Journal of Childhood, Education & Society
Volume 5, Issue 2, 2024, 176-200
DOI: 10.37291/2717638X.202452371
ISSN: 2717-638X
Research Article

A systematic review on factors influencing the development of children's creativity

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Abstract: No one can deny that creativity is essential for survival and a key skill for prosperity in the 21st century. In an era where the skill of creativity is the pathway to development, it is crucial that we nurture children's creativity to better prepare them for academic, professional, and personal success. Systematic reviews on factors that could support or impede children's creativity is scarce. The present review was conducted to fill this gap. Major electronic databases were searched and studies meeting predetermined selection criteria were analyzed. The search yielded 55 studies published between 2010 to 2022 in English. We classified influencing factors into four types: individual, family, educational, and socio-cultural factors. We concluded by discussing recommendations for parents, educational stakeholders and researchers.

Article History
Received: 28 December 2023
Accepted: 26 March 2024

Keywords
Creativity; Development; Children; Factors; Systematic review

> Electricity is not only present in a magnificent thunderstorm and dazzling lightning, but also in a lamp; so also, creativity exists not only where it creates great historical works, but also everywhere human imagination combines, changes, and creates anything new" (Vygotsky, 1930/1967, cited in Smolucha, 1992, p. 54)

Introduction

Creativity is one of the finest and highest skills and abilities that are needed to face the challenges and the uncertainties of the rapidly changing world of 21st century (Beghetto, 2021; United Nations Educational Scientific and Cultural Organization (UNESCO), 2022). It is regarded as a vital skill in today's world and recognized as a key competency by international organizations such as the Organisation for Economic Development (Organisation for Economic Co-operation and Development (OECD), 2004, 2008, 2018, 2022) and World Economic Forum (World Economic Forum, 2016, 2018). According to the World Economic Forum (2016), around 65% of today elementary school children will be employed in professions that have not been created yet. Frey and Osborne (2017) add that jobs which need a high level of creativity are not likely to be automated in the present era. This is because AI can only generate artificial creativity that lacks many features such as authenticity and problem finding (Runco, 2023). Therefore, specific focus should be placed on nurturing creativity especially in children.

The Concept of Creativity

Forming a single universally accepted definition of creativity is a difficult task as the construct is multidimensional, encompassing cognitive, personality-related, and environmental factors (Metwaly et al., 2021). However, even though creativity is defined in various ways, there is a consistent emphasis on two elements that are fundamental in its description: originality and usefulness (Runco & Jaeger, 2012). Originality refers to the production of ideas that are new compared to other ideas currently available whereas usefulness characterizes ideas that have value. Beghetto and Glăveanu (2020) argue that this standard definition of creativity that emphasizes novelty and usefulness is overly product-oriented and does not appear to encompass the full construct.

Plucker and colleagues (2004) suggested the following definition in an attempt to represent and bring

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together diverse views found in the literature: creativity is "the interaction among aptitude, process, and environment by which an in dividual or group produces a perceptible product that is both novel and useful as defined within a social context" (p. 90). This definition is seemingly becoming more popular in the field (Batey, 2012; Beghetto et al., 2015). It takes into consideration the different perspectives found in other conceptions such as person and product. It is also in strong accordance with social cognitive theory (Bandura, 1986) which highlights the dynamic interplay and interaction among personal attributes, behaviors and environment while also acknowledging the active role of the person (Bandura, 2001).

Paul Torrance who is called the 'father of creativity' developed Torrance Tests of Creative Thinking (TTCT) based on Guilford's (1967) concept of divergent thinking to measure a person's capacity to produce different and original ideas to find a solution to a problem. These tests are one of the most popular tests in creativity research used to measure creative thinking, and they were translated into more than 35 languages (Millar, 2002). The test is based on measuring divergent thinking as conceptualized by Guilford (1967). Guilford views divergent thinking as a thought process used to produce various ideas to address a problem. This process is based on four sub-skills or sub-facets namely fluency, originality, elaboration and flexibility. Fluency is the ability to generate a great number of ideas to address a problem. Originality is defined as the ability to generate creative ideas different from those of others. Elaboration refers to the ability to develop ideas by adding details. Flexibility is described as the ability to produce a variety of ideas and solutions across various categories and different points of view.

It is important to note that two well-known frameworks have directed understanding and study of creativity. The first framework is the Four Ps of Creativity (Rhodes, 1961), in which creativity is structured in terms of Person, Product, Process and Press. Person refers to the individual or the creator who produces the creative product. Process are the steps or ways the creator follows to produce original ideas. Press is the environment around the creator, like school, family or culture that influence how they think and create. Product is the creative outcome or result of a creative process. The second framework is the Four Cs Model proposed by Kaufman and Beghetto (2009) which delineates four constructs that distinguish various degrees of creativity. It should be highlighted that it is inaccurate to describe creativity in people in terms of existence or non-existence (Dilekçi & Karatay, 2023). This is because creativity is present at various levels in everyone. Kaufman and Beghetto point out four levels of creativity (Beghetto & Kaufman, 2007, 2014; Kaufman & Beghetto, 2009). With respect to children, Little-c and Mini-c can be observed and nurtured. Figure 1 summarizes the descriptions of each level.

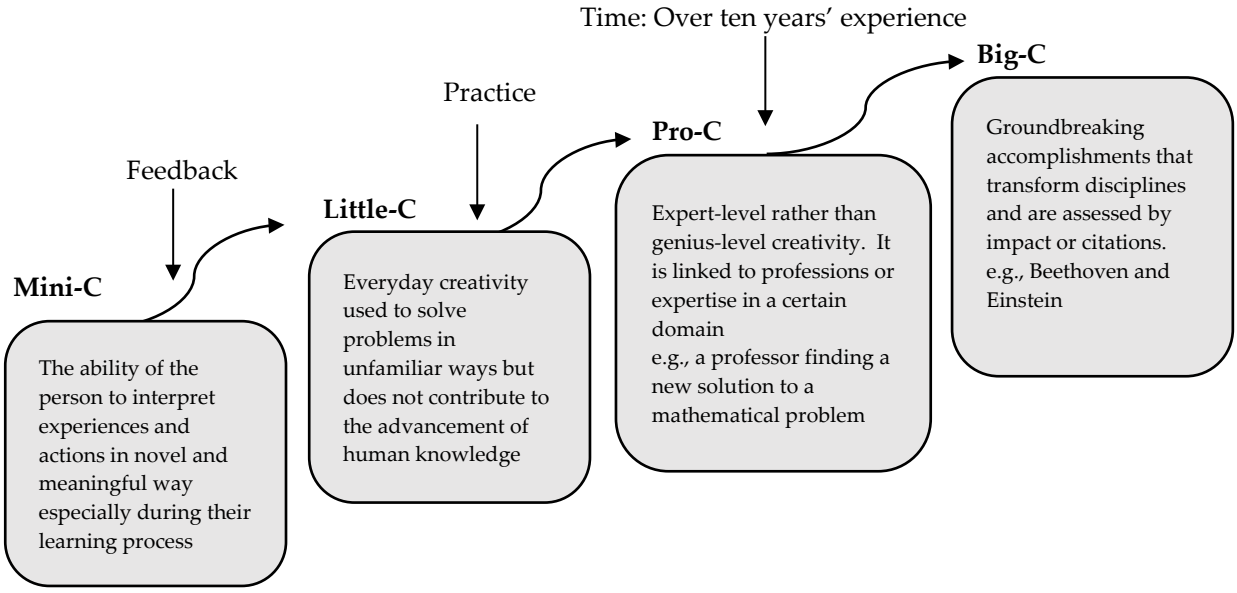

Figure 1. The Four Cs Model of Creativity (Beghetto & Kaufman, 2007, 2014; Kaufman & Beghetto, 2009)

In relation to creativity development, the environment or press plays a significant role. The first

theories and models of creativity focused on the person and the measurement of individual attributes related to creativity using psychological or psychometric approaches; however; more recent views and theories put emphasis on the role of the contextual factors that influence the ability to think creatively (Gomes et al., 2016; Henriksen et al., 2016; Shalley et al., 2004). Indeed, creativity does not emerge in a vacuum, rather it occurs within and is shaped by the social context. Sawyer (2006) and Wilson (2009) emphasize that the skill can be nurtured or stifled within the community in which the individual lives. An individual who is in an environment where creative ideas are not encouraged will find it difficult to be creative, whereas an individual who lives in an environment that promotes creative thinking is more likely to be a creative thinker (Kaufman, 2009).

Creativity in Childhood

Childhood is the golden age of creativity (Gardner, 2008). Each child has the ability to think creatively (Lee & Kemple, 2014) and to demonstrate and develop their creativity (Craft, 2002). However, if creativity is not encouraged in childhood, the likelihood of having adults equipped with this skill is low (Kaufman, 2018). Neurologically, the first years of life are very critical for developing the skill when the brain is still wiring (Eliot, 1999). As Shonkoff and Phillips (2000) indicated, the brain's capacity to develop and cope with environmental changes is more powerful during early childhood compared to other stages of life. Nevertheless, though children are endowed with a natural instinct to create, there is a need for an environment that supports creativity to develop in the early years of childhood (Shonkoff & Phillips, 2000). That is to say, creativity can be influenced by not only genetic factors, personality characteristics, cognitive capability, but also the surrounding environment, with the environment being a significant factor (Kandler et al., 2016; Velázquez et al., 2015). Korzynski, Paniagua, and Rodriguez-Montemayor (2019) add that creativity is not only a personal attribute but also a social phenomenon.

