Review

Analysis of Factors Associated with Active and Sedentary Behaviors of Children and Adolescents Considering Bronfenbrenner's Bioecological Theory: A Scoping Review Protocol

Vinícius Tenório Moraes Silva , Rafael dos Santos Henrique , José Ywgne , Francisco Salviano Sales Nobre , Paulo Henrique Guerra * , Leonardo Gomes de Oliveira Luz

Posted Date: 5 September 2025

doi: 10.20944/preprints202509.0554.v1

Keywords: Physical Activity; Child; Adolescents; Sedentary Behavior; Ecology

 doi:10.20944/preprints202509.0554.v1

Review

Analysis of Factors Associated with Active and Sedentary Behaviors of Children and Adolescents Considering Bronfenbrenner's Bioecological Theory: A Scoping Review Protocol

Vinícius Tenório Moraes da Silva [1,2], Rafael dos Santos Henrique [1], José Ywgne [2,3], Francisco Salviano Sales Nobre [4], Paulo Henrique Guerra [5] and Leonardo Gomes de Oliveira Luz [1,2]

[1] Federal University of Pernambuco, Department of Physical Education, Recife, Pernambuco, Brazil.
[2] Federal University of Alagoas, Arapiraca, Alagoas, Brazil.
[3] Federal University of Sergipe, Department of Physical Education, Aracaju, Sergipe, Brazil.
[4] Federal Institute of Education, Science and Technology of Ceará, Juazeiro do Norte, Ceará, Brazil.
[5] São Paulo State University, Rio Claro, São Paulo, Brazil.
* Correspondence: paulo.guerra@unesp.br

Abstract

The present scoping review protocol aims to investigate the complex factors associated with the active and sedentary behaviors in young people applying Bronfenbrenner's bioecological theory. The study will be carried out based on the steps proposed by the Preferred Reporting Items for Systematic Reviews and Meta-Analysis for Scoping Reviews. The review question was formulated with the help of the 'PCC' strategy, such that: a) population: studies carried out with children and adolescents (aged between 5-17 years) and with any health condition will be considered eligible; b) concept: studies in the area of physical activity (PA) and/or sedentary behavior (SB) that used Bronfenbrenner's theory and the PPCT method; c) context: studies conducted in any context will be included. The search for studies will be carried out in the following databases: PubMed, Scopus, SPORTDiscus, Web of Science, PsycINFO, ERIC, and Scielo. The processes of identifying and removing duplicates, as the evaluation of titles and abstracts will be carried out in Rayyan by two independent and blind reviewers. The research data can guide political agents in the implementation of public policies and the development of work policies that encourage the reduction of SB and the increase of PA in children and adolescents.

Keywords: physical activity; child; adolescents; sedentary behavior; ecology

1. Introduction

The theory of human development formulated by Urie Bronfenbrenner began to be constructed in the late 1970s. The author exposed important premises to the scientific field for planning and developing research in natural environments (De Assis, De Campos Moreira & Fornasier, 2021). Before the 1970s, the main concern of many researchers in the field was to discover the extent of the specific influences of nature and nurture, with only a small number of studies designed to emphasize the interactions between nature and nurture, i.e., the child's biologically based characteristics and abilities and the different contexts where the child lives (Krebs, 2009). His main criticism was the traditional way of studying human development, in which the largest amount of research completed on development occurred out of context (Bronfenbrenner, 1979). For him, the multiple influences of the contexts in which the subjects lived were ignored, since investigations focused only on the developing person within a restricted and static environment. The notion that development is

 doi:10.20944/preprints202509.0554.v1

influenced by the environment was already familiar and common in science at the time (Rosa & Tudge, 2013). However, Bronfenbrenner argued that despite this common understanding, little attention had been paid to research and theory on environmental influences on human development.

