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Bronfenbrenner's Ecological and Bioecological Models in Research on the Development of Creativity in Children and Adolescents: Protocol for a Scoping Review

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ADMINISTRATIVE INFORMATION

Support - No support.

Review stage at the time of initial registration - Preliminary searches.

Conflicts of interest - None declared.

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Amendments - This protocol was registered with the International Platform of Registered Systematic Review and Meta-Analysis Protocols (INPLASY) on 9 November 2026 and was last updated on 9 November 2026.

INTRODUCTION

Review question / Objective The research question will be formulated according to the Joanna Briggs Institute (JBI) guidelines for scoping reviews (Peters et al., 2020, 2022); additionally, the Preferred Reporting Items for Systematic Reviews and Meta-Analyses Extension for Scoping Reviews (PRISMA-ScR) (Tricco et al., 2018) will be used. Regarding the research question, the PCC framework (Peters et al., 2020) will be used, where P stands for population (children or adolescents aged 6 to 18 years), C is the concept (use of Bronfenbrenner's ecological, bioecological/PPCT models or derivatives to explain the development of creativity), and C is any developmental context (school, family, community, or extracurricular). Finally, the central research question is as follows: How have Bronfenbrenner's ecological and bioecological models been used to explain the development of creativity in children and adolescents aged 6 to 18 in school, family, and community contexts, and what types of evidence have been reported regarding the mechanisms they propose? The specific questions are as follows: a) Which model from Bronfenbrenner's framework (ecological, bioecological/PPCT, or a derivative, such as the socioecological model) do the studies state they use, which do they actually apply, and what role does it play in each study (justification, design, analysis, interpretation)? b) Which levels of the system (micro-, meso-, exo-, macro-, and chronosystems) and, where applicable, which components of the PPCT model are examined, and how are they operationalized? c) What mechanisms are proposed to explain the development of creativity in children and adolescents? d) What types of evidence (designs, analyses, and level of empirical validation) are reported regarding these mechanisms? and e) How is creativity conceptualized and assessed in these studies (instruments, informants, and procedures)? Based on the research question, the following general objective is formulated: To map and describe the scientific evidence on how Bronfenbrenner's ecological and bioecological models have been used to explain the

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development of creativity in children and adolescents, and to identify the types of evidence reported regarding their mechanisms and the knowledge gaps in the field.

The scope of this question is fundamental, as it explores what types of evidence exist on the topic, which is consistent with the selection of a scoping review as the methodological design. This tool allows for mapping the type and nature of the evidence but does not assess the extent to which each mechanism is supported because it does not include critical evaluation (Munn et al., 2018).

Operational Definitions

Mechanism: the explanation proposed by a study regarding how an element of the system relates to the development of creativity; for example, proximal processes, mediation, moderation by individual or contextual characteristics, interactions between levels, or change over time (Bronfenbrenner & Morris, 2006).

Level of empirical support: the type of evidence the study uses to support that mechanism, on an ordinal scale: theoretically proposed only; described using qualitative data; association (correlation or regression); cross-sectional statistical testing (mediation, moderation, or multilevel models); longitudinal testing; experimental or quasi-experimental testing. It describes the type of evidence, not its quality.

Background Creativity is recognized as a key competency for social, economic, and cultural progress (Vincent-Lancrin et al., 2019) and is increasingly relevant to educational systems, as it enables a versatile and relevant response to diverse challenges and adaptation to changing and unstable conditions (OECD, 2023, 2024; Runco, 2004).

Its scientific study is relatively recent: Guilford (1967) associated it with divergent thinking, and since then, it has been approached from cognitive, sociocultural, and didactic perspectives (Glăveanu, 2020). Today, it is defined as the production of ideas or products that are both original and effective or appropriate for a given context (Plucker et al., 2004; Runco & Jaeger, 2012), and it is studied through four approaches (person, process, product, and environment), each with its own instruments (Said-Metwaly et al., 2017).

