

School Failure from the Bioecological Model of Human Development

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ABSTRACT:

This article establishes an analytical framework for examining school failure from a multidimensional perspective. To this end, Bronfenbrenner's bioecological theory of human development is adopted as the conceptual foundation, allowing for an understanding of how students' school experiences are constructed across multiple levels of influence, from everyday interactions in the classroom and the home (microsystem and mesosystem) to broader structural contexts such as culture, public policies, and socioeconomic conditions (exosystem and macrosystem), while also recognizing the role of time in processes of change (chronosystem).

This theoretical framework enables a systematic approach to the phenomenon, fostering an integrated understanding of the factors associated with school failure from a bioecological perspective.

Keywords: school failure; risk and protective factors; bioecological theory.

Introduction

The concept of school failure has a historical background linked to sociological, psychological, and educational fields. Its origins can be traced back to the French Revolution, a period during which the implementation of a free, compulsory, and democratic education system revealed inequalities in academic achievement. This situation led to a sociological interpretation of school failure as a critical response to psychological approaches in education (Zambrano Leal, 2017).

Over time, this phenomenon has undergone transformations reflecting changes in educational conceptions and sociocultural contexts. Although it was initially attributed primarily to individual limitations related to

ability or motivation (Aristimuño, 2015), socially oriented perspectives soon emerged to challenge this reductionist view, emphasizing the influence of structural factors and institutional functioning (Zambrano Leal, 2017). More recent studies have shown how certain school dynamics tend to label and stigmatize students, generating effects that may extend throughout their lives (Navas Espinosa, 2021). From this perspective, school failure is understood as the result of a social construction shaped by the educational context and the interactions that occur within it (Aristimuño, 2015).

Despite multiple approaches and more than half a century of research, school failure remains a persistent issue in lower secondary education, particularly in relation to low academic

performance and grade retention factors closely associated with school dropout. Addressing this phenomenon therefore requires a different perspective that makes it possible to identify the interaction among personal, family, and school-related factors, as well as sociodemographic aspects. In this regard, Bronfenbrenner's ecological theory of human development, and later the bioecological model with its Process-Person-Context-Time (PPCT) framework (Gifre Monreal & Esteban Guitart, 2012), offers a relevant lens through which to explore how these factors intersect and influence school processes that may lead to situations of school failure.

Analytical Strategy

From a qualitative approach, an analytical strategy based on documentary review was developed (Casasempere-Satorres & Vercher-Ferrándiz, 2020) to examine academic publications related to school failure and to Bronfenbrenner's ecological and bioecological theories of human development. In addition, educational studies grounded in this theoretical framework were considered. The analytical strategy included criteria for the selection and review of studies, as well as an in-depth analysis of the translated work on human development theory. Through this process, the most relevant conceptual contributions were identified and articulated for the construction of this reflective article.

Analytical Development

School Failure as a Multifaceted Phenomenon

This educational problem has been examined from diverse perspectives due to its multifactorial nature (Menor, 2020), which makes it a particularly complex issue to analyze. Initially, school failure is understood as a negative relationship between the student and the school, which hinders the achievement of minimum academic objectives for a given grade and results in grade retention or withdrawal

from the education system (Cubero-Pérez et al., 2023; Formichella & Alderete, 2023; Ibabe, 2016; Martínez-Valdivia & Burgos-García, 2020; Torres et al., 2018). This negative relationship not only involves deficiencies in competency development but also affects the contexts in which the individual develops, placing them at risk of social exclusion (Longás Mayayo & Riera i Romaní, 2016), limiting access to subsequent educational levels, undermining self-esteem, and hindering effective socialization.

From a broader perspective, school failure can be understood as a complex process resulting from the interaction of personal, family, and school-related factors (Galindo et al., 2018; Martínez-Valdivia & Burgos-García, 2020; Pinheiro et al., 2016; Vázquez, 2016), embedded within a socially constructed reality shaped by educational institutions. Detaching this analysis from such a context would undermine its depth, rigor, and analytical validity (Pezzi et al., 2016).

Expanding the conceptual scope, school failure is also closely related to grade retention (the central focus of the present analysis). Despite its widespread use and, at times, institutional endorsement, grade retention has shown limited effectiveness and has been questioned across academic contexts (Arroyo Resino et al., 2019; Bayona-I-Carrasco et al., 2020). Evidence suggests that retention often exacerbates academic lag rather than resolving it, increasing the likelihood of repeated retention and ultimately leading to students' disengagement from school and potential dropout (Bayona-I-Carrasco et al., 2020; Longás Mayayo & Riera i Romaní, 2016). Moreover, this phenomenon is strongly associated with socioeconomic inequalities and disproportionately affects students from disadvantaged backgrounds, ethnic minorities, or those with limited cultural capital (Domingo & Martos, 2017).