Bronfenbrenner's theory of human development is a theory that was accepted as being in a continuous state of development until Bronfenbrenner died in 2005 (Tudge et al., 2009). The bioecological theory developed by Urie Bronfenbrenner can be didactically divided into three phases (Bronfenbrenner et al., 1994). In the first phase (1973–1979), in which the theory was called the Ecological Approach to Human Development, Bronfenbrenner focused his discussions on the methodological limitations of research at the time (De Carvalho-Barreto, 2016). His main criticisms were aimed at experimental research, which focused on the behavior of people in strange situations and places, that is, in contexts to which they did not belong. In the second phase (1980–1993), Bronfenbrenner turned to the way the environment was conceptualized in research into human development (Bronfenbrenner et al., 1994). The author named the model the Ecological Paradigm, which emphasized the active aspect of the person in the environment, as well as the effects of time and development processes (Bronfenbrenner, 1999). In the third phase (1994–2006), the theory receives its current nomenclature and is characterized by the formulation of the Process-Person-Context-Time Method (PPCT Method). The evolution of the term ecology to bioecology is related to the recognition of people's structural and functional levels, which include biological, cognitive, emotional, and behavioral aspects (De Carvalho-Barreto, 2016). Thus, the main characteristic of this theory is the dynamic interaction between its four pillars: the process, the person, the context and time, whose emphasis is centered on proximal processes (Bronfenbrenner & Morris, 1998, 2007).

Bronfenbrenner changed the ways in which the environment was considered, that were a consensus among many psychologists in the late decades of the last century. He stated that the environmental properties were not distinguished by reference to linear variables but analyzed in system terms (Krebs, 2009). In this way, the bioecological model developed by Bronfenbrenner (Bronfenbrenner, 1999) emerges as a strong tool for understanding as a whole the mechanisms present in the environment of the individual, with the objective of investigating the individual's development through the relationship between the individual and the environment (Bronfenbrenner, 2005).

Its model is conceptualized from a bioecological perspective, in which individual and context relate and define each other in a reciprocal way (Bhering & Sarkis, 2009). The development of the individual in the theoretical-methodological model refers to the continuity and change in the biopsychological characteristics of human beings, both individually and in groups, throughout the person's life course and through generations and historical time (Bronfenbrenner, 1999). Therefore, the bioecological model represents a tool to better understand the multiple factors associated with child development (Bronfenbrenner, 1995).

Human development occurs through gradually more complex processes of reciprocal interaction between an active subject and the people, objects, and symbols of their immediate environment (Bronfenbrenner, 1995). This process of reciprocity is called the proximal process, which, to have effects on development, must occur regularly over an extended period of time (Nobre, Valentini & Rusidill, 2020). Therefore, the concept of development for Bronfenbrenner refers to the result of a joint function between a proximal process, the characteristics of the developing person, the immediate context in which he or she lives, and the amount and frequency of time in which the developing person has been exposed to a specific proximal process and the environment, this set being called the PPCT (Process-Person-Context-Time) method of development (Bhering & Sarkis, 2009).

Bronfenbrenner (1999) points out that in this model the person's characteristics appear twice: first as one of the four elements, and then as a result of development, and can be observed in the person at a later point in time, resulting from the cumulative interaction of the four components of the model. The PPCT method is the research design that allows the investigation of the relationship between the characteristics of the person and the environment as a determining factor in the

 doi:10.20944/preprints202509.0554.v1

individual's development (Bhering & Sarkis, 2009). In the context of scientific production, few studies involving factors of active and sedentary behavior, that have used the PPCT method for analysis.

Low levels of moderate-to-vigorous physical activity (MVPA) and high levels of sedentary behavior (SB) are two of the largest public health concerns worldwide (Werneck et al., 2019). Global trends of physical activity (PA) levels show that, between 2001 and 2016, 81% of adolescents did not meet the World Health Organization MVPA recommendations (e.g., 60 minutes per day), and it is estimated that four in five adolescents worldwide are insufficiently active (Guthold et al., 2020). Considering that the regular practice of PA contributes to human development, as well as being related to the prevention and treatment of chronic non-communicable diseases, such as heart disease, stroke and diabetes (WHO, 2019), reduced PA levels represent a public health problem.

The perspective of PA and sedentary behavior needs to be expanded (Guerra et al., 2019). Reducing levels of insufficient PA and time spent in sedentary behavior are complex challenges at a global level, especially because it is necessary to consider several factors, including social, demographic, economic, and behavioral aspects, among others (Santos et al., 2019). In this sense, more recent studies show consistent evidence related to associations of insufficient PA and sedentary behavior, in all age groups, with higher risks of cardiovascular diseases and chronic non-communicable diseases (Arem et al., 2015; Xu et al., 2019; Paudel et al., 2023).