Present Study

To the best of our knowledge, there is no systematic review on the factors influencing the development of children's creativity. Existing systematic reviews focus on themes such as obstacles and opportunities for educators in promoting children's creativity in online learning environments (Maslin et al., 2023), how interventions, trainings and programs can foster creativity from an early age (Alves-Oliveira et al., 2021; Ruiz-del-Pino et al., 2022), creating a framework to explain how children are creative using complex dynamic systems theory (Kupers et al., 2019) and how digital technologies influence the development of young children's creativity (Fielding & Murcia, 2022). One systematic review investigated the role of context in developing adolescents' creativity (Zanden et al., 2020).

Systematic analysis of factors that might facilitate or hinder children's creativity is therefore scarce. A systematic review in this area is much needed to help understand the factors related to children's creativity development. The current review aims to fill this gap. A clear understanding of the factors that foster or impede the promotion of children's creativity would help parents, educational policy makers and teachers establish a supportive environment for nurturing creativity. Instead of asking a child at home or in the classroom to be creative, we need to provide them with an encouraging and an appropriate environment that can stimulate their creativity. Therefore, in line with the purpose of the current review, this study sets out to answer one research question: What factors influence the development of children's creativity?

These factors which are based on the findings of previous empirical studies were identified and categorized as effective recommendations discussed later.

It is important to clarify that this systematic review does not present a meta-analysis but rather aims to provide a comprehensive synthesis of the literature on factors influencing children's creativity. While meta-analyses statistically combine data from multiple studies, our systematic review aims to provide a thorough narrative synthesis of relevant literature.

Method

Once the research question was formulated, systematic and explicit methods were employed to identify, choose and critically analyze pertinent research findings from major educational databases. Clear criteria for inclusion were formulated to specify which studies to choose for the review. The studies included are:

- studies on individual, family, educational and social-cultural factors that influence the development of children's creativity
- published between 2010 and 2022
- empirical
- published in English
- published in peer reviewed journals

Including individual, family, educational, and socio-cultural factors ensures a holistic understanding of creativity development in children. Focusing on empirical studies published between 2010 and 2022 ensures the incorporation of recent literature while maintaining relevance to contemporary insights and trends in understanding creativity development in children. Moreover, limiting the review to English publications enhances accessibility, making the findings valuable to a wider audience. Inclusion of peer-reviewed journals ensures the reliability and credibility of the reviewed literature.

Our inclusion criteria were designed to review studies that contribute to understanding the factors influencing children's creativity, including those published in journals with a broader disciplinary focus. By including these more general journals, we aimed to ensure a comprehensive review of the literature, encompassing diverse perspectives and insights that contribute to understanding the development of children's creativity.

The exclusion criteria for the current systematic review are as follows:

- Studies focusing on adult populations or individuals outside the specified age range.
- Non-empirical studies (e.g., literature reviews, theoretical papers).
- Non-English language publications.
- Studies published before 2010.
- Studies unrelated to factors influencing children's creativity
- Non-peer-reviewed research.
- Studies lacking methodological rigor (e.g., significant flaws).

Data Collection

An extensive search for relevant studies was conducted in February 2023 and was based on different sources in order to include all the relevant studies in the review. The search process involved the use of various search databases, including ERIC (Education Resources Information Center), Taylor & Francis, Scopus, Web of Science, Springer Link, ScienceDirect and Jstore in addition to the search engine Google Scholar. Key journals specialized in studies on creativity and children such as Creativity Research Journal, Journal of Creative Behavior, Thinking Skills and Creativity, Psychology of Aesthetics Creativity and the Arts, Early Child Development and Care and Journal of Child and Family Studies were also searched. We also examined the reference lists of the articles identified to find additional pertinent studies. Studies were considered eligible if they met all the outlined inclusion criteria. Figure 2 provides a summary of the primary stages involved in gathering data for the systematic review.

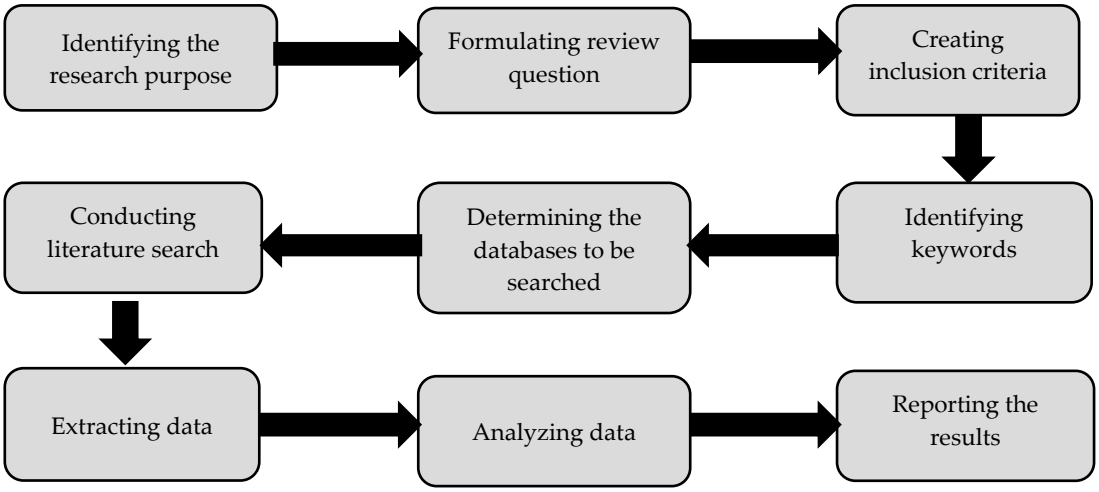

Figure 2. Steps in collecting data for the systematic review

To ensure the selected studies met the inclusion criteria, we engaged in the process of selecting relevant studies as illustrated in Figure 3. In the first stage, we removed 400 irrelevant studies by meticulously reading the title of the retrieved studies, after which 3839 studies remained. Subsequently, in the second stage, we excluded, unpublished papers, review articles, theses and commentaries and studies that did not have children as samples, resulting in the removal of an additional 3778 articles with 65 remaining. During the last stage, we conducted a comprehensive search to locate the full text of the remaining 55 articles used in this systematic review.