Although school dropout is not the central focus of this article, it is relevant due to its close connection with grade retention. Several studies

indicate that retention may increase the risk of dropout, particularly when academic difficulties accumulate alongside personal and family-related challenges (Ayala-Vasquez, 2024; Narváez-Peña, 2023; Rosli et al., 2015; Torres et al., 2018). This risk is heightened in socially vulnerable contexts characterized by low socioeconomic status, limited family involvement, and overage enrollment (Williams et al., 2024; Zorro & Larrotta, 2017).

From this perspective, academic performance refers to the level of learning achieved by students relative to their age and educational level, typically assessed through grading systems that classify performance as high, satisfactory, basic, or low (Arredondo Quijada & Vizcaino Martínez, 2020; Cardona Isaza, 2020; Garrido-Miranda & Madariaga, 2020; Martínez et al., 2020). When students fail to meet minimum expectations, they are considered to exhibit low academic performance, which may manifest throughout the educational trajectory in the form of subject-specific difficulties, school maladjustment, demotivation, behavioral problems, cognitive and metacognitive skill deficits, and knowledge gaps, without necessarily reflecting low intellectual ability (Erazo Santander, 2018). Although low academic performance is considered a moderately severe problem, it may be reversible if addressed in a timely manner.

Factors Associated with School Failure from a Bioecological Perspective

This analysis considers two dimensions related to school failure. The first involves sociodemographic factors that characterize the population, whose indicators are organized within the Person, Context, and Time dimensions (Bronfenbrenner & Ceci, 1994). The second involves school-related factors which, according to Bronfenbrenner's ecological theory of human development (1987) and the bioecological model, are primarily organized

within the Process and Context dimensions (microsystem and mesosystem).

The microsystem is defined as the most immediate context in which the person actively participates, such as the home, school, or peer group. The mesosystem, in turn, refers to the interrelation between two or more microsystems in which the person participates. For Bronfenbrenner (1987), the mesosystem is a system of microsystems that encompasses the connections and interactions among the different contexts in which the developing person is actively involved, including intermediate social ties and the communicative exchanges established between these settings.

The exosystem comprises one or more contexts in which the developing person does not participate directly, but in which events occur that influence the settings with which the person is directly involved. It can be understood as the interaction between the previously mentioned contexts and the broader environment elements that do not directly include the student but nonetheless affect them indirectly, such as decisions in educational and economic policy made by governmental authorities or, for example, the quality of caregivers' relationships in their work environments and the dynamics fostered in those settings, which affect adults and, in turn, the individuals with whom they interact directly (Barraza Niebles, 2023).

Factors associated with school failure include a set of personal, family, school-related, and sociocultural conditions that influence academic performance and students' persistence within the education system. These factors are commonly classified into two complementary categories: risk factors and protective factors. Risk factors refer to variables that increase the likelihood of physical, social, or emotional difficulties stemming from negative experiences in the school environment (such as low academic performance, interpersonal conflict, or grade retention) and from adverse

circumstances in family or social contexts, including violence or emotional neglect (Nunes et al., 2014; López-Gil et al., 2022; Leme et al., 2024). The following sections describe personal, family, and school-related factors that may function as either risks or protections, depending on the conditions and dynamics through which they manifest.

Personal Factors

Personal factors are a key component for understanding academic performance and processes associated with school failure, particularly grade retention. Multiple studies indicate that these factors are related to students' internal attributions about the causes of success or failure, their perceived control over outcomes, and their level of motivation (González-Valenzuela & Martín-Ruiz, 2019; Inglés et al., 2015; Nunes et al., 2014). These elements are linked to values that guide learning, including self-efficacy, commitment, and benevolence, which are considered foundational for building a strong academic identity and strengthening resilience under unfavorable conditions (Corchuelo Fernández et al., 2019; Fernández-Río et al., 2017; Gázquez et al., 2015; Villarrasa-Sapiña et al., 2024; Cubero-Pérez et al., 2023).

Among the most prominent personal factors is participation in sports, recognized as an agent of social integration and a contributor to well-being, particularly among girls and women (Soares et al., 2015). Sports participation, together with personal skills such as self-esteem, involvement, emotional bonds, and sustained effort, promotes a positive orientation toward learning and a stronger commitment to academic goals (Menor, 2020; Vázquez, 2016; Villarrasa-Sapiña et al., 2024).