Although some studies stand out by taking into account different determinants of PA and sedentary behavior (Alosaimi et al., 2023; Falck et al., 2024; Koh et al., 2022), analysis of the literature demonstrates that there is still no clarifying description of the multiple factors that determine the strong variability in adolescents, particularly when related to the recognition of people's structural and functional levels, including biological, cognitive, emotional, social, and behavioral aspects (De Carvalho-Barreto, 2016). It is understood that factors of a biological, behavioral, environmental, and social interaction nature can influence PA habits and sedentary behavior (Bauman et al., 2012), leading to the need for greater exploration of studies in this vein, including methodologies that seek to contemplate the complexity of the phenomenon.

In view of the above, there is a gap in the literature on this topic and it is in this context that the current review is inserted. Therefore, in this way, the objective of the present study will be to identify and summarize the complex factors associated with the active and sedentary behaviors of adolescents from the perspective of Bronfenbrenner's bioecological theory and his PPCT method, taking into account the multidimensional characteristics of active and sedentary behaviors.

2. Materials and Methods

2.1. Protocol and Registration

Considering the intention of mapping the literature, the present study is a scoping review of the literature. The scoping review methodology is developed as a policy and decision-making tool. Therefore, ensuring the integrity of these reviews by adhering to the most up-to-date reporting standards is integral to supporting well informed decision-making (Peters et al., 2021).

Its theoretical basis involves the Preferred Reporting Items for Systematic Reviews and Meta-Analysis (PRISMA) for Scoping Reviews (PRISMA-ScR) (Tricco et al., 2018) and the recommendations from the Joanna Briggs Institute (Bejarano et al., 2019). Also, it is important to mention the prior registration of the protocol in Open Science Framework (https://osf.io/pzq2w/), and that this report was developed according to the steps suggested by Arksey and O'Malley (2005). Checklist PRISMA-P is presented in Supplementary file 1.

2.2. Review Question

Considering that the review aims to map existing evidence on complex factors associated with the active and sedentary behaviors of adolescents, from the perspective of Bronfenbrenner's bioecological theory and his PPCT method, taking into account the multidimensional characteristics

 doi:10.20944/preprints202509.0554.v1

of active and sedentary behaviors, the review question was formulated with the help of the 'PCC' strategy (PCC framework) (Bejarano et al., 2019), such that:

I. Population: studies carried out with children and adolescents (aged between 5 and 17 years) and with any health condition will be considered eligible.
II. Concept: studies in the area of PA and/or sedentary behavior that used Urie Bronfenbrenner's Bioecological Theory and/or the PPCT method.
III. Context: studies conducted in any context (e.g., at home, school, community, at work, daily living environments, public and private institutions) will be included.

2.3. Eligibility Criteria

The review will include original studies, published in peer-reviewed journals that investigated levels of active and sedentary behaviors, including interventions in physical education classes and sports activities, considering Bronfenbrenner's bioecological theory and/or the PPCT method, in children and/or adolescents. Will not be considered (excluded) as well as other reviews, editorials, books, book chapters, guidelines, expert opinion articles, dissertations, theses, and conference abstracts. Studies that do not use Bronfenbrenner's bioecological theory as a guide to understand the levels of active and sedentary behavior will not fall within the scope of this review. For this, the review question developed was: "What are the studies present in the literature that investigate factors associated with active and sedentary behaviors of children and adolescents considering Bronfenbrenner's bioecological theory?".

2.4. Source of Evidence and Search Strategy

The search for studies will be carried out in the following databases: PubMed, Scopus, SPORTDiscus, Web of Science, PsycINFO, ERIC, and Scielo. In previous tests, conducted in PubMed, electronic searches were structured into three domains, which will be approximated with the AND operator:

I. Age: child* OR adoles* OR youth or young OR student* OR teen* OR preteen OR pre-teen OR juvenile
II. Behaviors: "physical activity" OR "physical inactivity" OR "sedentary behaviour" OR fitness OR sport* OR "motor competence" OR "motor skill" OR "motor development" OR "physical education" OR lifestyle OR performance
III. Theory: PPCT OR Bronfenbrenner AND The advanced search strategy, for each database, is presented in Supplementary file 2.

