study objectives, were available in full text, and were published within the last seven years. Exclusion criteria included incomplete articles and those whose titles and abstracts did not align with the study's thematic focus.

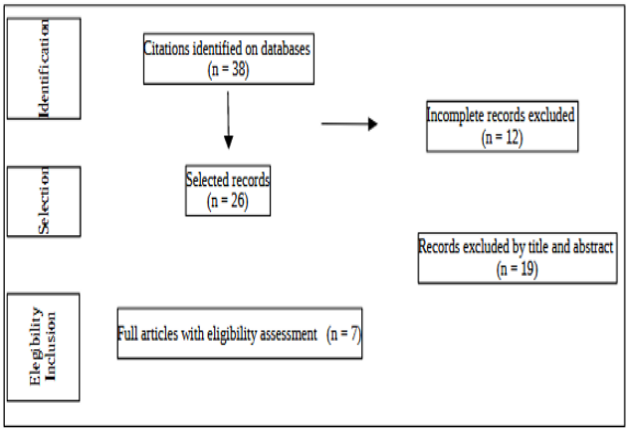
The evidence was analyzed using the following steps: 1. Identification; 2. Selection; 3. Eligibility; and 4. Inclusion. In the identification phase, full articles were retrieved from databases. In the selection phase, titles and abstracts were evaluated, and unrelated articles were excluded. In the eligibility and inclusion phase, full-text studies relevant to the research were selected.

The selected articles were organized into a table containing the following information: author names, references to board games, learning, and neurolearning.

RESULTS

In the identification phase, 38 publications were found, with 26 being full-text articles. During selection, 19 of the 26 articles were excluded based on their titles and abstracts, leaving 7 articles included in the final eligibility and inclusion phase. Figure 1 illustrates the review stages:

Figure 1 - Stages of selection of scientific articles



Source: (Authors, 2024)

Table 1. Details the findings from the selected articles:

Table 1 - Results of searches conducted based on the descriptors

AUTHORS	BOARD GAMES	LEARNING	NEUROLEARNING
Moraes and Maluff[9]	-	For the authors, learning is the response to an experience. Whenever new information reaches the central nervous system, the need for adaptation generates some lasting change in behavior.	It is the central nervous system that enables learning and its development from the third week of gestation.
Pellizzetti and Souza[10]	The use of games, play, and toys are important tools for teaching prerequisites for reading and writing behavior. They have naturally reinforcing consequences and little to no aversive consequences.	The authors highlight parental involvement—interactions and verbal encouragement—in their children's academic learning as a positive effect.	-
Olympio and Alvim[11]	It highlights the use of games as an integrating resource that fosters an atmosphere of engagement, relaxation, and bond formation. It becomes a facilitating tool, providing dialogue in a playful manner and encouraging a critical and reflective attitude among participants.	Cognitive changes and deficits during aging can lead to functional decline in the elderly. Due to difficulties in storing information and retrieving memories, engaging in activities that promote body movement and memory activation in a playful manner is necessary for socialization and learning.	-
Fernandes *et al.*[12]	Although playful games aim to have winners, in educational games, even with losers, the expectation is to spark interest and motivation to participate, providing a stimulating and challenging experience. It offers fun and immediate feedback.	Currently, adult learning occurs through strong, interactive, and innovative stimuli, where individuals take responsibility for their learning and integrate their own knowledge.	-
Barrera[13]	A game is characterized as a system of pre-existing rules, known and accepted by the participants, with a purpose that may involve overcoming a problem situation or opponents. Games provide opportunities for learning knowledge, strategies, and attitudes.	Self-regulation and reflection (awareness) are placed as the foundation of learning. Learning difficulties arise from psychological characteristics such as emotional and/or behavioral problems.	-
Petty, Souza and Monteiro[14]	The game allows the player to become aware of their actions and their outcomes, modifying what they consider insufficient, enabling a self-assessment of the results obtained (whether positive or negative).	Self-regulation and reflection (awareness) are placed as the foundation of learning.	-
Prado[2]	In the game, objectives, means, and outcomes are inseparable, allowing the child to learn from themselves and from the objects and people involved, within a motivating and challenging environment. Amidst the game, the individual must deal with conflicts and organize themselves through dialogues and arguments.	Learning is the process through which knowledge, values, skills, and competencies are acquired or modified as a result of study, experience, training, reasoning, and observation.	-

Source: (Authors, 2024)

DISCUSSION

Among the selected articles, only Moraes and Maluf (2015)[9] directly connect neurolearning with other descriptors, emphasizing the central nervous system's role in facilitating learning from the third gestational week. This underscores the need for further exploration of these topics.

Olympio and Alvim (2018)[11] highlight that aging can lead to cognitive deficits, and activities involving motor coordination and memory stimulation are essential for both learning and socialization. Their findings suggest that implementing such methodologies benefits elderly populations by fostering social interaction and knowledge-sharing through engaging activities.

This study sought to relate board games, learning, and neurolearning. The literature analysis revealed limited studies directly linking these descriptors. However, all authors examined agree that board games constitute valuable and challenging tools for learning, relationship-building, and self-evaluation.

In general, the literature presents few experiences regarding modern games, with variable perspectives on the competencies explored. Pellizetti and Souza (2014)[10] suggest that games possess reinforcing properties and entail minimal adverse consequences, even when players face challenges or setbacks.

Olympio and Alvim (2018)[11] and Fernandes *et al.* (2016)[12] emphasize board games as resources that promote bonding, relaxation, dialogue, engagement, and motivation. They also highlight that games offer immediate feedback, which is significant for mediators.

Barrera (2020)[13] discusses predefined rules and problem-solving scenarios, emphasizing that games create optimal conditions for acquiring new knowledge, strategies, and attitudes. The possibility of implementing rule modifications is also considered, provided that such changes do not disrupt gameplay dynamics.

Petty *et al.* (2019)[14] and Prado (2018)[2] explore players' self-awareness regarding their actions and outcomes, considering games as environments that foster personal reflection, decision-making skills, and conflict resolution.

Regarding learning, Moraes and Maluf (2015)[9] and Prado (2018)[2] argue that it results from lived experiences, behavioral adaptations, and central nervous system modifications. Prado (2018)[2] further highlights study and observation as integral to acquiring knowledge, values, skills, and competencies.

Parental involvement in children's learning is emphasized by Pellizzetti and Souza (2014)[10], who found that mothers' participation positively impacted academic performance, potentially reducing the number of interventions needed to enhance reading and writing skills.

Fernandes *et al.* (2015)[12], Barrera (2020)[13], and Petty *et al.* (2019)[14] regard autonomy and self-regulation as key pillars of learning. They advocate for challenging stimuli that encourage learners to take responsibility for their progress and self-awareness in their educational journey.

CONCLUSION

Although board games remain underutilized as an educational resource, the reviewed articles demonstrate their potential as effective tools for cognitive, emotional, and social stimulation across childhood, adulthood, and aging. In children, games can enhance literacy skills. For adults, they serve as motivating and challenging resources for skill development.

Among the elderly, games facilitate motor stimulation and socialization, yielding positive outcomes. A significant limitation of this study was the lack of specific literature linking neurolearning with board game-based learning methodologies.

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