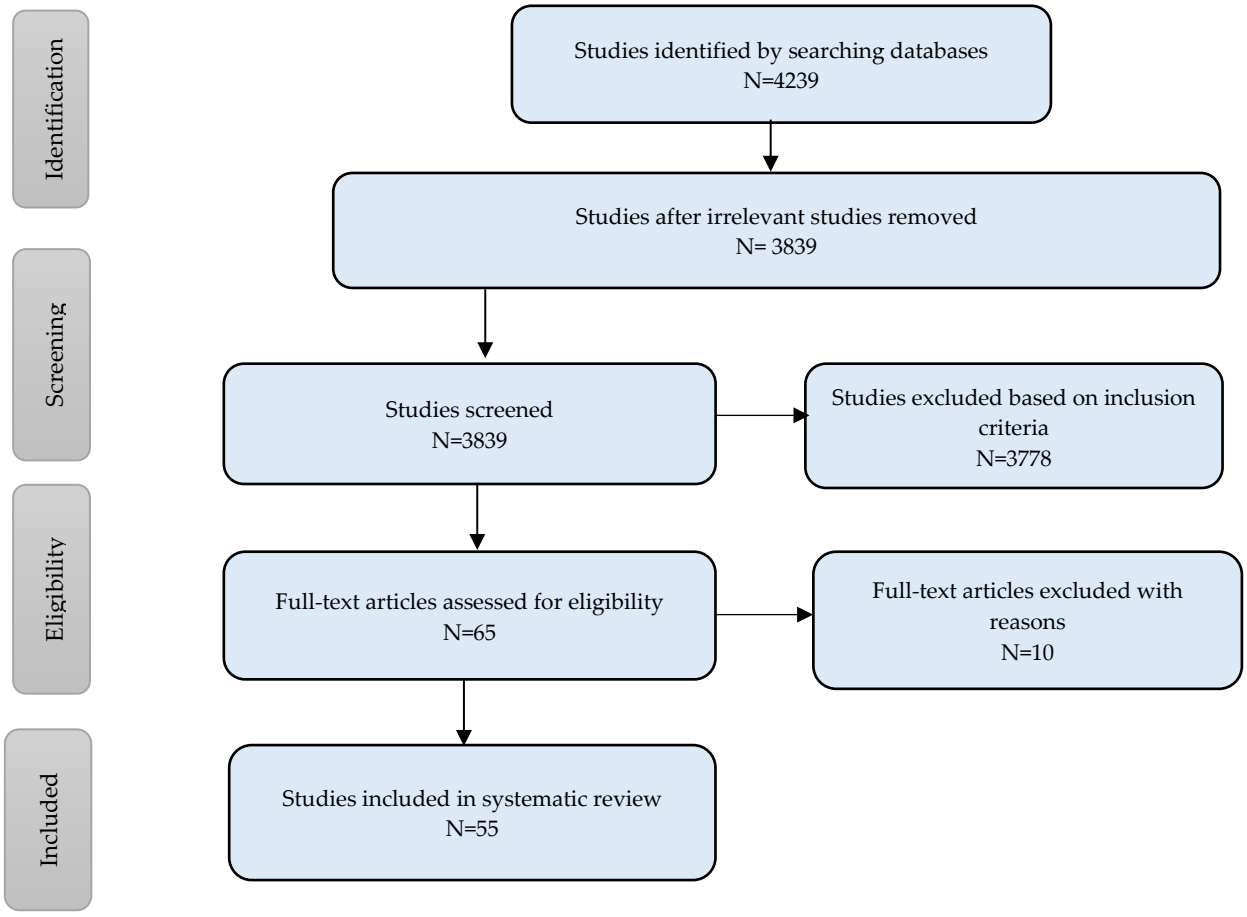

Figure 3. Selection process of studies in systematic review

Data Analysis

Following the compilation of pertinent studies, we tried to create a descriptive overview of these studies. To achieve this, we formulated a coding scheme for the purpose of scrutinizing the studies for specific characteristics in alignment with the review's purpose. We systematically extracted and documented the subsequent details from each empirical study:

- Year of publication
- Country
- Journal
- Type of factors
- Major findings

The extracted data was organized and recorded within a Microsoft Excel spreadsheet. The coding process was created based on Creswell's design of qualitative analysis (2016). Table 1 is an example illustrating how the studies were classified based on the established coding system.

Table 1. Example of the coding scheme of the selected studies for analysis

Study	Journal	Country	Type of factors	Major findings
(Vong et al., 2020)	Creativity Research Journal	China	Individual Family	Boys scored higher than girls in three domains: originality, fluency, and imagination. Children who didn't have siblings exhibited higher levels of creativity in fluency and originality compared to those with siblings, though this difference wasn't observed in imagination.
(Cantero et al., 2016)	Creativity Research Journal	Spain	Family	Maternal sensitivity had a significant, direct, positive impact on self-esteem, and a direct negative impact on shyness and this significantly influence creativity
(Zhang et al., 2020)	Thinking Skills and Creativity	China	Individual Educational	The findings indicated a positive correlation between students' creative thinking and their perception of teacher support. Particularly, the influence of perceived teacher support on divergent thinking was stronger in boys than in girls.
(Massonnié et al., 2019)	Frontiers in Psychology	United Kingdom	Educational	The findings demonstrated that classroom noise did not enhance children's creativity; instead, some adverse effects of the noise were noticed.
(Leikin & Tovli, 2014)	Creativity Research Journal	Russia	Socio cultural	Bilingual children consistently achieved high scores in convergent thinking from an early age, and maintained stable cognitive abilities throughout their development.

Results and Discussion

This section presents a discussion of the key results in the present systematic review. Then recommendations for parents, educational stakeholders and future research are formulated based on our review insight.

The review identified 55 studies with the majority (n=26) published in the leading journals on creativity research namely Thinking Skills and Creativity (n=17), Creativity Research Journal (n=5) and Journal of Creative Behaviour (n=4). For each article, we examined which factors were predominant to determine in which column the study fits best. Table 2 provides a summary of the results regarding the main factors investigated in the sample of studies we analyzed. The table serves as a quick reference, emphasizing the multifaceted nature of creativity development in children and the varying influences present across various socio-cultural contexts.

Table 2. A list of all the selected studies

Study	Country	Individual factors	Educational factors	Family factors	Socio cultural factors
(Massonnié et al., 2019)	UK		X		
(Dong et al., 2022)	China			X	

(Shah & Gustafsson, 2020)	UK	X	X			
(Moghadam & Razavi, 2022)	Iran		X			
(Castillo-Vergara et al., 2018)	Chile	X	X	X		
(Albar & Southcott, 2021)	Australia		X			
(Gong et al., 2020)	China	X	X	X		
(Setiyowati et al., 2019)	Indonesia			X		
(Zhang et al., 2020)	China	X	X			
(Craft et al., 2013)	UK		X			
(Roppola & Whitington, 2014)	Australia		X			
(Murcia et al., 2020)	Australia		X			
(Tang et al., 2022)	China			X		
(Lu et al., 2022)	China			X		
(Pang et al., 2020)	China			X		
(Liang et al., 2021)	China	X	X	X		
(Shi et al., 2021)	China			X		
(Zhang et al., 2018)	China	X		X		
(Vong et al., 2020)	China	X		X		
(Zbainos & Tziona, 2019)	Greece		X			
(Van Hooijdonk et al., 2020)	Netherlands		X			
(Schoevers et al., 2019)	Netherland		X			
(Willemsen et al., 2020)	Netherland	X				
(Üret & Ceylan, 2021)	Turkey		X			
(Tekin et al., 2012)	Turkey		X			
(Çetin & Ata, 2020)	Turkey			X		
(Celume et al., 2019)	France		X			
(Guignard et al., 2016)	France	X				
(Kyritsi & Davis, 2021)	Scotland		X			
(Kim & Park, 2020)	Korea			X		
(Huh & Lee, 2019)	Korea		X			
(Momeni et al., 2017)	Iran		X			
(Wei & Lee, 2015)	Taiwan	X	X			X
(Liao et al., 2018)	Taiwan		X			
(Wei & Dzeng, 2013)	Taiwan	X				X
(Ibán et al., 2020)	Spain		X			
(Cantero et al., 2016)	Spain	X		X		
(López-Martínez & Lorca Garrido, 2021)	Spain	X				
(Alfonso-Benlliure & Santos, 2016)	Spain	X				
(Krumm, Filippetti, et al., 2018)	Argentina	X				
(Krumm, Lemos, et al., 2018)	Argentina	X				
(Knox et al., 2022)	USA			X		
(Saggar et al., 2019)	USA	X				
(Al-Tamimi & Al-Qudah, 2019)	Jordan			X		
(Fearon et al., 2013)	Jamaica			X		
(Yildiz & Guler Yildiz, 2021)	Turkey	X		X		
(Kwaśniewska et al., 2018)	Poland			X		
(Theurer et al., 2020)	Switzerland	X				
(David & Pastor, 2017)	Romania	X				
(Bezerra et al., 2022)	Brazil	X				
(Leikin & Tovli, 2014)	Russia	X				X
(Chung et al., 2016)	China/France					X
(Hondzel & Gulliksen, 2015)	Norway/Canada					X
(Pugsley & Acar, 2020)	Not indicated			X		

The table above indicates that the studies included in the systematic review originate from diverse countries. Factors affecting creativity are categorized into four main areas: individual, family, educational, and cultural. Several studies explored one type of factor, while others explored a combination of factors.

Figure 4 provides a visual summary of research distribution across educational, family, cultural, and individual factors, giving a quick overview of where research emphasis lies within these domains.

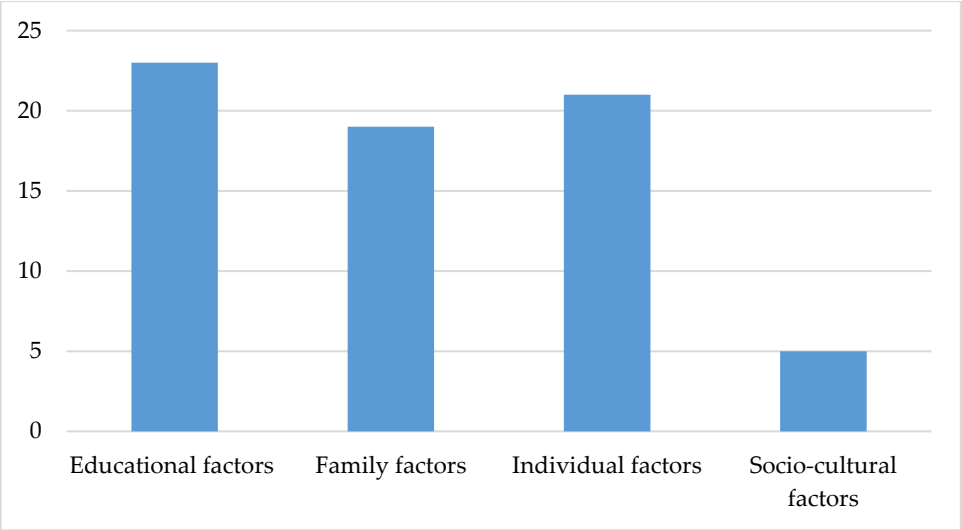

Figure 4. Type of factors that impact the development of creativity in children based on the selected studies

The figure illustrates that educational factors (n=23) have been the focus of the majority of studies on creativity in children, indicating a significant interest in understanding how educational practices impact creativity development in children. Individual factors (n=21) have also received considerable attention. Socio-cultural (n=5) is the least investigated factors in the reviewed studies. This suggests a gap in the existing literature regarding the influence of socio-cultural environments on children's creativity, suggesting a need for further research in this area.

