

The complementarity of life cycles in human development

A complementaridade dos ciclos de vida no desenvolvimento humano

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ABSTRACT Adolescence, the second decade of life, is analyzed through the lens of life-cycle complementarity. Human development is a continuous process in which each stage shapes the next. Drawing on a theoretical review of classical and contemporary authors, analysis of recent demographic data and illustrative educational indicators, this essay describes the ruptures and transitions that mark childhood, adolescence and youth. The study shows that adolescence is structured around three core axes – interaction, autonomy and identity – whose maturation depends on experiences accumulated in childhood and determines future opportunities in youth. Contexts of protection, stimulation and family support foster virtuous trajectories, whereas deprivation and violence tend to perpetuate cycles of vulnerability, illiteracy and inequality. The article also discusses contributions from classical authors and neuroscience findings that elucidate the cognitive, affective and social changes distinctively of this stage, highlighting heightened sensitivity to social risk and peer influence. Using the concept of complementarity, it argues that public policies must be designed in an integrated manner, with specific targets for each decade of life. The article concludes that acknowledging adolescence as a strategic phase embedded in a continuum of development is a prerequisite for formulating educational, health and protection interventions that promote full human development and reduce inequalities.

KEYWORDS Adolescence. Life-cycle complementarity. Public policies.

RESUMO A adolescência, segunda década da vida, é analisada à luz do conceito de complementaridade dos ciclos de vida. O desenvolvimento humano constitui-se em um processo contínuo no qual cada fase influencia a seguinte. Mediante revisão teórica de autores clássicos e contemporâneos, análise de dados demográficos recentes e exemplos de indicadores educacionais, descrevem-se as rupturas e transições que marcam a infância, a adolescência e a juventude. Demonstra-se que a adolescência é estruturada em três eixos centrais – interação, autonomia e identidade –, cuja maturação depende das experiências acumuladas na infância e condiciona oportunidades futuras na juventude. Evidencia-se que contextos de proteção, estímulo e apoio familiar promovem trajetórias virtuosas, enquanto privações e violências tendem a perpetuar ciclos de vulnerabilidade e desigualdade. Discutem-se as contribuições de autores clássicos e achados da neurociência que elucidam mudanças cognitivas, afetivas e sociais próprias dessa etapa, destacando a sensibilidade ampliada ao risco social e à influência dos pares. A complementaridade demanda políticas públicas planejadas e integradas, estabelecendo metas específicas para cada década da vida. Conclui-se que reconhecer a adolescência como fase estratégica, inserida em um continuum de desenvolvimento, é condição para formular intervenções educacionais, de saúde e de proteção que promovam pleno desenvolvimento humano e redução das desigualdades.

PALAVRAS-CHAVE Adolescência. Complementaridade dos ciclos de vida. Políticas Públicas.

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Introduction

Analyzing the situation of childhood and adolescence separately, without addressing the relationship between the different cycles of human development, constitutes a serious problem in the development of public policies for these groups, generating isolated programs, fragmented policies, and insignificant results in addressing existing economic and social inequalities.

Starting from a historical approach and presenting the main theories on the phases, stages, or cycles of human development, this essay aims to demonstrate how the concept of complementarity of life cycles is crucial to understanding each stage in itself and its relationships with each other, and the need for specific and articulated public policies to ensure their rights.

The structure of this essay starts from the most recent demographic data, systematizes different theories, and incorporates concepts from psychology, pedagogy, sociology, and neuroscience.

This study will address the second decade of life, adolescence, as a phase of human development; but, to understand it in the context in which it occurs, it is necessary to explore the concept of 'complementarity'.

Human development results from a complex set of biological, psychological, social, cultural, and even economic processes that have differentiated impacts on the different phases of life, sometimes as continuity and, at other times, as rupture. Human beings develop through radical ruptures, such as the one that occurs at birth, with the literal breaking of the umbilical cord, or in the rapid physical growth, also called a 'growth spurt', at the beginning of adolescence for girls and in the middle of this phase for boys, as well as through smooth transitions, as occurs over the years when one changes age from one year to the next.