Academic performance also depends on basic competencies in reading, writing, and arithmetic (Galindo et al., 2018), as well as reading habits and early schooling experiences, which facilitate school adjustment and cognitive development

across the educational trajectory (Arroyo Resino et al., 2019; González-Valenzuela & Martín-Ruiz, 2019; Mercader Rubio et al., 2022).

Taken together, these personal factors are closely aligned with Bronfenbrenner's bioecological theory of development, which conceptualizes each individual as an interplay of physical, cognitive, and experiential characteristics, together with sociodemographic and cultural dimensions that can facilitate or constrain proximal processes. These processes (developed later) are essential for understanding continuity in academic development and interaction among the different spheres of the environment (Esteban-Guitart et al., 2024).

Family Factors

Among protective factors in the family environment, economic circumstances are particularly important. Greater financial resources and economic stability enable the acquisition of learning materials and facilitate access to technological tools such as computers and internet connectivity (Formichella & Alderete, 2023), thereby supporting persistence in the education system. Along similar lines, parents' educational level, their attendance and participation in educational and cultural activities with their children, the effective support they can provide with schoolwork, and the value they place on education and schooling all influence how students perceive the importance of remaining in school and achieving positive academic outcomes (Benetti et al., 2016).

In addition, prioritizing the initial stage of schooling, maintaining high academic expectations, and fostering fluid communication between parents and teachers contribute to children's academic performance (Criado & Bueno, 2017; Fernandez-Rio et al., 2017). Family environments characterized by positive parenting styles, clear norms and routines, emotional support, modeling behaviors, home stimulation, co-residence with the father,

paternal involvement in academic matters, completion of the mother's education, and preschool attendance are identified as key elements that support academic success (Aristimuño & Parodi, 2017; Franceschini et al., 2016, 2017; Gázquez et al., 2015; Ibabe, 2016; Vázquez, 2016).

School-Related Factors

Among protective factors in the school context, key elements include high teacher expectations, ongoing feedback practices, and affective, trusting relationships between students and teachers as well as among classmates (Muylaert et al., 2019; Nunes et al., 2014; Pezzi et al., 2016). Such institutional environments foster a sense of belonging, strengthen self-regulation and self-efficacy, promote learning through challenging and meaningful activities, and ultimately support successful educational trajectories (Acuña-Zenof et al., 2021; Corchuelo Fernández et al., 2019; Domingo & Martos, 2017; Fernandez-Rio et al., 2017; Leme et al., 2024; López-Gil et al., 2022; Villarrasa-Sapiña et al., 2024). Likewise, factors such as teachers' training and experience, professional quality, teaching methods used across subject areas, the economic stability of educational staff, adequate working conditions within the institution, institutional culture, the use of different disciplinary strategies, the

quality of school infrastructure, and the available physical, technological, and human resources, as well as school leadership, are all determinants of effective educational processes (Alves & Araújo, 2018; Aristimuño & Parodi, 2017; Carrillo et al., 2018; Fernandez-Rio et al., 2017; Franceschini et al., 2017; Lacruz et al., 2019).

Given these considerations, the teacher's role stands out, since teachers structure classroom dynamics and lead teaching and learning processes (Torres et al., 2018; Muylaert et al., 2019; Torrico & Lepe, 2019). Teachers select instructional strategies, regulate classroom coexistence, organize curricular content, and promote the development of competencies and knowledge, preparing students to face future challenges (Cardozo et al., 2022; Martinez-Taboada et al., 2017). Teachers are positioned to create learning environments grounded in respect, mediated by differentiated and motivating strategies that help reframe learning so that it becomes effective given students' particular needs. Table 1 synthesizes the main school-related factors identified in the literature. These elements represent different domains that shape a school's internal dynamics and students' learning, including school climate, interpersonal relationships, and organizational and managerial practices.

Table 1 : School-Related Factors Identified in the Literature

School-related factors	Examples
School climate and safety	Institutional trust, classroom dynamics and organization, rules and codes of conduct
Teacher–student relationship	Positive relationships, discipline, classroom management
Attendance and behavior	Behavioral problems, absenteeism, grade retention, school dropout
Expectations and beliefs about one's own capacity	Academic expectations, teacher expectations, student self-efficacy
Pedagogical and curricular quality	Teaching methodologies, quality of curricular content delivered Facilities and infrastructure, instructional materials, support for students with special educational needs
School management and education policy	Teacher professional development, inclusion, management, leadership

Source. Author's own elaboration based on Bosco (2008), Murillo and Hernández-Castilla (2011), Mella and Ortiz (1999), and Hernández-Castilla et al. (2014).