In relation to the methodology design used in the sample, correlational studies (n=20) made up the majority followed by quasi-experimental or experimental studies (n=18), cross-sectional studies (n=10) and case studies (n=5). Correlational studies explored real-world relationships between different factors and creativity development without manipulating variables. This kind of studies provide insight into potential relationships between certain variables and creativity and also lay the foundation for more controlled experimental research. Experimental studies focused on manipulating variables to establish cause and effect relationships between specific variables and creativity. These controlled experiments enhance our understanding of how certain factors influence creativity and also verify hypotheses generated from correlational research. Cross-sectional studies helped capture a snapshot of creativity at a specific point in time, shedding light on differences among various groups or demographics. Finally, case studies provide in-depth, qualitative insights into the contextual factors affecting creativity within a real-life context. These kinds of research studies contribute to a more holistic comprehension of the factors affecting the development of children's creativity. Table 3 describes the selected studies in terms of the adopted methodology design, data collection instruments, the sample and the age of the participating children to facilitate comparison, and synthesis of the research findings presented in the review.

Table 3. The methodological design used in the selected studies

Study	Research methodology	Data collection instruments	Sample	Age of the participating children
(Massonnié et al., 2019)	Quasi-Experiment design	Idea generation tasks, selective attention assessments, and working memory assessments	44	5 and 11
(Dong et al., 2022)	Correlational Design	Questionnaires	329 student–parent pairs	Grade 4, 5, 7 and 8
(Shah & Gustafsson, 2020)	Quasi-Experimental Design	Verbal task (Guilford's Alternative Uses Task) and figural task (Test for Creative Thinking–Drawing Production).	111	7 to 11 years
(Moghadam & Razavi, 2022)	Quasi-experimental design	Pretest and posttest assessments of academic performance and creativity.	756	Grade 3
(Castillo-Vergara et al., 2018)	Quasi-experimental design	Establishment Vulnerability Index (EVI) The Multifactorial Evaluation of Creativity	1062	11 years

		(EMUC) test		
(Albar & Southcott, 2021)	Case studies	Observations Semi-Structured Interviews Artifacts Data	nineteen	5 and 6-year
(Gong et al., 2020)	Experimental design	Torrance's Thinking Creatively in Action and Movement (TCAM) test Questionnaires	420	4-years
(Setiyowati et al., 2019)	Correlational design	Questionnaires	677	Grade 1, 2, 3
(Zhang et al., 2020)	Correlational design	Perceived Teacher Support Questionnaire, Creative Self-efficacy Scale, Divergent Thinking Test, and Remote Associate Test	362	8–12 years
(Craft et al., 2013)	A case study Micro-ethnographic study	Observation Interview Documentary evidence (school)	560 children	11-years
(Roppola & Whitington, 2014)	A descriptive case study	Non-participant Observation Video Recording Video-Stimulated Review Interview	72	5-8 years
(Murcia et al., 2020)	Experimental design	Observation Digital photographs A to E of Creativity Framework.	8 children	3 and 4 year-
(Tang et al., 2022)	Correlational Research	Creativity Fostering Teacher Index Karwowski's creative self-efficacy scale Runco Ideational Behavior Scale	5523	younger than 18 years
(Lu et al., 2022)	Experimental design	Torrance Tests of Creative Thinking-Figural the Alternative Uses Test insight problem solving video observation and post-coding	74 pairs of students and their parents and grandparents	9 on average
(Pang et al., 2020)	A cross-sectional survey design	Torrance Test of Creative Thinking-Figural and Alternate Uses tasks Parents' reports	1,710	aged 6–13.
(Liang et al., 2021)	Correlational study	A divergent thinking figural, a product-oriented measure through CAT, a creativity domain questionnaire, MacArthur scale of subjective social status, questionnaire from the Parental Involvement in Activities Scale, The USC Parental Overcontrol Scale, Parental autonomy support, After-school activities participation questionnaire, creative self-efficacy questionnaire, Aurora battery of successful intelligence	606	9 and 14 years
(Shi et al., 2021)	Correlational study	Consensual Assessment Technique (CAT), Family's Support of Perseverance in Creative Efforts questionnaire, search persistence scale, Disaster Exposure Scale, Motivation scale	134 Chinese	
(Zhang et al., 2018)	Correlational study	The Family Affluence Scale, Parent-Child Relationship Scale, the Chinese Five Personality Inventory for Children, The Social Creativity Questionnaire for Elementary School Children	955	8 to 13 years
(Vong et al., 2020)	Correlational study	Torrance's Thinking Creatively in Action and Movement tests (TCAM), Chinese version	493	M age = 74 months
(Zbainos & Tziona, 2019)	A quasi-experimental design	Graphic-artistic form of the Evaluation of Potential Creativity (EPoC) test	90	11 years
(Van Hooijdonk et al., 2020)	Experimental design	Creative problem-solving tasks	140	Grade 4 and 5
(Schoevers et al., 2019)	A case study	Observation Interviews	22	Grade 4
(Willemsen et al., 2020)	Quantitative with a focus on structural equation modeling (SEM)	Mathematical creativity test (MCT), Test of Creative Thinking–Drawing Production Form A, Creative Writing Task, Dutch standard mathematical achievement test, the Dutch standard literacy achievement test, Raven's	331	8.5 to 11.5 years old

		Standard Progressive Matrices (Raven		
(Üret & Ceylan, 2021)	A quasi-experiment	'Torrance Tests of Creative Thinking Figural A Form and Figural B Form' were used as data collection tools in the research.	30	5-year-old
(Tekin et al., 2012)	A quasi-experiment	How creative are you scale?	251	6th, 7th, 8th
(Çetin & Ata, 2020)	A correlational design	the Korea Integrative Creativity Test and Parental Bonding Instrument Scale	71 mothers, 71 fathers, and 71 4-6-year-old children	4-6-years
(Celume et al., 2019)	Experimental design	EPoC battery of test to measure convergent and divergent tests Valence and arousal Self-Assessment Manikin scale (SAM)	55	9 and 11 years
(Guignard et al., 2016)	A correlational design	Wechsler intelligence scale validated for children and adolescents EPoC (Evaluation of Potential Creativity)	338	3 to 10 years
(Kyritsi & Davis, 2021)	A qualitative case study design	Field Notes Interview Transcripts:	25 children	11–12 years
(Kim & Park, 2020)	A correlational design	TTCT RIBS to measure everyday ideational capacity	333 Korean Students with their parents (333)	M age= 11.96
(Huh & Lee, 2019)	An experimental design	Torrance Test of Creative Thinking (TTCT), pretests and posttests of English, and a questionnaire.	Twenty-seven	Grade 5
(Momeni et al., 2017)	An experimental design	Creativity test of Jean-Louis Cellier	52	4 to 6 years
(Wei & Lee, 2015)	Experimental research.	A revised version of the Torrance Test of Creative Thinking and the Creativity Test for Preschoolers	149 children	4 to 6 years
(Liao et al., 2018)	A quasi-experimental approach	English receptive vocabulary test, the Torrance Test of Creative Thinking, and an English learning motivation questionnaire	256 elementary	6 to 7 years
(Wei & Dzeng, 2013)	Cross-sectional design	Creativity Test and Scoring Scale People-drawing Test Scorings Scale Free-drawing Test and Scoring Scale	1,055	6 to 8 years
(Ibán et al., 2020)	Experimental design	CREA test to measure creative thinking Grade Point Average (GPA)	Sixty	9 and 10 years
(Cantero et al., 2016)	Correlational design.	Children's Creativity Test Creative Intelligence Test Questionnaire Assessing Self-Esteem during Elementary School Shyness Scale	151	6–12 years
(López-Martínez & Lorca Garrido, 2021)	A correlational, cross-sectional, quantitative approach	A creativity test (PIC-N) and a test about intelligence	323	9 and 12 years
(Alfonso-Benlliure & Santos, 2016)	Cross-sectional design	Test de Creatividad Infantil (Child Creativity Test)	1491	6 and 12 years
(Krumm, Filippetti, et al., 2018)	Cross-sectional design	The figural torrance tests of creative thinking (TTCT), CREA. Creative intelligence, K-BIT, Kaufman brief intelligence test, Working Memory, WISC-IV, Stroop color-word test, Shifting tasks	209	8- to 13 years
(Krumm, Lemos, et al., 2018)	A correlational research design	The Torrance Test of Creative Thinking-Figural Form B; and the Creative Personality Scale (EPC).	359	9 to 13 years
(Knox et al., 2022)	A qualitative research design	Video recordings of family groups and wider classroom settings and Conversation analysis.	five child-caregiver dyads	Grade 1 and - 6