Although many classic authors of the last century – such as Jean Piaget (1896-1980), Lev Semenovitch Vygotsky (1896-1934), Erik

Erikson (1902-1994) and Sigmund Freud (1856-1939) – have proposed differentiated phases of development, establishing age ranges in which specific processes occur, they all agree that there is continuity in development and that one phase influences another, either through the realization of the expected processes or through the absence of their occurrence. In the most recent studies on this phase of life, the evidence also indicates this progressiveness¹.

A child who is stimulated, protected from violence, adequately nourished, and experiences supportive and understanding relationships will positively benefit from learning, knowledge, and interactions, developing their full potential to mature and move into adolescence with a strong emotional foundation. This foundation will mitigate the impacts of the transition and allow them to experience adolescence with its challenges and opportunities, experimenting with new relationships, learning, and discoveries that will transform this new phase of life into an achievement that will nurture self-esteem and self-confidence to make decisions and take on responsibilities that will pave the way for their personal and professional development, so that, in youth, they can transition to adulthood as a complete human being.

When the beginning of life is marked by deprivation, inequality, and violence, each subsequent stage of development represents a challenge to be overcome, as the person needs to respond to the demands of the new phase of development without having the necessary foundations to build skills, abilities, knowledge, and social relationships, which leads to enjoying the new phase and strengthening themselves as a subject to advance in experiences as a young person. It is in this context that the processes of reproduction of poverty, low schooling, illiteracy, and vulnerabilities that affect children, adolescents, and young people occur.

For this reason, the complementarity of life cycles' concept becomes fundamental for the development, implementation, and evaluation of specific public policies for each age group.

The demographic transition and social indicators

From a demographic point of view, one can think of three major initial cycles of human development: the first decade of life, childhood; the second, adolescence; and the third, youth. The publication *Panorama do Censo 2022* by the Brazilian Institute of Geography and Statistics (IBGE)² indicated that the child population, from 0 to 9 years of age, is 26,454,300, which is equivalent to 13% of the total Brazilian population living through its first decade of development: childhood. Adolescence, the second decade of life, which goes from 10 to 19 years of age, with 28,050,903, represents 13.8% of the population. Youth, the third decade of life, aged between 20 and 29 years, is 30,936,186 and corresponds to 15% of the population. Therefore, 42% of the Brazilian population, or 85,441,389 people, are living through the first three decades of their lives.

These statistics highlight the aging of the Brazilian population and allow us to glimpse what the country needs to do in different decades of life to guarantee the full development of its children, adolescents, and young people.

The study ‘Multidimensional Poverty in Childhood and Adolescence in Brazil’³, conducted by the United Nations Children’s Fund (UNICEF) based on the Annual Continuous National Household Sample Survey (PNAD Contínua), from 2016 to 2022, revealed that childhood illiteracy suffered a serious increase as a consequence of the COVID-19 pandemic, associated with the low quality of education. According to the study, there was an increase in illiteracy among children aged 7, 8 and 9 years old. In 2022, it was 20% at age 7; 8.5% at age 8; and 4.4% at age 9. In 2021, these percentages rose to 40%, 20.8% and 9.5%, respectively³.

In 2022, the illiteracy rate among young people aged 10 to 19 in Brazil was 1.5%, according to the IBGE’s 2022 Census Panorama publication², meaning that more than 420,000

adolescents are illiterate. In the third decade of life, the illiteracy rate among young people aged 20 to 29 was 3.2%, which corresponds to approximately 1.1 million individuals.

This example of illiteracy applied to the three different life cycles shows that it will be necessary to strengthen educational policies with specific actions in each decade of life, not only to ‘leave no one behind’, but also to ensure that those who have suffered the impacts of the lack or ineffectiveness of public policies can receive an opportunity and rebuild their trajectories to fully enjoy the subsequent stages.