Also, aiming to identify other studies that may be eligible, a manual search will be carried out in Google Scholar (e.g., the first 10 pages) and in the reference lists of the initially selected studies. Supplementary file 2 presents the search strategy for each database.

2.5. Process of Study Selection

This review has a working group composed of two researchers, who will work independently throughout the process. VS and JN, independently, will be responsible for assessing titles, abstracts, full texts and data extraction. LL will be the researcher who will lead the consensus and resolution of doubts throughout the process.

The processes of identifying and removing duplicates, and titles and abstracts assessment will be carried out in Rayyan. All assessment phases will be guided by the indicated inclusion criteria.

2.6. Process of Data Extraction from Selected Studies

In a spreadsheet, the working group will extract the data related to the review. This spreadsheet will be organized as follows:

 doi:10.20944/preprints202509.0554.v1

I. Study characteristics: identification (citation), country in which the study was carried out, follow-up period, study design and instruments to evaluate the variables;
II. Characteristics of individuals: sample size, gender, average age;
III. Main result: Levels of active and sedentary behaviors, interventions in physical education classes and sports activities, analyzed based on Bronfenbrenner's Bioecological Theory and/or PPCT method.

2.7. Data Synthesis

Based on the refinement of the information in the extraction spreadsheet, the descriptive summary will be developed and analyzed by the entire working group. Within the organizational process, the aim is to map the descriptive, methodological and results information of the original studies.

3. Discussion

3.1. Dissemination

The results of this scoping review will be submitted for publication in a peer-reviewed journal, preferably open access, and presented at scientific meetings and conferences on active and sedentary behavior, and the human development of children and adolescents. Once published, the results will be disseminated through digital scientific communication platforms, including academic social networks, to expand their reach and impact.

It is expected that the research conducted in the study will lead to a deeper understanding of how Bronfenbrenner's Bioecological Theory of Human Development and the PPCT method can relate environmental variables to the active and sedentary behavior of children and adolescents. The research data can guide political agents in the implementation of public policies and the development of work policies that encourage the reduction of sedentary behavior and the increase of active behavior in children and adolescents, through school projects with the implementation of physical activity programs that consider the school context and interaction with the community and family, as well as awareness campaigns with presentations to raise awareness about the risks of sedentary behavior and the benefits of physical activity, in addition to the improvement of public infrastructures to facilitate outdoor activities in the community context.

3.2. Limitations

Although some studies cite Bronfenbrenner or ecological models, they do not report deeper information about the model in question. Moreover, many interventions are published in the grey literature, which is also not covered by our review. Although these possible limitations exist, it is important to remember that the results of the proposed scoping review can contribute to scientific advancement by identifying gaps and trends in research, guiding future studies, and informing companies, healthcare professionals, and the general public who are interested in active and sedentary behavior, and human development in children and adolescents.

Supplementary Materials: The following supporting information can be downloaded at the website of this paper posted on Preprints.org, Figure S1: title; Table S1: title; Video S1: title.

Author Contributions: Conceptualization, V.S., L.L., F.S.N. and P.H.G.; methodology, All; validation, All; writing—original draft preparation, S.R.; writing—review and editing, All; supervision, V.S. and L.L. All authors have read and agreed to the published version of the manuscript.

Funding: This research received no external funding.

Institutional Review Board Statement: Not applicable"

Informed Consent Statement: Not applicable

 doi:10.20944/preprints202509.0554.v1

Data Availability Statement: The original contributions presented in this study are included in the article material. Further inquiries can be directed to the corresponding author.

Acknowledgments: The authors Vinícius Silva and José Ywgne receive support from the National Council for Scientific and Technological Development (CNPQ, process: 131131/2024-9) and the Coordination for the Improvement of Higher Education Personnel (CAPES, process: 88887.148923/2025-00) through a doctoral scholarship.