(Saggar et al., 2019)	Experimental design	NEPSY-II Inhibition task, Emotionality, Activity, and Sociability (EAS-TS) Scale, Child Behavior Checklist (CBCL), Torrance Test of Creative Thinking-Figural (TTCT-F), Wechsler Abbreviated Scale of Intelligence, Second Edition (WASI-II), Functional Near-Infrared Spectroscopy (fNIRS) data were collected using a 52-channel Hitachi ETG-4000 Optical topography system	48	9 years
(Al-Tamimi & Al-Qudah, 2019)	Cross-sectional design	Parenting Style Measure (a questionnaire) Creativity Measure (a questionnaire)	677	grades 1-3
(Fearon et al., 2013)	Correlational design	Torrance Tests of Creative Thinking Parenting Styles and Dimensions Questionnaire (PSDQ)	54 parents and 66 students	M age= 9.4 years
(Yildiz & Guler Yildiz, 2021)	Correlational	A demographic information form, Torrance Tests of Creative Thinking Figural Form A, the Scientific Concepts and Scientific Process Skills Instrument for Preschool Students, and the Home Screening Questionnaire for children of 3–6 years of age	70	60 and 66 months
(Kwaśniewska et al., 2018)	Correlational	The ten-item personality inventory The climate for creativity in parent-child relationship questionnaire	Mothers in Poland (N = 3073)	▪
(Theurer et al., 2020)	Correlational research	Holistic Measure for Creative Potential Divergent Thinking Tasks Openness to Experience Scale	▪	Grade 5
(David & Pastor, 2017)	Cross-sectional correlational study	Creative Attitude Survey (CAS), Two samples of creativity tests (one verbal and one figurative), Four tasks of Generating alternatives, Bonnardel 53 test to measure intelligence, Academic performance	22	10 and 12 years
(Bezerra et al., 2022)	Cross-sectional observational study	Brazilian Figural Creativity Test (TCFI) Wechsler Abbreviated Scale of Intelligence (WASI), Phonological Awareness - Sequential Assessment Tool (CONFIAS), Reading Assessment of Words and Pseudowords Isolated (LPI),	75	Grade 1, 2, 3
(Leikin & Tovli, 2014)	Cross-sectional comparative study	Working Memory Test, Creative Thinking Tests,	31	M age =71.9 months
(Chung et al., 2016)	Cross-cultural comparative research study	(Wallach-Kogan Creativity Tests; WKCT), (Evaluation of Potential Creativity; EPoC)	288	6 to 11 years old.
(Hondzel & Gulliksen, 2015)	Qualitative research	semi-structured interviews	2 of the participants are fathers and 9 are mothers	▪
(Pugsley & Acar, 2020)	Correlational Research Design	Torrance Ideal Child Checklist, Attitudes and Values Scale, The Creative Environment Scale, Interpersonal Mindfulness in Parenting Scale, Marlowe-Crowne Social Desirability Scale, knowledge of Resources for Infant Educarers (RIE) Parenting, Demographic collection survey	1324 parents	▪

The inclusion of various research methodologies across the selected studies highlights the diversity and comprehensive approach taken towards investigating children's creativity development. The sample sizes in the reviewed studies vary widely, including children, parents or caregivers and specific demographic groups. The participating children's ages range from 3 to 14 years old and reflect the varied developmental stages and educational levels of the children involved in the studies. This variety in sample selection, contexts, and age allow for a richer and more nuanced understanding of creativity development in children.

Regarding years of publication, Figure 5 shows the general trend of the number of studies on the factors affecting the development of creativity in children from 2010 to 2022. The year 2020 was a particularly productive period as 12 out of the 55 articles were published. This is consistent with what was found in Fielding and Murcia's review (2022). Also, the increase in publications indicates researchers' growing awareness of the significance of creativity for children. This corresponds also with the findings of previous systematic reviews (Fielding & Murcia, 2022; Maslin et al., 2023; Smare & Elfatihi, 2023).

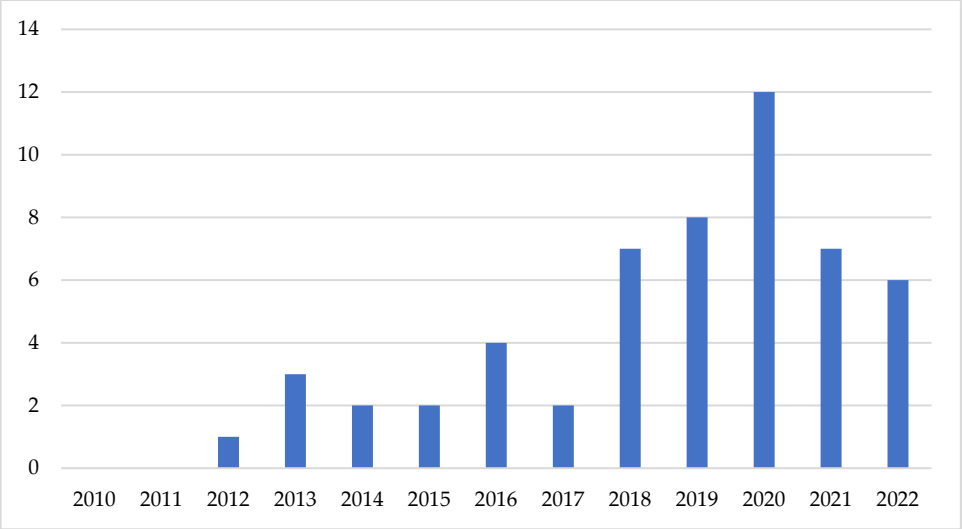

Figure 5. Distribution of studies between 2010 and 2022

The fifty-five studies that were included in the current review were conducted in 25 countries. Most commonly, the studies were conducted in China (n=11). Figure 6 illustrates the distribution of studies by country.

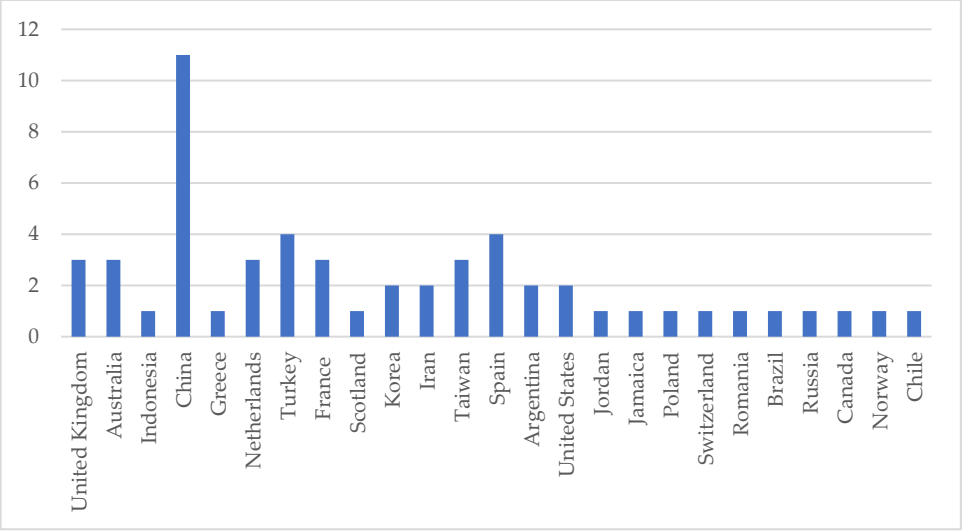

Figure 6. Distribution of the selected studies by country

Although the studies were distributed across 25 countries, many of them were conducted in China. This is understandable as creativity has attracted increasing attention recently in the country. A shift from 'Made in China' to 'Created in China' is the China's economic future strategy (Wuwei, 2011). The phenomenon of 'Made in China' and 'created by foreign capital' which is based on sweat industries and China's dependence on exports and low-cost processing has produced unwanted consequences such as exhaustion of natural resources, environmental pollution and lack of innovation (Wuwei, 2011). Therefore, the development of creativity in this country is viewed as a crucial educational objective to be integrated into the regular curriculum and across all subjects (Cheng, 2010). Additionally, the development of

creativity in young children has become a key focus in the educational policies outlined by Chinese policymakers (Vong, 2008).

Figure 7 provides a summary of the major factors that were investigated in the reviewed studies, offering a quick and comprehensive overview of the foci of the studies included in the review, along with their corresponding findings. Noteworthy, (+) shows a positive correlation with measures of creativity, (−) indicates a negative correlation with creativity, while (~) is inconclusive, meaning no obvious conclusions can be deduced from findings.