Illiterate young people only exist because, during their childhood and adolescence, they were deprived of the right to education. Evaluating public policies based on the concept of complementarity of life cycles allows us to identify the key moments in which developmental processes should occur that lead to the evolution from one phase to another with significant gains, enabling access to the opportunities of the next phase and the continuity of human development.

In the case of education, a child who is literate at age 8, as an adolescent, completes primary school at age 15 and secondary school at age 18; as a young adult, they experience a positive transition to university and complete a virtuous cycle of development that projects the country towards a future with less inequality and fewer violations of rights.

In the case of health policies, we could examine the nutritional situation of childhood to observe the high rates of malnutrition and obesity, which worsen in adolescence and, later, in youth.

In Brazil, violence also spans the life cycles, with the aggravating factor of starting in childhood with mistreatment, abuse, and sexual exploitation, and continuing into adolescence and youth with the highest rates of homicides of adolescents and young people, especially young black people from the poor communities of large urban centers.

Understanding the life cycles as complementary allows us to comprehend the real

development of children, adolescents, and young people as subjects who are progressively constituted in a process of transitions and ruptures that prepares and enhances their capacities to enjoy and expand their rights, or that excludes, stigmatizes, and frustrates their development.

The historical construction of adolescence

Whenever adolescence is discussed, it's necessary to highlight the need to avoid common misconceptions, prejudice, and the stigmatization that exists in society regarding this phase of life. Much of what is known about adolescence stems from exaggerated interpretations of adolescent behavior, caricatured portrayals by the media, and outdated views that have been superseded by studies in new areas of knowledge that have contributed to the understanding built throughout history. It's important to emphasize that adolescence only began to exist as an area of study, a subject's identification, and became socially recognized in Western society after the Industrial Revolution in the 19th century.

References to this phase of life appear as far back as ancient philosophers, who dedicated themselves to thinking about the theories, ethical values, and attitudes that young people should have in the face of life's mysteries. Socrates and Aristotle are attributed with phrases in which they complained about the instability and lack of willpower of adolescents. Even so, both endeavored to identify positive processes that occur in each phase of life to help them develop based on their ideal models.

With the emergence of psychology, Sigmund Freud (1856-1939) made an important contribution to the study of the subjective dimension of adolescence.

With the contribution of Jean-Jacques Rousseau (1712-1778) in the book 'Emile', progress was made towards a pedagogy that

sees the adolescent as a being in formation.

Here we retrieve some paragraphs from a text of my authorship, published in 2012, entitled 'The principle of the developing person' as defining opportunities for State action in the lives of adolescents who commit offenses' to bring aspects of adolescence constructed throughout history.

Emile Durkheim (1858-1917), a sociologist who deeply studied the so-called 'social fact', demonstrated that society is a set of norms, actions, ideas, and values that are not only in the individual's consciousness, but are constructed in life within society. When someone begins to live in society, they find it already in place and construct themselves based on their experiences. The sociologist believed that if he could demonstrate how much an individual act is the result of the social environment surrounding it, he would have proof of the usefulness of sociology. In studying the issue of suicide, he revealed how young people felt pressured by excessive rigor and control or by total abandonment and indifference. Durkheim's studies gave rise to a discussion that views adolescence more as a social production or even as a 'social achievement'.

The word 'adolescent' was also studied in its origin to try to establish a meaning for it. Originating from Latin, its meaning has been explained as *ad-olescer* (to grow), *adolescere* (to become ill) or *adolescens* (young man). In fact, studying the word doesn't help much in understanding the concept, because, however much one seeks the origins of the word, the context of its emergence is what could help to understand its meaning⁴⁽⁵³⁾.