Although it was initially conceived as an individual personality trait (Amabile & Pillemer, 2012; Glăveanu, 2010), its development depends largely on the interaction between the individual and their social and cultural environment (Amabile, 1996; Csikszentmihalyi, 1988; Hennessey & Amabile, 2010). In school, the physical environment, the pedagogical component, and social factors influence students' creativity (Davies et al., 2013; Richardson & Mishra, 2018).

Bronfenbrenner (1979) explained development as the result of an individual's interaction with nested systems (micro-, meso-, exo-, and macro-systems), to which he later added the chronosystem (Bronfenbrenner, 1986). Its mature version, the bioecological model, organizes development into process, person, context, and time (PPCT; Bronfenbrenner & Ceci, 1994; Bronfenbrenner & Morris, 2006). Proximal processes—reciprocal, regular, and progressively more complex interactions with people, objects, and symbols—are its primary mechanisms, and their strength varies depending on the individual, the context, and time (Bronfenbrenner & Morris, 2006).

Yeh (2004) applied this framework to creativity using an ecological systems model, tested with adult professionals, and Mouchiroud et al. (2022) organize their review of the social environment of creativity by system levels and note that the meso- and exosystems have been little studied. Among schoolchildren and adolescents, applications range from the qualitative description of a school workshop (Paris & Lawler, 2016) to interpretive comparisons between educational systems using data from PISA 2022 (Gelmez Burakgazi & Reiss, 2025). He et al. (2025) draw on ecological systems theory but test a gene × parent-child relationship interaction—a person × process mechanism specific to the PPCT model.

This discrepancy has been documented in other fields. Tudge et al. (2009, 2016) found that most studies cited the early version of the model and that, even when citing the mature version, only 2 out of 20 evaluated all four PPCT components. Tong and An (2024) observed the same pattern in international and intercultural education, and Dimova et al. (2026), in child and adolescent mental health, found that few studies address the exo-, macro-, or chronosystem.

In the field of creativity, recent reviews also fail to answer this question. Kupers et al. (2019) reviewed 184 studies on creativity in elementary school from a dynamic systems perspective; Yang et al. (2025) used ecological levels to classify factors in creative teaching, but focused on teachers; and Xu et al. (2025) organized the findings of their systematic review on creativity in children aged 3 to 6 according to those levels, without examining how the model is used or what evidence exists regarding its mechanisms. In summary, there has been no mapping of which model and with what fidelity Bronfenbrenner's perspective is applied to childhood and adolescent creativity, which levels and mechanisms are studied, or which research designs are used.

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Rationale A scoping review was chosen because the research question that underpins and guides the study is broad and exploratory in nature: it seeks to map how the ecological and bioecological models proposed by Bronfenbrenner are used and what types of evidence exist regarding their mechanisms, rather than to estimate effects. JBI considers this design appropriate for examining how a topic has been researched, clarifying concepts, and identifying knowledge gaps (Munn et al., 2018; Pollock et al., 2026). The expected body of literature is heterogeneous (quantitative, qualitative, mixed-methods, and theoretical studies, as well as reviews, using different constructs and measures of creativity), so a statistical synthesis is not appropriate. The review will follow the framework of Arksey and O'Malley (2005), with adjustments by Levac et al. (2010) and the JBI methodology (Peters et al., 2020).

The relevance of this scoping review is grounded in the very origins of the bioecological model: it was formulated to study individuals' developmental processes, not to classify contexts. If studies on creativity use this model for this purpose, the explanatory mechanisms (proximal processes, person × context interactions, change over time) remain unexamined. A detailed examination of the fidelity of its application and the level of empirical testing will reveal which levels and mechanisms have been studied, which are merely proposed, and which research designs are missing—providing guidance to researchers and those designing school programs using this framework. This review complements Xu et al. (2025), which focused on preschool, because it encompasses the school-age period and examines the use of the model itself, not just the factors it organizes.