Conflicts of Interest: The authors declare no conflicts of interest.

Abbreviations

The following abbreviations are used in this manuscript:

MVPA – Moderate-to-vigorous physical activity
PA – Physical activity
PPCT Method – Process- Person-Context-Time Method

Appendix A

Appendix A.1. PRISMA-P Checklist

Table A1. PRISMA-ScR (Preferred Reporting Items for Systematic review and Meta-Analysis extension for Scoping Reviews (PRISMA-ScR) 2018 checklist.

SECTION	ITEM	PRISMA-ScR CHECKLIST ITEM	REPORTED ON PAGE #
TITLE			
Title	1	Identify the report as a scoping review.	1
ABSTRACT			
Structured summary	2	Provide a structured summary that includes (as applicable): background, objectives, eligibility criteria, sources of evidence, charting methods, results, and conclusions that relate to the review questions and objectives.	1
INTRODUCTION			
Rationale	3	Describe the rationale for the review in the context of what is already known. Explain why the review questions/objectives lend themselves to a scoping review approach.	2
Objectives	4	Provide an explicit statement of the questions and objectives being addressed with reference to their key elements (e.g., population or participants, concepts, and context) or other relevant key elements used to conceptualize the review questions and/or objectives.	4
METHODS			

 doi:10.20944/preprints202509.0554.v1

SECTION	ITEM	PRISMA-ScR CHECKLIST ITEM	REPORTED ON PAGE #
Protocol and registration	5	Indicate whether a review protocol exists; state if and where it can be accessed (e.g., a Web address); and if available, provide registration information, including the registration number.	4
Eligibility criteria	6	Specify characteristics of the sources of evidence used as eligibility criteria (e.g., years considered, language, and publication status), and provide a rationale.	4
Information sources*	7	Describe all information sources in the search (e.g., databases with dates of coverage and contact with authors to identify additional sources), as well as the date the most recent search was executed.	4
Search	8	Present the full electronic search strategy for at least 1 database, including any limits used, such that it could be repeated.	5
Selection of sources of evidence†	9	State the process for selecting sources of evidence (i.e., screening and eligibility) included in the scoping review.	5
Data charting process‡	10	Describe the methods of charting data from the included sources of evidence (e.g., calibrated forms or forms that have been tested by the team before their use, and whether data charting was done independently or in duplicate) and any processes for obtaining and confirming data from investigators.	5
Data items	11	List and define all variables for which data were sought and any assumptions and simplifications made.	5
Critical appraisal of individual sources of evidence§	12	If done, provide a rationale for conducting a critical appraisal of included sources of evidence; describe the methods used and how this information was used in any data synthesis (if appropriate).	5
Synthesis of results	13	Describe the methods of handling and summarizing the data that were charted.	5
RESULTS			
Selection of sources of evidence	14	Give numbers of sources of evidence screened, assessed for eligibility, and included in the	5

 doi:10.20944/preprints202509.0554.v1

SECTION	ITEM	PRISMA-ScR CHECKLIST ITEM	REPORTED ON PAGE #
		review, with reasons for exclusions at each stage, ideally using a flow diagram.	
Characteristics of sources of evidence	15	For each source of evidence, present characteristics for which data were charted and provide the citations.	5
Critical appraisal within sources of evidence	16	If done, present data on critical appraisal of included sources of evidence (see item 12).	5
Results of individual sources of evidence	17	For each included source of evidence, present the relevant data that were charted that relate to the review questions and objectives.	5
Synthesis of results	18	Summarize and/or present the charting results as they relate to the review questions and objectives.	5
DISCUSSION			
Summary of evidence	19	Summarize the main results (including an overview of concepts, themes, and types of evidence available), link to the review questions and objectives, and consider the relevance to key groups.	5
Limitations	20	Discuss the limitations of the scoping review process.	6
Conclusions	21	Provide a general interpretation of the results with respect to the review questions and objectives, as well as potential implications and/or next steps.	6
FUNDING			
Funding	22	Describe sources of funding for the included sources of evidence, as well as sources of funding for the scoping review. Describe the role of the funders of the scoping review.	6