Jean Piaget (1896-1980), through his studies, revealed the processes of development and how human beings learn. He described development in childhood and adolescence in four phases: i) sensorimotor phase (0 to 2 years of age), characterized basically by the acquisition of visual and motor information, during which the child develops knowledge

about the environment around them, objects and space, seeing the results of their own actions located in space and time; ii) preoperational phase (2 to 7 years of age), in which animism and egocentrism are characteristic of this phase – the child gives life to objects and things in nature, everything revolves around their own existence, the appearance of language contributes to their socialization; iii) Concrete operational stage (7 to 12 years of age), characterized by the mastery of concrete operations that combine with each other, of which the child is aware of the mechanisms and how they coordinate – it is also called operational and logical thinking, because, in this stage, the child uses logic to solve problems, but is limited to solving concrete problems; iv) Formal operational stage (from 12 years of age onwards), when the adolescent begins to master the ability to abstract and understand themselves as part of a context.

Adolescents develop the ability to hypothesize, examine statements, and question them. With mastery of a broad set of skills, they find it easier to learn, provided their interest is stimulated. Since they already master abstraction and the ability to think about ideas (metathinking), their capacity for socialization increases.

For him [Piaget], adolescence corresponds to the most remarkable moment in the development of intelligence, because it is in this phase that thought reaches its capacity for abstraction in the hypothetical-deductive or logical-mathematical form. It is the moment to move from concrete questions to discussing ideas, formulating hypotheses and arriving at conclusions, developing the capacity for dialectical thinking. This capacity is projected in their socialization, helping the adolescent to be more cooperative in the group and establish reciprocal relationships⁴⁽⁵⁴⁾.

In his book ‘The Moral Judgment of the Child’⁵, Piaget demonstrated that a child’s moral development unfolds through their

interactions with others. By analyzing, through observation of games, he realized that respect for rules by children and adolescents has different meanings. While children respect the rules and have difficulty changing them, adolescents accept new combinations and make observations about them. In any case, the cooperation that the game requires is the important element for the adolescent to assume values and attitudes.

Given the importance of Piaget’s pioneering studies and the uniqueness of his contribution in different fields, we record here the key elements of the development of Piaget’s moral judgment, using as a basis the summary table of his contribution systematized by the psychologist and pedagogue Denise D’Aurea-Tardeli in the ‘Revista Mente e Cérebro’⁶⁽²⁵⁾:

The ‘sensorimotor’ period, from 0 to 2 years of age, with cognitive development based on practical intelligence and moral judgment marked by anomie, lacking a sense of morality.

The ‘preoperational’ period, from 2 to 7 years of age, with cognitive development based on the emergence of symbolic function and language development, and moral judgment marked by heteronomy; morality based on fear of reprisal; obedience to authority.

The ‘concrete operational’ period, from 7 to 12 years of age, with cognitive development of rational and logical thought and moral judgment marked by heteronomy; morality based on unilateral respect and reciprocity; children follow the rules and expect everyone to do the same.

The ‘formal operational’ period, from 12 years of age onwards, with cognitive development of the capacity for abstraction, simultaneity, and metathinking, and moral judgment marked by autonomy, morality based on higher principles of law and mutual respect; equity and cooperation. recognition that the rules can be changed.

Although Piaget focuses his attention on the development of the individual and analyzes their interaction, in the case of his work on moral judgment, through the observation of

play experiences, he refers to this aspect as ‘the irritating question of the individual and the social’⁵. It is likely that he did not have much patience for the somewhat fruitless debate that questioned whether the individual is a product of the social environment or whether he is only a product of his own characteristics. Obviously, both aspects are important, but, even today, it is observed that sectors of both academia and social practices have difficulties in articulating the two dimensions in the study of human development.

Lev Semenovich Vygotsky (1896-1934), born in the same year as Piaget, focused his studies on the interaction between the individual and collective dimensions of human development; how the subject is constituted from their subjective aspects and how social and collective aspects influence the individual’s formation. Called socio-interactionism, this field of developmental studies is very important in preserving the uniqueness of individuals and, at the same time, demonstrating how the social environment acts in their formation.