Following Bronfenbrenner's ecological theory of human development (1987), the microsystem, as the most internal level or immediate environment in which developing individuals interact directly, highlights the significance of personal, family, and school-related dimensions. Factors such as motivation, self-efficacy, commitment, involvement, and the attributions individuals make regarding academic success or failure are shaped by everyday experiences in the family and the school, as well as by the relationships established with key actors in these settings.

Ecological Theory of Human Development and Its Later Bioecological Version

Within Bronfenbrenner's ecological model (1987), development is understood as a lasting change in how a person perceives their environment and relates to it. This process occurs within interpersonal structures that constitute different contexts. Relationships emerge when one individual attends to or actively participates in another's activities; these interactions are known as dyads, which constitute the fundamental unit of the microsystem because they enable the formation of more complex relational structures such as triads or tetrads.

At the most basic level, a dyad may involve observation, in which one participant consistently attends to another's actions and the other recognizes that attention. Over time, this relationship may evolve into a dyad of shared activity, in which both individuals engage in complementary actions that stimulate learning and strengthen motivation, even when they are not physically together. This type of bond supports the development of reciprocity and interdependence, which are key in cognitive growth.

Bronfenbrenner's theory describes a sequence of stages that unfold as interaction is sustained over time. Among these is the emergence of balance in power dynamics, which supports understanding and managing different forms of hierarchical relationships. Later, an affective bond may consolidate, characterized by intense emotions that give rise to a primary dyad. In this type of relationship, each person remains present in the other's thoughts and influences the other's behavior, even when physically apart. In this way, the connection contributes to the acquisition of competencies, knowledge, and values in the developing individual.

From this perspective, family and school-related factors are central to the formation of dyads, understood as the foundation of interactions within the microsystem. Accordingly, the relationships individuals establish with family members (mother, father, siblings, or other caregivers), as well as with teachers and classmates, constitute the first direct bonds that make it possible to build more complex relational structures. Sustained interactions, characterized by participation and mutual recognition, shape the immediate environment and are decisive in processes of personal, social, and academic development.

The exosystem, macrosystem, and chronosystem are elements that, although not part of the individual's immediate environment, nonetheless have a presence in their development. According to ecological theory, the exosystem includes aspects of the more remote environment that, while not directly involving the individual, may indirectly influence their life, for example, school board activities, decisions in educational and economic policy, or caregivers' work environments and the relationships established within them, which directly affect adults and indirectly affect developing individuals. The macrosystem refers

to values, beliefs, and cultural patterns that shape behavior; state organization, as well as geographic and demographic arrangements, are part of this level of analysis (Bronfenbrenner, 1987; Martínez-Abad et al., 2025). Finally, the chronosystem concerns how environments and their effects change over time (Barraza, 2023).

Although the bioecological model positions time as an important component of development, its relevance is not limited to chronological time nor does it necessarily require longitudinal research designs. Even in cross-sectional studies, the chronosystem can be analyzed through significant transitions that occur at specific moments in life. These transitions may refer to changes in individual characteristics (e.g., entry into adolescence) or changes in the immediate environment (e.g., moving from primary to secondary school), as well as other transitions such as changing school sites, schedules, or even teachers (Esteban-Guitart et al., 2024). According to Bronfenbrenner, such moments are particularly sensitive because they involve assuming new roles, establishing different relationships, and participating in new activities, elements that give rise to new proximal processes and interactive contexts.

An example that illustrates development is a student's academic performance, which is influenced by both individual and contextual factors (Barraza Niebles, 2023). This is because development occurs through continuous interaction between the individual and other people, objects, and symbols (Bronfenbrenner & Ceci, 1994; Bronfenbrenner & Evans, 2000). The central idea is to consider context, developing persons, and the interactions established at a given time as synergistic effects rather than as simple additive effects (Esteban-Guitart et al., 2024).

Following the formulation of ecological development theory, proximal processes were

defined as interactions in the immediate environment that can promote development. Human development was thus understood to be driven primarily by proximal processes that is, bidirectional interactions that are continuous and increasing in complexity between the individual and their environment (Bronfenbrenner & Evans, 2000). However, the effectiveness of these processes depends on both personal characteristics and context (Bronfenbrenner & Ceci, 1994). In this view, proximal processes may lead to adaptive or maladaptive development depending on the quantity and quality of available resources (socioeconomic, cultural, guidance, and support) for engaging in interaction (Esteban-Guitart et al., 2024).