METHODS

Strategy of data synthesis For the scoping review, all sources published from 1979 through the date of the search will be considered; furthermore, the following databases will be used: PubMed (Title/Abstract), Scopus (Article title, Abstract, Keywords), and WoS (Topic), along with the following search terms for identifying documents: ("Children" OR "Adolescents") AND ("Bronfenbrenner" OR "Bronfenbrenner model" OR "Bronfenbrenner ecological model" OR "Bronfenbrenner bioecological model" OR "Bronfenbrenner Process-Person-Context-Time model" OR "Bronfenbrenner Process Person Context Time" OR "Bronfenbrenner PPCT model" OR "Bronfenbrenner PPCT" OR "Bronfenbrenner social-ecological model" OR "Bronfenbrenner social ecological model" OR "Bronfenbrenner socio-ecological model" OR "Bronfenbrenner socioecological model" OR "Bronfenbrenner ecological" OR "Bronfenbrenner bioecological" OR "Bronfenbrenner social-ecological" OR "Bronfenbrenner social ecological" OR "Bronfenbrenner socio-ecological" OR "Bronfenbrenner socioecological" OR "Ecological model" OR "Bioecological model" OR "Process-Person-Context-Time (PPCT) model" OR "Process-Person-Context-Time model" OR "PPCT model" OR "Social-ecological model" OR "Social ecological model" OR "Socio-ecological model" OR "Socioecological model" OR "Ecological" OR "Bioecological" OR "Process-Person-Context-Time" OR "PPCT" OR "Social-ecological" OR "Social ecological" OR "Socio-ecological" OR "Socioecological") AND ("Creativity" OR "Creative thinking" OR "Divergent thinking" OR "Divergent production" OR "Ideational fluency" OR "Creative ideation" OR "Idea generation" OR "Creative idea generation" OR "Creative problem- -solving" OR "Creative problem-finding" OR "Creative potential" OR "Creative ability" OR "Creative abilities" OR "Creative skills" OR "Creative performance" OR "Creativity development" OR "Development of creative thinking").

Eligibility criteria The selection criteria are based on the PCC framework (Peters et al., 2020) and will be applied in the two stages that make up the screening process. Prior to formal screening, they will be tested on a sample of records, and any subsequent adjustments will be documented as a deviation from the protocol.

Inclusion Criteria

a) Population: children and adolescents aged 6 to 18. In studies with mixed-age samples, the study will be included if the mean age of the participants falls within that range or if the results for each age group are reported separately. Families, teachers, and peers may participate as informants, provided that the central focus and objective of the study is the creativity of children and adolescents.

b) Concept: model. The study must cite one of the following models as its theoretical or analytical framework: i) the ecological model (Bronfenbrenner, 1979, 1986); ii) the bioecological/PPCT model (Bronfenbrenner & Ceci, 1994; Bronfenbrenner & Morris, 2006); iii) a derived model based on one of the models proposed by Bronfenbrenner, such as the socioecological models or the ecological systems model of creativity development (Yeh, 2004). Studies that meet these criteria will be included regardless of the depth with which the model is applied, which will be coded during the data extraction stage.

c) Concept: creativity. The study examines the development of creativity in children and adolescents: its level, changes over time,

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associated factors, and processes or mechanisms. Any manifestation of creativity (creative potential or divergent thinking, creative beliefs or self-perceptions, creative behavior or achievement, creative product or process) and any domain is accepted.
d) Context: Any developmental context in any country will be included, such as school-based (classroom, school, educational system), family, community, or out-of-school settings.
e) Type of source: Original quantitative, qualitative, or mixed-methods studies (cross-sectional, longitudinal, or intervention studies); theoretical works that apply Bronfenbrenner's models to the creativity of children and adolescents; reviews of any type (systematic, narrative, scoping, or bibliometric); and chapters from academic books. Sources must be published as articles in peer-reviewed journals or as chapters in academic books, and must explicitly state the use of Bronfenbrenner's ecological or bioecological models, or be based on them as a theoretical or analytical framework.
f) Language and date: Publications in English or Spanish from 1979—the year *The Ecology of Human Development* was published—through the search date.