This simply means that certain categories of higher mental functions (voluntary attention, logical memory, verbal and conceptual thinking, complex emotions, etc.) could not emerge and be constituted in the developmental process without the constructive contribution of social interactions⁷⁽¹⁷⁾.

Although the idea of social interactions is present in other theories, it is Vygotsky who makes them explicit in an articulated theoretical framework that examines human development from deeper dimensions of the formation of ideas, knowledge, repetition, social response, and continuous and inter-related processes.

We are faced with a thesis of Vygotsky that has not yet been sufficiently assimilated and explored in research, even in the field of contemporary psychology: the essential thing in development is not in the progress of each

function taken in isolation, but in the change of relations between different functions, such as logical memory, verbal thought, etc.; put another way, development consists in forming composite functions, systems of functions, systemic functions, functional systems⁷⁽¹⁸⁾.

The complexity of Vygotsky’s thought lies precisely in the pursuit of knowledge about multiple interconnected processes that stem from practical, symbolic, social, and cultural experiences. These processes are also connected to genetic inheritance, individual characteristics, and aspects related to the family context.

What is important to retain for our purposes is that, in socio-interactionist theory, human physical capacity and intelligence do not realize their potential without the appropriate tools, that is, without the transfer of elements of culture and technology mastered in each period of history. What leads adolescents to commit an offense is not limited to the result of the individual’s actions in the social environment. Aspects of culture, values, and the possibilities of the subject’s presence in the world are social determinants that must be studied and understood so that the subject can be recognized as a living organism within a historical and cultural context, and so that the adolescent can recognize themselves as a person with their own history, culture, and context.

Sigmund Freud (1856-1939) was the Austrian neurologist who developed psychoanalysis, a theory and practice that broadened the understanding of the human being as a subject, deepening knowledge about the human mind and demonstrating the importance of the unconscious in solving psychic problems. For him, psychosexual development is the main issue in the psychoanalytic theory of instincts, which explains that, at birth, everyone possesses sexual energy, libido, which develops in five phases: from 0 to 1 year, the oral phase; from 2 to 4 years, the anal phase; from 4 to 6 years, the phallic phase; from 6 to

11 years, the latency phase; and, from 12 years onwards, with the beginning of adolescence, the genital phase, in which there is a resumption of sexual impulses and the adolescent begins to seek, in people outside their family group, an object of love.

Adolescence is a period of change in which the young person has to process the loss of childhood identity in order to gradually build an adult identity. The adolescent seeks to differentiate themselves from others, while at the same time seeking to fit into a group with its own styles and tastes⁸⁽²⁴⁾.

In this historical overview of contributions to the study of adolescence as a phase of human development, the issue of the 'identity crisis' experienced by adolescents was addressed in the work of Erik Erikson (1902-1994)⁹. Of the eight developmental phases throughout life which, according to Erikson, the individual passes, the fifth is that of puberty-adolescence, experienced between 11 and 19 years of age. The characteristic highlighted by him is the search for self-recognition based on who the person is and who they want to be.

Key aspects of brain development during adolescence

Neuroscience studies¹⁰ have made an important contribution to reconciling historical learnings, confronting some myths, and introducing a more systematic and in-depth study of the adolescent brain.

In the field of neuroscience, there is an interest in studying what characterizes adolescence. Studies focused on brain maturation identify a period of turbulence in adolescence caused by what appears to be brain development starting from the anterior surface of the brain, leaving the connections of the frontal cortex until last.