JBI = Joanna Briggs Institute; PRISMA-ScR = Preferred Reporting Items for Systematic reviews and Meta-Analyses extension for Scoping Reviews. * Where sources of evidence (see second footnote) are compiled from, such as bibliographic databases, social media platforms, and Web sites. † A more inclusive/heterogeneous term used to account for the different types of evidence or data sources (e.g., quantitative and/or qualitative research, expert opinion, and policy documents) that may be eligible in a scoping review as opposed to only studies. This is not to be confused with information sources (see first footnote). ‡ The frameworks by Arksey and O'Malley (6) and Levac and colleagues (7) and the JBI guidance (4, 5) refer to the process of data extraction in a scoping review as data charting. § The process of systematically examining research evidence to assess its validity, results, and relevance before using it to inform a decision. This term is used for items 12 and 19 instead of "risk of bias" (which is more applicable to systematic reviews of interventions) to include and acknowledge the various sources of evidence that may be used in a scoping review (e.g., quantitative and/or qualitative research, expert opinion, and policy document). From: Tricco AC, Lillie E, Zarin W, O'Brien KK, Colquhoun H, Levac D,

 doi:10.20944/preprints202509.0554.v1

et al. PRISMA Extension for Scoping Reviews (PRISMAScR): Checklist and Explanation. Ann Intern Med. 2018;169:467–473. doi: 10.7326/M18-0850.

Appendix A.2 Search Strategy

Table A2. Draft search strategy for each electronic databases queried: PubMed, Scopus, SPORTDiscus, Web of Science, PsycINFO, ERIC, and Scielo.

For each search listed below, no start date and language were applied, and databases were searched from their inception or date of the earliest available publication.	
Database	Search estrategy
PubMed	(((child*[Text Word] OR adoles*[Text Word] OR youth[Text Word] OR young[Text Word] OR student*[Text Word] OR teen*[Text Word] OR preteen[Text Word] OR pre-teen[Text Word] OR juvenile[Text Word])) AND ((PPCT[Text Word] OR Bronfenbrenner[Text Word]))) AND (("PA"[Text Word] OR "physical inactivity"[Text Word] OR "sedentary behaviour"[Text Word] OR fitness[Text Word] OR sport*[Text Word] OR "motor competence"[Text Word] OR "motor skill"[Text Word] OR "motor development"[Text Word] OR "physical education"[Text Word] OR lifestyle[Text Word] OR performance[Text Word]))
Scopus	ALL ((child* OR adoles* OR youth OR young OR student* OR teen* OR preteen OR pre-teen OR juvenile) AND (ppct OR bronfenbrenner) AND ("PA" OR "physical inactivity" OR "sedentary behaviour" OR fitness OR sport* OR "motor competence" OR "motor skill" OR "motor development" OR "physical education" OR lifestyle OR performance))
SPORTDiscus	((child* OR adoles* OR youth or young OR student* OR teen* OR preteen OR pre-teen OR juvenile)) AND ((PPCT OR Bronfenbrenner)) AND (("PA" OR "physical inactivity" OR "sedentary behaviour" OR fitness OR sport* OR "motor competence" OR "motor skill" OR "motor development" OR "physical education" OR lifestyle OR performance))
Web of Science	((ALL=((child* OR adoles* OR youth or young OR student* OR teen* OR preteens OR pre-teen OR juvenile))) AND ALL=((pact OR Bronfenbrenner))) AND ALL=(("PA" OR "physical inactivity" OR "sedentary behaviour" OR fitness OR sport* OR "motor competence" OR "motor skill" OR "motor development" OR "physical education" OR lifestyle OR performance))
PsycINFO	(Any Field: child* OR Any Field: adoles* OR Any Field: youth OR Any Field: young OR Any Field: student* OR Any Field: teen* OR Any

