TYPE Review Articles
DOI 10.53905/Activein.v1i02.14

INSPIRETECH GLOBAL INSIGHT
IGI Active Living and Health Insight

OPEN ACCESS

EDITED BY
Assoc. Prof. Dr. Ahmad Yani
Universitas Islam Riau, Indonesia.

Toward a Sports-Based Behavior Contract Model for ADHD Management in Inclusive Schools: Evidence from a Systematic Literature Review

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CITATION APA STYLE 7
Firmansyah, R., Wulandari, P. L., Safrina, S., Musaqina, I., & Hutagalung, A. E. (2026). Toward a Sports-Based Behavior Contract Model for ADHD Management in Inclusive Schools: Evidence from a Systematic Literature Review. *IGI Active Living and Health Insight*, 1(02), 110-106. https://doi.org/10.53905/Activein.v1i02.14

ABSTRACT

Purpose of the study: This systematic literature review aimed to synthesize the existing evidence on the effectiveness of integrating behavior contracts and adaptive physical activity as complementary interventions for managing Attention Deficit Hyperactivity Disorder (ADHD) in inclusive school settings. The review also sought to identify research gaps and establish a conceptual foundation for developing a sports-based behavior contract model.

Materials and methods: A Systematic Literature Review (SLR) was conducted following the PRISMA 2020 guidelines. Literature was retrieved from Google Scholar, Garuda, and the Directory of Open Access Journals (DOAJ) using predefined keywords related to behavior contracts, adaptive physical activity, ADHD, hyperactivity, and inclusive education. Studies published between 2016 and 2026 in English or Indonesian were screened based on predefined inclusion and exclusion criteria. Following the identification, screening, eligibility, and quality assessment processes, thirteen studies were included in the thematic synthesis.

Results: The findings demonstrate that behavior contracts consistently enhance students' behavioral commitment, self-regulation, and adherence to targeted behaviors through structured reinforcement mechanisms. Meanwhile, adaptive physical activities—including swimming, martial arts, gymnastics, and motor-based games—effectively reduce hyperactivity, improve attentional control, and promote executive functioning among children with ADHD. However, no reviewed study empirically integrated these two evidence-based approaches into a unified intervention framework. This gap highlights the potential of combining structured physical activity with behavior contracts to simultaneously strengthen behavioral regulation and channel excess motor activity within inclusive educational environments.

Conclusions: Current evidence supports the complementary effectiveness of behavior contracts and adaptive physical activity for ADHD intervention; nevertheless, their integration remains underexplored. The proposed sports-based behavior contract model represents a promising conceptual framework that warrants future empirical validation through experimental and longitudinal studies in inclusive schools.

Keywords
ADHD; adaptive physical activity; behavior contract; executive function; inclusive education; systematic literature review.

INTRODUCTION

Inclusive schools in Indonesia are increasingly accepting students with attention deficit hyperactivity disorder (ADHD), better known internationally as Attention Deficit Hyperactivity Disorder (ADHD) (Minsih et al., 2025, p. 563; Ramadani & Mahabbati, 2025). The main characteristics of children with this condition include difficulty concentrating, an uncontrollable urge to move, and high impulsivity, as confirmed in clinical studies of ADHD characteristics according to the DSM-V (Chanet & Utami, 2021). This condition presents unique challenges for classroom teachers in inclusive schools, who must manage the diversity of learning needs while maintaining a conducive classroom climate for all students, including children with special needs. Case studies in inclusive early childhood education settings even show that managing hyperactive behavior requires structured planning involving the principal, therapists, support teachers, and parents in a coordinated manner (Ernawati & Diana, 2025).

One approach that has long been used in behaviorist guidance and counseling to change maladaptive behavior is the behavior contract technique. This technique is a written agreement between the counselor (or teacher) and the client regarding the target behavior to be changed, along with consequences or reinforcement that have been mutually agreed upon in an open and fair manner (Marisa et al., 2020). The basic principles include providing immediate reinforcement, clarity of the target behavior along with its frequency and duration, and integration of the contract with the overall school program. The effectiveness of this technique has been demonstrated in various contexts of problematic behavior, ranging from truancy Marisa et al. (2020) and aggressive behavior Djawad et al. (2023) to school discipline (Malik et al., 2024). Similar approaches based on tokens and signal cards have also been shown to modify hyperactive behavior in elementary school students (Rahmawati & Sholichah, 2025; Suchowierska & Cieślińska, 2012).