From this standpoint, development cannot be attributed solely to genetic or environmental factors in isolation; rather, it emerges from the ongoing interaction among individual characteristics, social environments, and proximal processes that is, everyday, sustained interactions within the immediate environment. Relationships between parents and children, teachers and students, or peers are therefore fundamental to development, although their effectiveness largely depends on resources and contextual stability (Bronfenbrenner & Ceci, 1994). Families with knowledge, educational materials, and stable structures facilitate the development of skills and learning, while the absence of these elements may substantially limit the positive effects of such interactions. Under conditions of poverty, family instability, or low parental educational attainment, even substantial efforts may be insufficient. For this reason, the model helps explain how certain personal, family, and school-related factors can strengthen (competence) or weaken (dysfunction) core developmental processes, becoming risk or protective factors in relation to school failure. Table 2 summarizes the structure of the bioecological model with examples.

Table 2 : Process–Person–Context–Time Model (PPCT)

PPCT model	Components	Meaning	Example
Process	Proximal processes	Reciprocal, regular, and progressively more complex interactions between a person and elements of the environment (people, objects, or symbols)	Learning to read, resolving conflicts, or acquiring new knowledge with guidance from an adult or peer
	Person	Individual characteristics such as temperament, motivation, persistence, or personality	A student with high motivation when facing school difficulties
Context	Resources	Biological, cognitive, emotional, or material conditions that facilitate or limit interaction with the environment (e.g., skills, experiences, intelligence)	Good health, emotional support, access to educational resources, or academic skills
	Demand	Visible personal attributes that shape how others respond to or interact with the person	Age, gender, physical attractiveness
	Microsystem	Immediate settings in which the person is an active participant (home, school, peer group)	Family, school, friends, classroom
	Mesosystem	Interrelation between two or more microsystems in which the person participates	Active collaboration between family and school
Time	Exosystem	Settings in which the person does not participate directly but that affect them	Parents' workplace, institutional support networks, local education system policies
	Macrosystem	Cultural patterns, values, beliefs, ideologies, economic and normative systems shaping other contextual levels	Expectations regarding students' roles
	Microtime	Rhythm, frequency, and continuity of interactions within specific situations	Time devoted daily to schoolwork
	Mesotime	Time span over which processes occur within an environment	Consistency of family or teacher support over an academic year
	Macrotime	Historical changes or life transitions that modify contexts and interactions across development	Educational reforms, technological advances, or social changes that reshape educational opportunities

Source. Author's own elaboration based on Bronfenbrenner and Morris (2006) and Jaeger (2017).

The Bioecological Model and School Failure

In seeking to examine theories and models that help explain the elements that converge in academic performance, it is important to note that school failure is a complex phenomenon that cannot be understood as an isolated event or attributed to a single cause. Its emergence reflects the interaction of multiple dimensions that shape students' educational experience. At the core of this process are personal, family, and school-related factors whose dynamics significantly influence academic performance, students' persistence in the education system, and, ultimately, their diverse educational trajectories. To understand these dimensions, it is not only relevant to adopt a comprehensive view of grade retention, but also necessary to identify potential lines of intervention—particularly those most responsive to students' everyday realities.

These factors are understood as dual in nature, in that they may operate as risks that heighten educational vulnerability while also functioning as protective resources that strengthen persistence and academic success.

This perspective holds that students' performance and the ways they face school challenges are influenced by the quality of bonds and resources available in proximal settings such as family and school, as well as by the external conditions within which these settings are situated. Moreover, in cross-sectional studies, it is recognized that students' transitions and prior experiences, such as moving to a new educational level, changing school sites, or having repeated a grade, form part of the chronosystem insofar as they constitute events that shape their educational trajectories. Identifying risk and protective factors at these

different levels not only supports a better understanding of school failure but also offers insights for intervention from an integrated and context-sensitive perspective.

Conclusions

School failure cannot be understood as an isolated event; rather, it emerges from the complex interaction among personal, family, school-related, and contextual elements. Analyzing this phenomenon requires moving beyond reductionist explanations centered solely on the student and adopting a multidimensional view.

From the bioecological model, it can be observed that students' direct relationships with their immediate environments (microsystems), as well as the connections among these settings (mesosystems), affect academic performance. In addition, the indirect influence of external factors, such as the working conditions of caregivers or prevailing education policies (exosystem and macrosystem), also shapes students' educational experience.

Adopting a theoretical framework such as Bronfenbrenner's facilitates the integration of different levels of analysis and supports an analytical approach that articulates personal, family, school-related, and contextual dimensions.

Finally, adopting an ecological perspective entails recognizing education as a social, historical, and cultural process that unfolds across multiple settings of socialization, such as family and school. Accordingly, this analysis of school failure may contribute to future research by encouraging attention to both individual circumstances and structural factors that shape students' development and learning from a bioecological standpoint.

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