 doi:10.20944/preprints202509.0554.v1

	Field: preteen OR Any Field: pre-teen OR Any Field: juvenile) AND (Any Field: PPCT OR Any Field: Bronfenbrenner) AND Any Field: ("PA" OR "physical inactivity" OR "sedentary behaviour" OR fitness OR sport* OR "motor competence" OR "motor skill" OR "motor development" OR "physical education" OR lifestyle OR performance)
ERIC	(child* OR adoles* OR youth or young OR student* OR teen* OR preteen OR pre-teen OR juvenile) AND (PPCT OR Bronfenbrenner) AND ("PA" OR "physical inactivity" OR "sedentary behaviour" OR fitness OR sport* OR "motor competence" OR "motor skill" OR "motor development" OR "physical education" OR lifestyle OR performance)
Scielo	(child* OR adoles* OR youth or young OR student* OR teen* OR preteen OR pre-teen OR juvenile) AND (PPCT OR Bronfenbrenner) AND ("physical activity" OR "physical inactivity" OR "sedentary behaviour" OR fitness OR sport* OR "motor competence" OR "motor skill" OR "motor development" OR "physical education" OR lifestyle OR performance)

References

1. Alosaimi, N., et al. (2023). Clustering of diet, physical activity and sedentary behaviour and related physical and mental health outcomes: A systematic review. BMC Public Health, 23(1), 1572. https://doi.org/10.1186/s12889-023-16372-6
2. Arem, H., et al. (2015). Leisure time physical activity and mortality: A detailed pooled analysis of the dose-response relationship. JAMA Internal Medicine, 175(6), 959–967. https://doi.org/10.1001/jamainternmed.2015.0533
3. Arksey, H., & O'Malley, L. (2005). Scoping studies: Towards a methodological framework. International Journal of Social Research Methodology, 8(1), 19–32. https://doi.org/10.1080/1364557032000119616
4. Bauman, A. E., et al. (2012). Correlates of physical activity: Why are some people physically active and others not? The Lancet, 380(9838), 258–271. http://dx.doi.org/10.1016/S0140-6736(12)60735-1
5. Bejarano, C. M., et al. (2019). Neighborhood built environment associations with adolescents' location-specific sedentary and screen time. Health & Place, 56, 147–154. https://doi.org/10.1016/j.healthplace.2019.01.015
6. Bhering, E., & Sarkis, A. (2009). Modelo bioecológico do desenvolvimento de Bronfenbrenner: Implicações para as pesquisas na área da Educação Infantil. Horizontes, 27(2), 7–20.
7. Bronfenbrenner, U. (1979). A ecologia do desenvolvimento humano: Experimentos por natureza e design. Harvard University Press.
8. Bronfenbrenner, U. (1995). Ecologia do desenvolvimento através do espaço e do tempo: Uma perspectiva futura. In P. Moen, G. H. Elder Jr., & K. Lüscher (Eds.), Examining lives in context: Perspectives on the ecology of human development (pp. 619–647). American Psychological Association.
9. Bronfenbrenner, U. (1999). Environments in developmental perspective: Theoretical and operational models. In S. L. Friedman & T. D. Wachs (Eds.), Measuring environment across the life span: Emerging methods and concepts (pp. 3–28). American Psychological Association.
10. Bronfenbrenner, U. (2005). Making human beings human: Bioecological perspectives on human development. SAGE Publications.
11. Bronfenbrenner, U., & Morris, P. A. (1994). Modelos ecológicos de desenvolvimento humano. Enciclopédia Internacional de Educação, 3(2), 37–43.