Although behavioral contracts are effective in building awareness and commitment, verbal and administrative approaches

alone are considered insufficient for children with hyperactive symptoms, as their fundamental need extends beyond written control and agreements to channel excess physical energy. Several studies have shown that structured physical activities such as swimming, martial arts, gymnastics, and motor games have been shown to help reduce the intensity of hyperactive behavior and improve children's ability to sit still and focus in class (Chanet & Utami, 2021; Harwell & Jackson, 2008). In the context of adaptive physical education in inclusive schools, modified sports activities tailored to the characteristics of children with special needs have also been shown to increase student participation and quality of life (Fridayati et al., 2022; Orhan et al., 2025; Tafuri & Palma, 2025) . Thus, combining the behavioral contract mechanism with sports activities as a form of reinforcement (reward) has the potential to be a crucial novelty, because it integrates the cognitive-commitment aspect of the behavioral contract with the psychomotor-energy aspect of physical activity simultaneously.

Throughout the literature search, explicit integration between behavior contract techniques and sports activities as a complete intervention scheme is still rarely discussed specifically in national journals; these two research streams generally develop separately. Therefore, this systematic literature review aims to (1) map the characteristics and main findings of studies on behavior contracts and adaptive physical/sports activities in the context of hyperactive children and inclusive schools, (2) comparatively analyze the mechanisms and forms of sports activities that have the potential to be integrated into behavior contracts, and (3) identify research gaps that can form the basis for the development of sports-based behavior contract models in the future.

METHODOLOGY

Research Design

This study used the Systematic Literature Review (SLR) method following the PRISMA 2020 (*Preferred Reporting Items for Systematic Reviews and Meta-Analyses*) protocol (Page et al., 2021). SLR is an appropriate design for synthesizing evidence from a predetermined set of primary studies in a transparent and replicable manner.

Search Strategy

Literature search was conducted through Google Scholar, Garuda (Digital Reference Library), and Directory of Open Access Journals (DOAJ) databases, using a combination of keywords: "behavior contract", "behavioral contract", "adaptive sport", "physical activity", "hyperactivity", "ADHD", "GPPH", and "inclusive school", both in Indonesian and English. Inclusion and Exclusion Criteria

Table 1. Criteria Inclusion and Exclusion

Criteria	Inclusion	Exclusion
Year publication	Published between 2016 and 2026	Published before 2016 or after 2026
Type document	Article journal national or international which includes study empirical or study clear conceptual	Articles that are not in the form of results study empirical or study conceptual , such as proceedings peer review, opinion , or abstract just
Type access	Full text articles available for review	Articles that only provide abstracts or full text are paid/inaccessible (restricted access)
Language	Indonesian or English	Languages other than Indonesian or English that do not have translations
Focus topic	Studies that discuss technique behavior contract, activity physical , or sport adaptive in context child hyperactive child with ADHD, or child in need special	Studies that do not related with behavior contract, activity physical , sports adaptive , hyperactivity , ADHD, or child in need special
Relevance	Relevant to the context of education or guidance and counseling	Studies that are not related to the context of education or guidance and counseling
Duplication		Duplicate articles obtained from different databases

Study Selection Process

The literature selection flow chart (PRISMA Flowchart) is structured in the following hierarchical format:

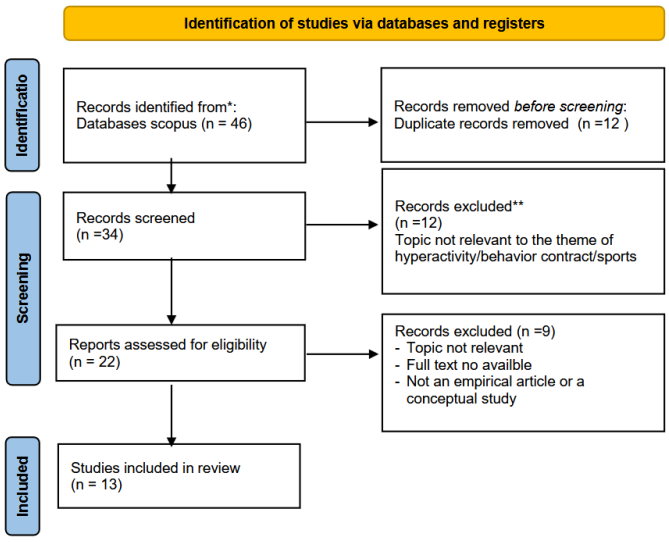

Figure 1. PRISMA 2020 Flow Diagram

RESULTS AND DISCUSSION

This section presents the characteristics of the reviewed studies, visualization of literature trends, and a comparative synthesis of cross-journal findings regarding the potential integration of behavior contracts and sports activities for hyperactive children in inclusive schools.