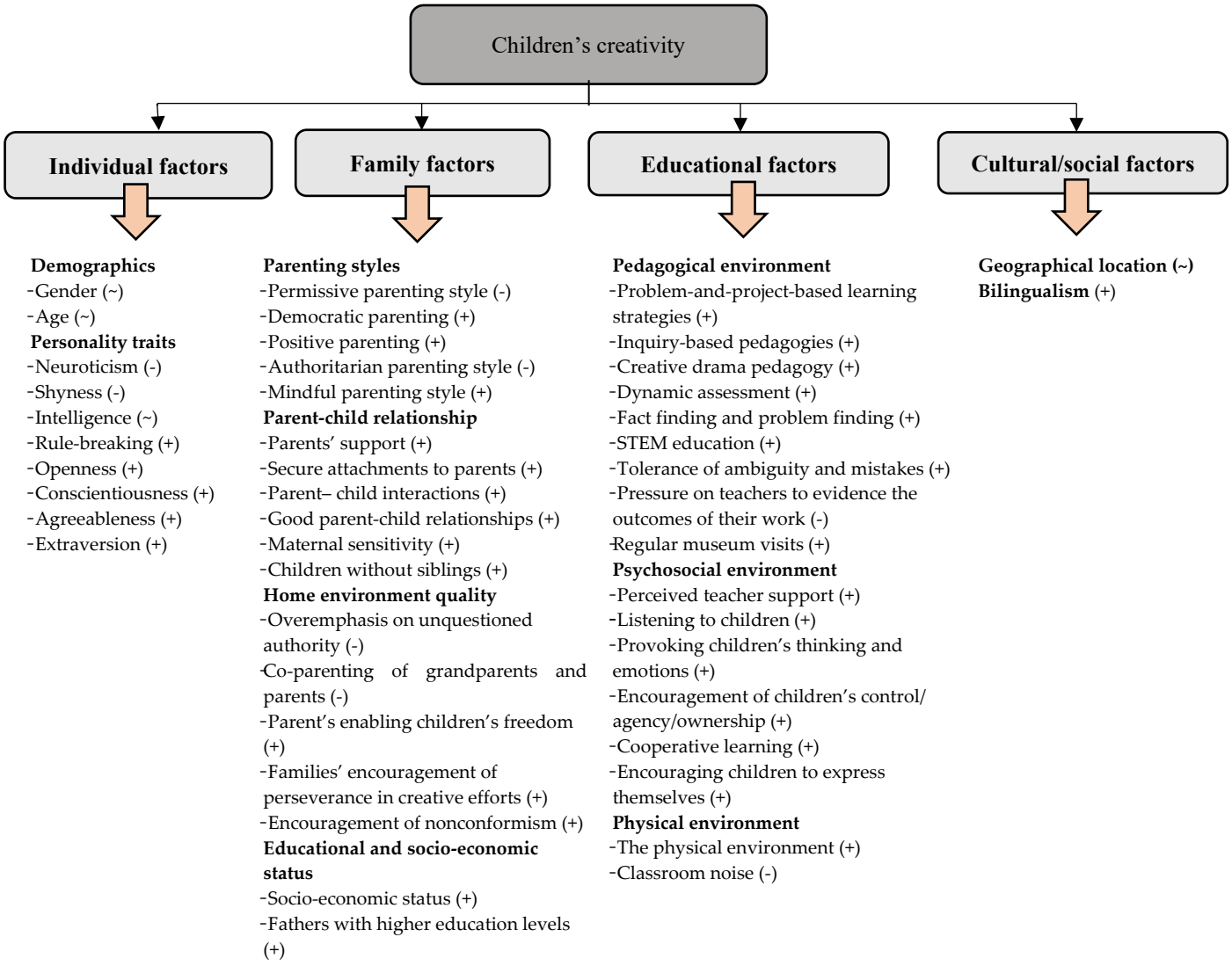

Figure 7. Factors that influence children's creativity

In the subsequent sections, we discuss the results reported in the studies in our sample. Even though we acknowledge that these factors can be interconnected, for the purpose of clarity, we discuss each of these factors individually, starting with results related to individual factors.

Individual Factors

Demographics

Twenty-one studies explored individual factors related to children's creativity development including demographics and personality traits. Demographic analysis focused on possible differences in gender and age. In relation to gender, the studies in our sample produced mixed results regarding the correlation between gender and creativity. David and Pastor's study (2017) showed that there was no

significant difference in creativity between girls and boys. However, Yildiz and Guler Yildiz (2021) found that girls scored higher in fluency and elaboration. Shan and Gustafsson's study (2020) also indicated that girls outperformed boys in fluency and flexibility. Similar results were obtained in Castillo-Vergara and colleagues' study (2018) in which girls scored higher in flexibility and oringality than boys. Contrasting findings were reported in other studies. The study of Alfonso-Benlliure and Santos (2016) revealed that boys scored higher than girls on Global Creativity. Similarly, Gong, Zhang, and Tsang (2020) found that boys obtained higher scores in creativity including fluency, and originality than girls. Wei and Lee (2015) reported similar results that boys possessed significantly more originality than girls. The findings of Vong et al. (2020) also demonstrated that boys outperformed girls in all three dimensions of originality, fluency and imagination. Additionally, the impact of perceived teacher support on divergent thinking showed a greater significance in boys compared to girls (Zhang et al., 2020). However, boys brought up in three-generation family were more likely to show disadvantages in creativity development compared to girls (Pang et al., 2020).

Regarding age, it was found that the relationship between creativity and openness consolidates with age (Leikin & Tovli, 2014; Theurer et al., 2020). That is to say, as children get older, the relationship between being creative and being open to new ideas or experiences becomes stronger and more stable. Another study conducted in Taiwan indicated that older children scored higher than the younger ones on people-drawing and free-drawing, but not on overall creativity (Wei & Dzeng, 2013). Contrary to the 4th grade slump reported in previous studies (Piaget, 1977; Torrance, 1968), divergent thinking, generally showed an increase with age for originality, and elaboration (Shah & Gustafsson, 2020). The findings in the study of Liang and colleagues (2021) revealed that Little-c is mostly affected by age while mini-c creativity is mainly impacted by family environment and parenting.

Personality Traits

Personality traits also served as a focus of analysis. Regarding intelligence, studies in our sample provided somewhat mixed findings. David and Pastor (2017) found a positive relationship between creativity and intelligence. López-Martínez and Lorca Garrido (2021) indicated that intelligence was associated with general creativity and narrative creativity, but not to the specific domain of graphic creativity. Willemsen and colleagues' study (2020) showed that intelligence was also found to be important for creativity in all domains. It was also found that there is a progressive development of creativity and intelligence in children from the first to the third year, with significant progress in the third year (Bezerra et al., 2022). Furthermore, correlations between creativity with intelligence and reading skills were observed across all three grade levels, with the third year demonstrating particularly strong correlations (Bezerra et al., 2022). Contrary to these results, Guignard and colleagues (2016) found that there is a weak correlation between intelligence and creativity. Krumm and colleagues (2018) investigated executive functions in relation to creativity. Executive function is a multidimensional concept that involves the subprocesses of inhibition, working memory and shifting (Miyake et al., 2000). It is also a higher-order cognitive process that enables the regulation of cognitive, behavioral and emotional activity. Executive functions especially shifting and inhibition made a significant contribution to creativity (Krumm, Filippetti, et al., 2018). The study added that shifting is a stronger predictor of creativity than fluid and crystallized intelligence.

Other studies demonstrate that the way creativity develops in children does not seem to be related to how intelligent they are, or how old they are, or whether they're a boy or a girl; rather it is linked to personality. Saggar and colleagues (2019) indicated that there is a significant positive correlation between externalizing problem behavior particularly rule-breaking and aggressive behavior and creativity. In fact, classic tasks used to measure creativity such as tests of divergent thinking (Guilford, 1950) involves the process of breaking rules to create new connections between cognitive elements that were not previously associated. Furthermore, neuroticism was proved to be negatively related to creativity (Krumm, Lemos, et al., 2018). Most creative children are likely to exhibit independence, self-confidence and emotional self-control when dealing with the demands of their surrounding and also tend to display less vulnerability,

irritability and emotional distress (Krumm, Lemos, et al., 2018). Shyness was also found to block and limit creativity in children. Cantero and colleagues (2016) found a negative relationship between shyness and creativity. Shy children feel anxious when dealing with unknown and new situations and prefer conformity for fear of being rejected (Cantero et al., 2016). Personality traits particularly openness, conscientiousness, agreeableness and extraversion were also found to be significantly associated with social creativity (Zhang et al., 2018). These personality traits are commonly shaped by the family environment in which a person is raised, and this environment also has an impact on creativity. The next section discusses the family factors that influence the development of children's creativity.

Family Factors

Parenting Style

The way parents raise, guide, interact with and discipline their children influence significantly child's creativity development. The study of Al-Tamimi and Al-Qudah (2019) showed that there is a negative relationship between the overprotective and negligent parenting styles and the level of creativity. Overprotective parenting instills in parents fear of the consequences of anything the child does and thus becomes excessively overprotective. As a result, the child becomes a follower, dependent on others and void of freedom and will to think for themselves. Negligent parenting also affects negatively creativity as parents are not involved enough in their children's lives and are indifferent to their needs. Permissive (Setiyowati et al., 2019) and authoritarian (Fearon et al., 2013; Setiyowati et al., 2019) parenting styles were also found to lead to low creativity development in children. Permissive parenting which is characterized by a high degree of warmth and affection from parents and low levels of control and discipline results in having a child who is not ready to make decisions and thus unable to think creatively. Authoritarian parenting which is characterized by high control of children's practices, unquestioned obedience to parental authority and punitive discipline leads to having children who have negative thoughts and fear to experience new things and consequently inability to think creatively. Moreover, parents' overemphasis on cultural values, particularly social conformity and unquestioned authority was also found to be negatively related to their children's creativity (Kim & Park, 2020).