Since it is in the frontal cortex that aspects of social adaptation and judgment are formed, we could then justify some adolescent behaviors by this stage of brain development. Other scientists attest that brain development is so advanced in adolescence that it accelerates the speed of learning, facilitates abstraction, promotes autonomy, and facilitates selective memory for social interactions. António Damásio, in his work *Descartes' Error*, shows that brain processes occur in a correlated way, overcoming the body-spirit dichotomy and revealing that emotion is not a luxury. Emotion, reason, and the human brain form an inseparable whole. Although less evident, the internal changes are equally profound. Recent neuroscientific research indicates that, in the early stages of adolescence, the brain undergoes a spectacular acceleration of electrical and physiological development. The number of brain cells can almost double in the space of a year, while neural networks are radically reorganized, impacting emotional, physical and mental capacity⁴⁽⁵⁶⁻⁵⁷⁾.

Recent neuroscience studies are making increasingly assertive discoveries regarding adolescence, as demonstrated in the recent publication by Professor Sarah-Jayne Blakemore of the Institute of Cognitive Neuroscience at University College London (UCL), England. Using tests that combine techniques for responding to pre-structured questions and brain imaging via magnetic resonance imaging, she reveals new aspects of adolescent behavior. In the article entitled 'Amplified concern about social risk in adolescence: development and validation of a new measure'¹¹, co-authored by her and researchers in the fields of psychology and psychiatry, she proposes the development of a measure for the likelihood of adolescents taking risks related to health and social risks. The article reveals that adolescents do not have an antisocial nature and that there is no evidence that, at this stage of life, they enjoy taking risks and challenging society.

This supports the body of evidence that adolescence is a period of intense sensitivity to the social environment. Furthermore, both health concerns and social risk decreased with age, but the rate of decrease was more pronounced for social risk versus health risk, suggesting that adolescence is a period of heightened concern with social risk. In practical terms, these findings have potential implications for public policy. Within the context of education, an understanding of social risk can offer insight into why adolescents are more or less motivated to engage with schoolwork. [...] Within a legal context, concerns surrounding social risk can be a factor in adolescents' decisions to engage in criminal behavior, particularly in peer contexts where choosing not to participate in group behavior may risk exclusion. Together, these findings highlight the importance of social risk in adolescent behavior and suggest that interventions to reduce risk-taking behavior in this age group should consider the role of social risk¹¹⁽¹⁷⁾.

The ideas of continuous development, life cycles complementarity, and their ruptures and continuities help to better understand various social phenomena, for example, the practice of delinquent acts by adolescents. To understand the subject, it is necessary to understand their trajectory, an expression used by this author in the study on the practice of delinquent acts recorded in the book 'Sem Liberdade, Sem Direitos'¹².

This overview of different approaches to the study of adolescence shows that the perception of this phase of life has been evolving based on various studies and reinforces the importance of maintaining a continuous process of observation, study, and updating.

Adolescence: interaction, autonomy, and identity

As can be seen from the brief mention of different theories about adolescence, the three

central elements of this phase of life are interaction, autonomy, and identity.

Interaction is the process resulting from the adolescent's maturation and the search for relationships beyond the family and school context. While children interact with their peers based on what their responsible adults allow, adolescents establish relationships based on their own interests. This process is part of their self-affirmation and is crucial for their self-esteem, since it is within their peer group that they find their greatest affinity of interests.

When parents or guardians suppress the relationships that adolescents develop independently, the tendency is for them to hide these relationships and keep them somewhat secret. This attitude of not confronting their parents and preferring to appear obedient is the beginning of a rupture with dominant authority and the creation of a subterfuge that generates apparent accommodation. The phrase most often heard by professionals working in socio-educational settings, uttered by parents (essentially mothers, as they are the majority who maintain a bond with the sentenced adolescent) is: "*my son was hanging out with the wrong crowd and wouldn't listen to me*".

Expanding social interactions is an essential process for human development. Human beings are, essentially, social beings; that is, they develop most of their skills and abilities through interaction with others. These interactions need to be stimulated, supported, and guided so that adolescents can make the most of them and not be dominated by more experienced individuals. The sexual exploitation of children and adolescents, child labor, the exploitation of adolescent labor, the recruitment of adolescents by drug, arms, and human trafficking, and enticement to commit crimes occur precisely in this field of social interactions, when adolescents lack the support of their family group to help them critically analyze the interests of the groups they are drawn to.