Table 2. Characteristics Reviewed Studies

Author / Year	Method Studies Original	Findings Main
(Ernawati & Diana, 2025)	Qualitative descriptive, field study in Inclusive PAUD	Structured behavioral therapy, positive reinforcement, and controlled physical activity are effective in shaping adaptive behavior in hyperactive children of early age.
Bentholm & Ramskov (2023, p. 13)	Study library / descriptive	Physical activity has been shown to reduce ADHD symptoms and improve executive function, but requires systematic planning and home and school support.
(Wijayanti & Cahyadi, 2019)	Experimental study of antecedent-consequence modification	Modifying antecedents and consequences reduces hyperactivity and increases attention in children with ADHD.
Alwahbi (2020, p. 329)	Studies case qualitative single case	Physical activities such as swimming and martial arts reduce the intensity of hyperactive behavior and help children focus better in class.
(Yang et al., 2022, p. 85)	Qualitative descriptive/counseling case study	The behavior contract technique effectively reduces truancy through clear agreements and reinforcement.
(Poon et al., 2023, p. 17)	Studies case counseling individual	Effective behavior contract lower behavior aggressive student through negotiated contract in a way open .
(Richardson et al., 2015, p. 135)	Studies implementation technique counseling	Behavior contracts improve junior high school students' school attendance discipline.
(Fadzil et al., 2026)	Token/signal card based intervention study	The token and signal card system (good behavior game) effectively modifies the hyperactive behavior of early elementary school students.
Widiyanto & Putra (2021)	Literature review of adaptive physical education	Adaptive physical education in inclusive schools needs to be modified according to the characteristics of children with special needs for optimal participation.
Hayatunnufus et al. (2022)	Study library strategy learning	Structured adaptive physical education learning strategies increase the involvement of students with special needs in physical activities.
Fitriatun (2022)	Study library technique learning	Adaptive physical education learning techniques are tailored to support the motor and behavioral development of children with special needs.
Poon et al. (2023, p. 17)	Evaluation of physical education learning in inclusive elementary schools	Physical Education learning for students with special needs in inclusive schools requires activity modifications and consistent teacher support.(Poon et al., 2023, p. 17)
(Brunssen et al., 2025, p. 6)	Textbook/ study book conceptual	Adaptive physical education and sports are the conceptual basis for modifying physical activity for children with special needs.

Graph contains a recapitulation of the number of articles reviewed in this SLR based on the year of publication.

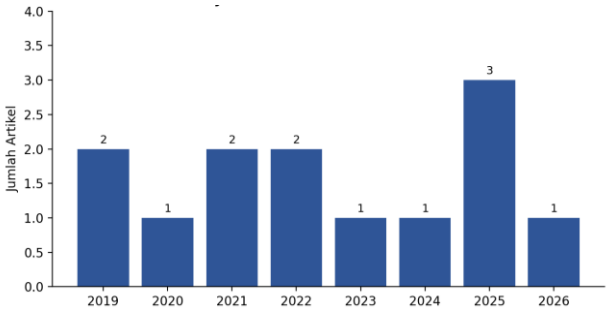

Figure 2. Trend in Number of Articles Based on Publication Year

The following graph summarizes the frequency of occurrence of the types of sports/physical activities mentioned as potentially being used as a form of energy distribution or reward in the reviewed literature.