Democratic parenting style (Dong et al., 2022; Setiyowati et al., 2019) and mindful style (Pugsley & Acar, 2020) were proved to result in high creativity development. A positive parental style involving support, warmth, understanding and encouragement of autonomy has a positive impact on creativity while parenting style involving reproach, pressure, restriction, severe punishment, parental indulgence, and too much control has a negative impact on creativity (Dong et al., 2022). Mindful parenting style also appears to indirectly foster creativity because it is related to lower conform for socially acceptable characteristics (Pugsley & Acar, 2020). Therefore, as indicated by Gong and colleagues (2020) to develop creativity in children, it is obligatory to enable children's freedom by their parents and reduce the external factors that inhibit creativity, such as an authoritarian family environment. In addition to that, maternal sensitivity has a significant, direct, positive impact on self-esteem, and a direct negative impact on shyness and this significantly influence creativity (Cantero et al., 2016). In other words, children who believe that their mothers respond sensitively to their needs tend to be less shy at school and indirectly, show more creative behavior.

Parent-Child Relationship

The parent-child relationship plays a significant role in shaping and nurturing a child's creativity. Building a good and close parent-child relationship positively impacts children's creativity (Zhang et al., 2018). Parents' support of their children in their creative pursuits significantly enhances children's ability to produce more original ideas and boosts their creative self-efficacy (Shi et al., 2021; Tang et al., 2022). Liang and colleagues (2021) found that parents' encouragement of autonomy was positively correlated with both mini-c and little-c creativity whereas pressured parenting and overcontrolling was negatively correlated with both mini-c and little-c. Furthermore, children who have secure attachments to their parents have a sense of self-sufficiency that results in better development of creativity (Çetin & Ata, 2020). Research also indicates that parents' interaction with their children is more influential compared to

grandparents. The findings of Lu and colleagues (2022) demonstrated a significant improvement in children's creative performance following interactions with parents, whereas interactions with grandparents resulted in minimal improvement. When interacting with children, employing directive questioning, restating/reframing, idea blending, and using shared experiences as dialogic forms by caregivers were found to shape children's creative thinking (Knox et al., 2022).

Home Environment Quality

Children raised in homes characterized by high-quality environments demonstrated high scores on creativity indicators (Yildiz & Guler Yildiz, 2021). Elements of home environment quality include providing sufficient stimulation for children, spending time with them inside and outside, playing with them, and giving them their own space at home, all foster children's creativity (Yildiz & Guler Yildiz, 2021). Additionally, encouraging the child to endorse nonconformity, experience novelty and variety, be perseverant in creative efforts and fantasize, all contribute for creating a climate for creativity at home (Kwaśniewska et al., 2018).

Studies have also shown that the co-parenting of grandparents and parents had a negative impact on children's creativity. Children raised in the three-generation families, especially in the grandparents-headed families, tended to have less creativity compared to living without grandparents (Pang et al., 2020). Researchers offered many reasons that explain the negative impact grandparents exert on children. One of the reasons is having a conflicting family climate between parents and grandparents during the child-rearing practice due to values differences between the two generations. Also, living with both parents and grandparents limit independence and autonomy, discourage divergence and restrict creativity (Pang et al., 2020). Strong grandparental control that emphasizes safety more than education and their use of direct instruction to solve problems instead of responding to children's psychoemotional needs could also affect negatively the development of creativity. Additionally, the decreasing direct involvement of parents as the primary caregivers in the upbringing of children deprives children of chances to develop their creativity (Pang et al., 2020).

Research also showed that in nuclear families, children without siblings exhibited significantly higher creativity than children with siblings (Pang et al., 2020; Vong et al., 2020). This could be explained by the fact that children without siblings have much more chances to interact with their parents, have greater access to resources for implementing their creative ideas, and have opportunity to develop higher levels of autonomy, which consequently foster their creativity (Pang et al., 2020; Vong et al., 2020).

Parent's Educational and Socio-economic Status

Factors like a parent's educational background and socioeconomic status also have an impact on the promotion of children's creativity. Family socio-economic status was found to positively influence children's creativity (Castillo-Vergara et al., 2018; Liang et al., 2021; Zhang et al., 2018). This is because families from higher socio-economic status tended to offer more resources and were more likely to involve their children in after-school activities which consequently facilitate their creativity (Liang et al., 2021). Fathers with higher education levels were also reported to have a positive influence on children's creativity (Yildiz & Guler Yildiz, 2021). The researchers think that fathers with higher educational levels possess more advanced parenting skills. Hence, children with fathers who have a higher educational background are more likely to be advanced in their creative thinking skills. The following section discusses other educational factors that influence children's creativity. These are categorized into pedagogical, psychosocial, and physical environment factors.

Educational Factors

Pedagogical Environment

The pedagogical environment entails the school activities, teaching methods, and strategies that affect students' creativity. Regarding the question of whether the type of school affects children's creativity, it was found that in Beijing, public preschool attendance correlated positively with children's creativity

(Gong et al., 2020). The researchers explained that public preschools in Beijing could have done well in developing children's creativity probably because public preschools receive students who are better at creativity than private preschool students in the very beginning (Gong et al., 2020). Conversely, in other studies, private schools scored higher than public schools regarding creativity (Castillo-Vergara et al., 2018; Wei & Lee, 2015). In Taiwan for example, private kindergarten children were significantly more fluent and flexible than those from the public schools (Wei & Lee, 2015). The researchers argue that one of the main reasons behind this finding is that children in private schools are generally from a higher socio-economic background which made it easier for them to have access to resources such as interactive devices. Also, private schools tend to provide a curriculum that encourage creativity compared to public schools (Wei & Lee, 2015). In Chile, creativity in private schools was found to be higher than public schools because of participation in extracurricular activities (Castillo-Vergara et al., 2018). Therefore, though children are naturally curious and inquisitive, they need outside support to promote their creativity such as a creativity-fostering curriculum and extracurricular activities.

An example of extracurricular activities that can develop children's creativity is visiting museums. Frequency of visits to science museums was found to positively affect creativity (Gong et al., 2020). Children's museum offers a natural space that motivates children to be creative. As compared to formal institutions like school, children's museum stimulates curiosity and the desire to explore which are both essential for the development of creativity. The space, with the various exhibits and objects it offers, allows children to look, move and think with the various new experiences in life, arts and sciences, which consequently ameliorate their ability to produce creative ideas (Gong et al., 2020). Therefore, it is necessary for educational institutions to offer their students opportunities to visit children museums. Also, the government and social funds need to invest in creating such spaces like children's museums, as they benefit children and develop their creative potentials.

As far as classroom tasks are concerned, problem-and-project-based learning strategies immensely aroused children's creative processes (Albar & Southcott, 2021). This is because such tasks encourage risk-taking, resilience, experimentation, curiosity and thus creativity (Albar & Southcott, 2021). Inquiry-based pedagogies also support and create opportunities for the development of children's creativity (Murcia et al., 2020). Researchers advocate that teachers should create a non-prescriptive learning environment where children think for themselves, wonder, imagine and create new ideas using digital technologies. The teacher has to use inquiry questions and dialogic learning conversations that motivate children to adapt and persist with open ended tasks. (Murcia et al., 2020). Research also revealed a positive correlation between fact finding and problem finding with the number of ideas produced and the originality of these ideas (Van Hooijdonk et al., 2020). Therefore, it is beneficial to integrate fact finding and problem finding before engaging in idea finding when aiming for encouraging students to think creatively.

Research also revealed a long-lasting positive impact of STEM education on the creativity of 5-year-old children in kindergarten (Üret & Ceylan, 2021). During STEM education, children are encouraged to create, test, produce, recreate new ideas when a solution does not work, communicate ideas and work together, and consequently trigger and empower children's creativity (Üret & Ceylan, 2021). Regarding assessment, dynamic assessment helps to provide a more vivid representation of students' creative potential which can be of valuable assistance for fostering and nurturing creativity (Zbainos & Tziona, 2019). The study of Zbainos and Tziona offered evidence that effective interaction between assessor and the participant, along with the active intervention by examiners and the evaluation of examinees' responses to interventions fosters students' creativity. Contrary to static normative assessment that focuses on the score, dynamic assessment involves mediation and takes into consideration the expressed ability (level) of a student before and after guidance (Zbainos & Tziona, 2019).

Drama Pedagogy Training or creative drama is reported to have a significant impact on creativity (Celume et al., 2019; Momeni et al., 2017). Drama Pedagogy Training encourages the sharing of ideas through an open learning environment that allows children's-free expression. It also fosters interthinking among children resulting in co-creation in a positive space and thus promote creative thinking (Celume et

al., 2019). This form of active pedagogy encourages students to co-construct their learning through engaged dialogue, collectively reflecting on the learning experiences presented as collaborative dramatic games and thus promoting creativity (Celume et al., 2019). Creative drama provides a chance for children to build their own fantasy worlds and every time they wish, they can travel between realities to fantasy (Momeni et al., 2017).