 doi:10.20944/preprints202509.0554.v1

12. Bronfenbrenner, U . & Morris, P.A. (2007). The bioecological model of human development. In W. Damon & R. M. Lerner (Eds.), Handbook of child psychology: Theoretical models of human development (6th ed., pp. 793–828). John Wiley & Sons. https://doi.org/10.1002/9780470147658.chpsy0114
13. Bronfenbrenner, U . & Morris, P.A. (1998). The ecology of developmental processes. In W. Damon & R. M. Lerner (Eds.), Handbook of child psychology: Theoretical models of human development (5th ed., pp. 993–1023). John Wiley & Sons.
14. De Assis, D. C. M., De Campos Moreira, L. V., & Fornasier, R. C. (2021). Teoria Bioecológica de Bronfenbrenner: A influência dos processos proximais no desenvolvimento social das crianças. Research, Society and Development, 10(10), e582101019263. https://doi.org/10.33448/rsd-v10i10.19263
15. De Carvalho-Barreto, A. (2016). Paradigma sistêmico no desenvolvimento humano e familiar: A teoria bioecológica de Urie Bronfenbrenner. Psicologia em Revista, 22(2), 275–293. https://doi.org/10.5752/P.1678-9523.2016V22N2P275
16. Falck, R. S., et al. (2024). Cross-sectional and longitudinal neural predictors of physical activity and sedentary behaviour from a 6-month randomized controlled trial. Scientific Reports, 14(1), 919. https://doi.org/10.1038/s41598-023-48715-z
17. Guerra, P. H., et al. (2019). Systematic review of physical activity and sedentary behavior indicators in South-American preschool children. Revista Paulista de Pediatria, 38, e2018112. https://doi.org/10.1590/1984-0462/2020/38/2018112
18. Guthold, R., et al. (2020). Global trends in insufficient physical activity among adolescents: A pooled analysis of 298 population-based surveys with 1.6 million participants. The Lancet Child & Adolescent Health, 4(1), 23–35. https://doi.org/10.1016/S2352-4642(19)30323-2
19. Koh, Y. S., et al. (2022). A cross-sectional study on the perceived barriers to physical activity and their associations with domain-specific physical activity and sedentary behaviour. BMC Public Health, 22(1), 1051. https://doi.org/10.1186/s12889-022-13431-2
20. Krebs, R. J. (2009). Bronfenbrenner's bioecological theory of human development and the process of development of sports talent. International Journal of Sport Psychology, 40(1), 108–116.
21. Nobre, F. S. S., Valentini, N. C., & Rusidill, M. E. (2020). Applying the bioecological theory to the study of fundamental motor skills. Physical Education and Sport Pedagogy, 25(1), 29–48. https://doi.org/10.1080/17408989.2019.1688772
22. Paudel, S., et al. (2023). Do associations of physical activity and sedentary behaviour with cardiovascular disease and mortality differ across socioeconomic groups? A prospective analysis of device-measured and self-reported UK Biobank data. British Journal of Sports Medicine, 57(14), 921–929. http://dx.doi.org/10.1136/bjsports-2022-105435
23. Peters, M. D. J., et al. (2021). Scoping reviews: Reinforcing and advancing the methodology and application. Systematic Reviews, 10, 1–6. https://doi.org/10.1186/s13643-021-01821-3
24. Rosa, E. M., & Tudge, J. (2013). Urie Bronfenbrenner's theory of human development: Its evolution from ecology to bioecology. Journal of Family Theory & Review, 5(4), 243–258. https://doi.org/10.1111/jftr.12022
25. Santos, L. S., et al. (2019). Association between insufficient level of physical activity and multiple health risk behaviors in adolescents. Motriz: Revista de Educação Física, 25(3), e101935. https://doi.org/10.1590/S1980-6574201900030003
26. Tricco, A. C., et al. (2018). PRISMA extension for scoping reviews (PRISMA-ScR): Checklist and explanation. Annals of Internal Medicine, 169(7), 467–473. https://doi.org/10.7326/M18-0850
27. Tudge, J. R. H., Mokrova, I., Hatfield, B. E., & Karnik, R. B. (2009). Uses and misuses of Bronfenbrenner's bioecological theory of human development. Journal of Family Theory & Review, 1(4), 198–210. https://doi.org/10.1111/j.1756-2589.2009.00026.x
28. Werneck, A. O., et al. (2019). Physical activity and sedentary behavior patterns and sociodemographic correlates in 116,982 adults from six South American countries: The South American physical activity and sedentary behavior network (SAPASEN). International Journal of Behavioral Nutrition and Physical Activity, 16, 1–11. https://doi.org/10.1186/s12966-019-0839-9
29. World Health Organization. (2019). Global action plan on physical activity 2018–2030: More active people for a healthier world. World Health Organization.

 doi:10.20944/preprints202509.0554.v1

30. Xu, C., et al. (2019). Sedentary behavior, physical activity, and all-cause mortality: Dose-response and intensity weighted time-use meta-analysis. Journal of the American Medical Directors Association, 20(10), 1206–1212.e3. https://doi.org/10.1016/j.jamda.2019.05.001