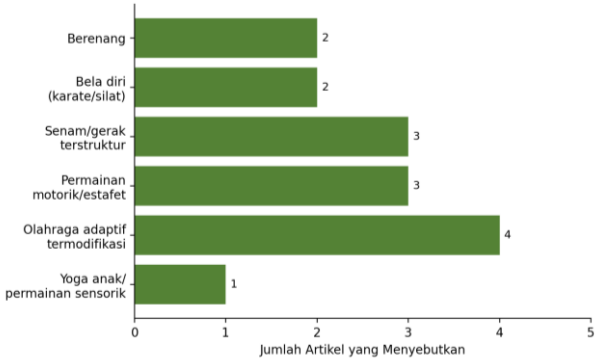

Figure 3. Types of Physical Activity/Exercise Mentioned in the Literature

Table 3. Comparison Synthesis Journal

Author & Year	Mechanism Contract Behavior	Form Activity Sport	Findings Main	Gap Study Furthermore
Wu et al. (2017, p. 7)	Written contracts, immediate reinforcement, clear behavioral targets	Not using exercise as a reward	Effective lower behavior truant	Not yet tested on hyperactive children; rewards are still non-physical
Indari (2023)	Open negotiations, consequences mutually agreed upon	Not using exercise as a reward	Effective lower behavior aggressive	Potentially combined with physical activity to channel excess energy that causes aggressiveness
(Fadzil et al., 2026)	Token/signal card system as symbolic reinforcement	No explicit use sport	Effectively modifying hyperactive behavior of elementary school students	Tokens can be exchanged for structured exercise sessions as an energy-based reward.
Chanet & Utami (2021)	No use formal contract	Swimming, self-defense as primary intervention	Reduces hyperactivity intensity and increases focus in class	Not yet formalized in a written behavioral contract scheme
Martín-Rodríguez et al. (2025)	No use formal contract	General physical activity (not specific type)	Physical activity reduces ADHD symptoms when planned systematically.	There is a need for an explicit systematic planning framework integrated with behavioristic counseling.

A comparative analysis of the thirteen reviewed articles reveals a consistent dichotomy: research within behaviorist counseling, exemplified by studies such as Marisa et al. (Yang et al., 2022, p. 85) and Djawad et al. (Indari, 2023), conclusively establishes that the behavior contract technique effectively modifies problematic behavior. This efficacy is attributed to mechanisms involving clear agreement, immediate reinforcement, and well-defined behavioral targets. However, the reinforcement strategies employed in these studies are predominantly non-physical or administrative, encompassing praise, point systems, or specific privileges, and do not integrate physical activity as a reward mechanism. Conversely, investigations by Chanet and Utami (Chanet & Utami, 2021) and Ginting et al. (Martín-Rodríguez et al., 2025) affirm that structured physical activities—including swimming, martial arts, and general sports—are efficacious in mitigating hyperactive behavior and enhancing attentional focus. Nonetheless, these interventions notably lack a formal, written behavioral contract framework.

The study by Fadzil et al. (2026) offers a compelling point of intersection, employing token and signal card systems as symbolic reinforcement to address hyperactive behaviors among elementary school students. This mechanism parallels the principles of behavioral contracts and suggests a viable pathway for incorporating structured exercise sessions into token exchange protocols, effectively bridging the cognitive-commitment aspect of behavioral contracting with the psychomotor energy-regulation potential of physical activity (Adams et al., 2017, p. 287; Wysocki et al., 1979, p. 57). Consequently, although these three research streams—behavioristic counseling, physical activity for ADHD, and adaptive physical education in inclusive schools—possess complementary conceptual foundations, the national literature lacks explicit, empirical validation of an integrated, coherent, and measurable intervention design.

Findings illustrated in Graph A indicate a burgeoning research interest in utilizing physical activity to modulate the behavior of children with special needs, with a notable surge between 2021 and 2026, consistent with the growing emphasis on inclusive adaptive physical education(Lai et al., 2020; Ma et al., 2024). Concurrently, Graph B reveals that modified adaptive sports and structured gymnastics or movement-based activities are the most frequently identified interventions for channeling excess energy, followed by motor-based relay games. This pattern suggests that physical activities with clearly defined movement structures and adjustable difficulty levels are particularly suited as reward components in behavior contracts, as they align with contract principles necessitating established behavioral targets, frequency, and duration(Weinstock et al., 2012, p. 357, 2016, p. 44).

The theoretical basis for the relationship between physical activity and the amelioration of hyperactive-impulsive symptoms lies in the enhancement of executive functions, which are recognized as a fundamental deficit in children diagnosed with ADHD (Liang et al., 2026; Morgan, 2025). Global systematic reviews and meta-analyses have consistently demonstrated that interventions centered on physical activity yield positive outcomes for inhibitory control, working memory, and cognitive flexibility among youth populations with ADHD (Montalva-Valenzuela et al., 2022). In a meta-analysis of 24 experimental studies, Song et al. observed that structured physical activity interventions significantly enhanced inhibitory control and working memory in children with ADHD, particularly when involving open motor skill activities executed on a consistent, scheduled basis (Liu et al., 2025; Song et al., 2023, p. 13). These results substantiate the proposition that structured sports—specifically gymnastics, relay games, and modified adaptive sports, which are among the most prevalent activities noted in Graph B of this study—possess the requisite mechanistic relevance to serve as reward components within behavioral contracts. This is because these activities function not merely as conduits for energy release but also as mechanisms for the neurocognitive training of self-regulatory capacities(Christie & Schrater, 2015, p. 296; Joseph et al., 2011, p. 803).