The creativity technique pedagogy such as brainstorming significantly improved students' creativity (Liao et al., 2018). It provides students with a degree of autonomy to choose the responses and significantly improves their motivation to learn. The creative-pedagogy approach supports the children's use of the English language creatively, and gives them a degree of independence regarding their choice of responses (Liao et al., 2018). Furthermore, flipped learning method that requires students to learn the instructional content individually at home or in another spaces before coming to the classroom to talk about knowledge increases academic performance and creativity in students (Moghadam & Razavi, 2022). However, increased academic pressure related to examination impede children's creativity development (Liang et al., 2021).

Psycho-social Environment

The psycho-social environment refers to the social and emotional atmosphere in the classroom and how students feel and interact with their peers and their teacher. Research showed that perceived teacher support impacts students' creative thinking. Academic support such as repeating explanation, emotional support like encouraging the student in study and life and competence support such as recommending the students to take part in different activities or competition, all contribute to promoting creativity (Zhang et al., 2020). In addition to that, listening to students, provoking their thinking and emotions; and tolerating ambiguity and mistakes are all pedagogies that foster imagination and creativity (Roppola & Whitington, 2014). Also, the teacher's encouragement of children's autonomy, risk taking, ownership of learning and collaboration contributed to promoting creativity (Kyritsi & Davis, 2021).

Research also showed that creativity is promoted in a classroom where the teacher creates an open atmosphere for students to express their ideas and take these ideas seriously (Schoevers et al., 2019). Hence, teachers should allow students to take ownership of their learning and equip them with a mindset that utilizes creativity as the path to self-directed and authentic learning (Huh & Lee, 2019). They also have to give students opportunities to work together as collaboration enhances creativity (Craft et al., 2013; Ibán et al., 2020). It is important to note that emphasizing children's ownership and placing high expectations on skillful creative engagement are all pedagogic practices that promote creativity (Craft et al., 2013). However, pressure placed on children to perform well and focus on their individual progress are all barriers to creativity (Kyritsi & Davis, 2021).

Physical Environment

The physical environment can influence differently children's creative potential. Children in the art room indicated, on average, greater levels of creative thinking compared to those in the classroom task due to the more comfortable feeling elicited by this environment (Shah & Gustafsson, 2020). Also, research demonstrated that classroom noise does not promote children's creativity (Massonnié et al., 2019). On the contrary, some negative effects of noise were noticed especially for children with low selective attention skills. In the study, these children with the presence of noise gave fewer ideas which were rated as less original. Thus, teachers have to create a quiet environment especially for children with low selective attentions skills to minimize the influence of noise and enhance their focus and creativity.

Social Cultural Factors

Geographical Location

In relation to variations between countries, Canadian children living in rural areas achieved higher scores on the TTCT compared to their Norwegian peers. Conversely, in urban areas, children in Norway outperformed their Canadian counterparts in similar urban settings (Hondzel & Gulliksen, 2015).

Surprisingly, it was found that Hong Kong-Chinese children achieved higher scores than those from Paris-French origin in all the divergent measures (verbal and figural fluency, flexibility, uniqueness, and unusualness), regardless of gender and grade (Chung et al., 2016). This finding was unexpected as in the traditional view, individualistic western people tend to outscore the collectivistic eastern people in creativity. This is because western countries value independence and freedom, while eastern countries emphasize obedience and respect of the norms (Hofstede et al., 2010). This could be explained by the influence of school on children (Niu & Sternberg, 2003). The study of Cheung & Lau (2013) asserted that the recent curriculum and education reform in Hong Kong which focuses on promoting divergent thinking contributed to the growth of creative thinking in children.

Research showed that the suburban children's fluency and originality scores are higher than those from the city possibly because they enjoy greater freedom and fewer restrictions. Also, city schools tend to apply more pressure on students, which may limit the development of young children's creativity (Wei & Lee, 2015). However, in another study conducted in Taiwan, urban children scored higher than rural children on creativity because cultural and educational advantages of urban Taiwanese children help in the development of creativity and also rural Taiwanese families typically do not put emphasis on the importance of school education and also because they live in isolated mountain regions where educational resources may be limited (Wei & Dzeng, 2013).

Bilingualism

Bilingual children scored high from early years in verbal and nonverbal creativity compared to monolingual children (Leikin & Tovli, 2014). Thus, language proficiency plays a crucial role in the effect of bilingualism on creativity. Increasing evidence shows that speaking more than one language does not only ameliorate one's verbal skills but also more general, non-linguistic cognitive abilities such as problem solving and creativity (Hommel et al., 2011). Bilingual individuals are faced with the challenge of selecting the appropriate language and ignoring the interreference from the other language. This makes them advantaged in executive functioning and good at organizing their tasks compared to monolinguals. Executive functioning enables individuals to manage complex tasks and pay attention to pertinent information and ignore irrelevant information. These skills are also important for creative thinking (Leikin, 2012).

Conclusion

This paper presents an exhaustive systematic review of the existing empirical studies investigating the factors which influence children's creativity. The results of the systematic review showed that parents and teachers play a key role in developing children's creativity. Individual differences produced mixed results regarding their impact on creativity, especially gender and age. However, personality traits such as rule breaking, openness, extraversion and self-esteem had a significant impact. These personality traits are shaped and influenced by the surrounding environment especially family. Family factors are also shown to play a significant role in the promotion of children's creativity. These include parenting style, parent-child interaction, home quality environment and parent's support of creative endeavors. In fact, not all children are privileged to live in an environment which fosters creativity. This is why, education has to compensate for such a gap and help children from disadvantageous background to be able to think creatively. Pedagogical, psychosocial and physical environments all play a role in influencing the development of children's creativity.

Limitations

We have to acknowledge that one of the major limitations in the present review is the possibility of missing some pertinent studies unintentionally. Also, including only studies published in English is another limitation of the review. Another limitation lies in the decision to include studies only from 2010 to 2022, which, while ensuring incorporation of recent literature and contemporary perspectives on children's creativity development, may overlook valuable insights from earlier studies.

Recommendations

For Parents

Parents have to foster with their child positive relationship characterized by open communication and support. They also need to engage actively with their children by creating opportunities for play, creative thinking and exploration. Parents have to spend quality time with their children and use directive questioning, restating/reframing, idea blending, and shared experiences to engage in meaningful conversations that stimulate creativity in the child. Secure attachments to parents is important; therefore, parents have to strive to make the child feel safe, loved and supported. Parents have to demonstrate maternal sensitivity by being attuned to the child's emotional needs and responses, showing sensitivity and responsiveness, which can positively influence their creativity.

Regarding home environments, parents have to allow their children to express themselves freely and encourage creativity and expose the child to various experiences and activities that stimulate their curiosity and exploration. They also have to celebrate their children's creative endeavors and their imaginative thinking and nurture a sense of perseverance and creativity. Parents have to provide autonomy and freedom to their children and enable them to experiment, make choices and pursue their interests.

For parenting style, parents have to adopt mindful and democratic parenting approach that encourage parents to be attentive in their interactions with their children. They also have to embrace nonconformism and avoid overemphasis on social conformity to allow their children to be independent and explore unconventional thoughts. They have to strike a balance between discipline and rules to encourage their children to think outside the box.

For Educational Stakeholders

Educational curricula and programs should aim at nurturing creativity especially for children from disadvantaged backgrounds. Regarding pedagogical environment, educational policy makers and teachers should incorporate problem-and-project-based learning strategies, dynamic assessment, STEM education, drama pedagogy and inquiry-based pedagogies to stimulate children's creative processes. They also have to encourage students to work collaboratively and avoid overemphasis on individual progress. They can also equip students with a mindset that puts emphasis on self-directed and authentic learning.

Educational policy makers and teachers should aim at creating less formal educational settings that allow freedom, collaboration, autonomy, risk taking and ownership of learning. Teachers should focus on offering support including academic, emotional and competence support to their students. They also have to create a calm and focused learning environment in the classroom to minimize noise and thus enhance creativity. Schools should organize frequent visits to children' museums and provide access to enriched physical environments such as well-equipped rooms.

For Future Research

Future research may:

- Conduct long-term studies to investigate the quality of parent-child and its effects on creativity across different developmental stages from childhood to adolescence.
- Explore the influence of cultural differences on parent-child and teacher-student relationships and their impact on developing creativity within diverse cultural backgrounds.
- Examine how digital technology and time spent on screens influence the home environment and its potential effect on children's creativity.
- Investigate how various parenting styles align or conflicts with different educational systems and their potential impact on creativity development in school-aged children.

- Investigate the outcomes of specific teacher training programs aimed at promoting autonomy, risk-taking, and ownership of learning among students and evaluate the effectiveness of these strategies in enhancing creativity and student engagement.

Declarations

Authors' Declarations

Acknowledgements: Not applicable.

Authors' contributions: All authors have equal contributions.

Competing interests: The authors declare that they have no competing interests.

Funding: Not applicable.

Ethics approval and consent to participate: Not applicable.

Publisher's Declarations

Editorial Acknowledgement: The editorial process of this article was completed under the editorship of Dr. Ibrahim H Acar through a double-blind peer review with external reviewers.

Publisher's Note: Journal of Childhood, Education & Society remains neutral with regard to jurisdictional claims in published maps and institutional affiliation.

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