Exclusion Criteria
a) Studies that mention Bronfenbrenner only superficially, without presenting his models as a framework for the study; for example, an isolated citation in the introduction or a reference that appears only in the bibliography.
b) Studies whose subject matter is not creativity in children and adolescents, such as those that examine only creativity or creative teaching by educators.
c) Studies that use the term "ecological" in another sense, such as ecological validity, environmental ecology, Gibson's ecological psychology, or momentary ecological assessment.
d) Studies based on other systemic models of creativity that do not incorporate Bronfenbrenner's models, such as Csikszentmihalyi's systems model (1988) or dynamic systems approaches (Kupers et al., 2019).
e) Studies with samples consisting exclusively of children under 6 years of age or adults over 18 years of age.
f) Documents such as theses of any kind (doctoral, master's, or undergraduate), editorials, letters, and conference abstracts.

Source of evidence screening and selection An Excel® spreadsheet will be used to record the information, which will include the total number of articles, duplicates, records for reading titles and abstracts, records for reading full-text articles, as well as a synthesis of the evidence to be included: a) author and year, b) country, c) study designs, d) population and sample, e) definitions of creativity and Bronfenbrenner's models or models derived from them, f) interventions, programs, or proposals for the development of creativity based on Bronfenbrenner's models or models derived from them, g) main results, h) key findings, i) study limitations, and j) a narrative synthesis of emerging findings. Two researchers will independently record the information; in the event of any doubts or discrepancies in the recording of the information, a third researcher will be consulted to resolve these doubts or discrepancies.

Data management Two researchers (M.L.G.D. and A.C.-P.) will independently review the research articles, examining the title and abstract and reading the full-text articles according to the selection criteria (inclusion and exclusion). In the event of disagreements, a third researcher (M.D.-D.) will resolve these disagreements between the two researchers.

Reporting results / Analysis of the evidence The findings will be compiled and organized as follows: a) author and year, b) country, c) study designs, d) population and sample, e) definitions of creativity and Bronfenbrenner's models or models derived from them, f) interventions, programs, or proposals for the development of creativity based on Bronfenbrenner's models or models derived from them, g) main results, h) key findings, i) study limitations, and j) a narrative synthesis of emerging findings. Additionally, they will be organized, grouped, and presented through narrative syntheses based on themes or content that overlap across the articles. Likewise, the elements necessary to answer sub-questions a–e will be recorded: the stated and applied model, system levels and PPCT components, proposed mechanisms, level of empirical testing, and method of assessing creativity. The form will be piloted and may be adjusted during data extraction (Pollock et al., 2023), and primary studies included in other reviews will be counted only once.

Presentation of the results The PRISMA flowchart (Page et al., 2021; Tricco et al., 2018), tables, figures, and a narrative summary will be used to present the results, taking into account the emerging categories and patterns of similarity that arise during the course of the scoping review. In addition, a table or evidence map will cross-reference the model used (ecological, bioecological/PPCT, or derived), the system levels examined, and the level of empirical testing of the

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mechanisms, to show which combinations have been studied and where knowledge gaps lie.

Language restriction English and Spanish.

Country(ies) involved Chile.

Other relevant information None

Keywords Creativity; Bronfenbrenner; Bioecological model/Bioecological model; Ecological systems theory; Ecological systems theory.

Dissemination plans Once the review is complete, it will be submitted to an international peer-reviewed journal. In addition, the findings of this research will be presented at research seminars and national or international conferences with the aim of providing educational guidance on the development of creativity using Bronfenbrenner's models.

Contributions of each author

Author 1 - Mario Díaz-Díaz - Conceptualization, methodology, research, data curation, writing—preparation of the original draft, writing—review and editing.
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