Martial arts provide compelling evidence, as their inherent structure—requiring adherence to rules, tiered progression, and gradual reinforcement—parallels the mechanisms of behavioral contracts. Lakes and Hoyt's study of 207 elementary students demonstrated that school-based martial arts training significantly improved cognitive, affective, and classroom self-regulation relative to conventional physical education. These findings corroborate reports by Chanet and Utami (Chanet & Utami, 2021) on hyperactivity reduction through swimming and martial arts, as well as Ginting et al. (Martín-Rodríguez et al., 2025) on the necessity of systematic planning to maximize the self-regulatory benefits of physical activity. The structural alignment between martial arts grading systems and the incremental targets of behavioral contracts suggests that sports with explicit rule frameworks can be effectively adapted as reinforcement components in these interventions.

In the broader landscape of behavior modification techniques, the efficacy of behavioral contracting as an evidence-based practice is underscored by a robust body of international research. Systematic evaluations, such as those conducted by Maggin et

al., utilizing rigorous What Works Clearinghouse standards, have validated that token- and contract-based reinforcement systems—the conceptual bedrock of behavioral contracts—consistently improve student behavior in the classroom, despite variations in methodological quality. This international evidence complements and reinforces local Indonesian findings; for instance, studies by Yang et al. (2022, p. 85) and Malik et al. have demonstrated the practical utility and positive outcomes of behavior contracts within diverse educational settings in Indonesia. Furthermore, research by Fadzil et al. (2026) highlights that these token systems can be ingeniously adapted to specifically address and mitigate hyperactive behaviors. By synthesizing these diverse strands of evidence—the structural clarity of behavioral contracts and the targeted modification potential of token exchange systems—it becomes evident that incorporating structured physical activity into behavioral contracts is a theoretically grounded evolution of established practice. Treating exercise sessions as dynamic token exchanges or specific reward clauses is not merely a speculative idea, but rather a logical extension of practices that have proven effective in each of their individual components, offering a cohesive, measurable strayty(Adams et al., 2017, p. 287; Weinstock et al., 2012, p. 357, 2016, p. 45) for managing hyperactivity in inclusive education.

CONCLUSION

This systematic literature review concludes that both behavior contract techniques and adaptive physical activity activities have strong evidence of effectiveness in addressing children's hyperactive behavior, both in early childhood education settings and inclusive schools in general. Behavior contracts excel in building awareness, commitment, and clarity of behavioral targets through structured agreement and reinforcement mechanisms, while physical activity excels in channeling excess energy and improving children's psychomotor focus. However, the explicit integration of these two approaches into a single sports-based behavior contract model remains a significant research gap in the national literature. Therefore, the purpose of this study to map the potential for such integration can be answered conceptually, although direct empirical evidence regarding this combined model is still very limited.

The main limitation of this SLR lies in the nature of the reviewed literature, which is largely case studies or descriptive-qualitative studies with a limited number of subjects, so generalization of the findings requires caution. Furthermore, the literature search focused on openly accessible databases (Google Scholar, Garuda, DOAJ), thus large-scale experimental studies in paid databases such as Scopus or ProQuest were not fully covered. As a tactical recommendation, classroom teachers and counselors in inclusive schools are advised to begin designing behavior contracts that explicitly include structured exercise sessions (e.g., gymnastics, relay races, or modified adaptive sports) as reinforcement/rewards for achieving behavioral targets, with consistent recording of frequency and duration. Future research should design quasi-experimental or single-subject studies that specifically test the effectiveness of this sports-based behavior contract model in a measurable manner on hyperactive children in inclusive schools.

ACKNOWLEDGMENTS

The authors would like to express their sincere gratitude to Sekolah Tinggi Olahraga dan Kesehatan Bina, Medan, Indonesia, for providing academic support throughout this study. Appreciation is also extended to the researchers and authors whose published works formed the evidence base for this systematic literature review. Their valuable contributions have significantly advanced knowledge on behavior contracts, adaptive physical activity, and ADHD interventions in inclusive education.

The authors are grateful to the editors and anonymous reviewers for their constructive comments and insightful suggestions, which substantially improved the quality of this manuscript. Finally, the authors acknowledge all institutions that provide open-access scientific databases and resources, facilitating comprehensive evidence synthesis in this review..

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