In this process, dialogue is the most important way to help adolescents understand

that human relationships are mediated by a wide variety of interests: affective, economic, religious, political, sexual, social, and many others. There are also mutual, collaborative, and supportive interests, as well as the sharing of visions and ideals. The main issue is that all these interests are intertwined in the daily lives of family, community, institutional, and social settings, and that it takes a great deal of attention, dialogue, self-confidence, and self-knowledge to separate one from the other.

In the context of positive family dialogue, built from childhood throughout the life cycle, it will be possible to help the adolescent make their own choices. However, in a context of conflict, repression, distancing, and the imposition of relationship standards, it is very predictable that adolescents will seek distance from the guidance of the family nucleus and build their circle of reference in the opposite field, as a process of self-affirmation and protest.

The second important dimension of development that occurs in adolescence is autonomy, a term that originates from the idea of 'making one's own rules'. This is a topic widely studied by most psychologists who investigate human development, as this dimension is essential for the construction of judgments and values and, as Piaget would say, for the search for balance between what one wants and what one does. In adolescence, the individual is equipped with knowledge, skills, and competencies that guarantee them a minimal understanding of what is right and wrong. What generates conflict and dispute is the relationship of adults with these concepts. In this context, there is a consensus that everyone should respect the law, but it is evident that not everyone does.

The major conflict observed by adolescents is the inconsistency between what is done and what is said. As adolescents become aware of this inconsistency, parents, teachers, leaders, and role models lose legitimacy and begin to be questioned. The reaction to these questions, with mere repression or discrediting of

the adolescent, generates estrangement and loss of reference points. This internal conflict becomes a lax attitude towards the importance of law and norms, and adolescents prefer to fend for themselves.

The third important dimension of human development in adolescence is identity formation. As mentioned, identity construction processes are continuous, but they reach their peak during adolescence. Furthermore, this is important because overcoming the phase determined by childhood learning occurs precisely with the construction of the adolescent subject who differentiates themselves from others through their uniqueness and subjectivity. It is the human being assuming their unique presence in the world based on their choices and projections.

While in childhood 'imitation' is an important learning resource, in adolescence, 'differentiation', doing things 'my way' and personal expression are more important, because it is through this attitude that adolescents reveal how they want to be seen by the world and with which aesthetic, behavioral and attitudinal references they want to identify.

At this stage of development, affirmation of one's personal abilities and peer recognition of them are also of great importance. Being a good student, having athletic skills, artistic abilities, being the funny person in the group, and various other characteristics that reinforce the individual's differentiation within the collective, as long as they are positive, are a source of immense pleasure and fulfillment. It is at this stage of life that gender, ethnic-racial, place of residence, and group affiliation identities gain great relevance for the adolescent. When these characteristics are socially valued, they become a source of pleasure and fulfillment, and when they are rejected, discriminated against, or belittled, they generate profound psychic pain, suffering, and frustration.

In adolescent development, to build their identity, expand their interaction, and produce their autonomy, although it may seem contradictory, the reaction of their peers is given

great importance. Adolescents are strongly influenced by what other adolescents say, do, and propose.

Recent studies in the field of neuroscience highlight the importance of the opinions of other adolescents in the behavior of each individual. Adolescents are very susceptible to the opinions and reactions of their peers.

They place great importance on the opinions and attitudes of their peers, but that doesn't mean those opinions are correct. Helping them develop a critical sense about these opinions is a great challenge, but they can never be ignored as if they weren't important to each adolescent.

Adolescence is a period of life often characterized by behaviors that, *prima facie*, are irrational, such as seemingly excessive risk-taking and impulsivity. However, these behaviors can be interpreted as adaptive and rational if we consider that one of the main developmental goals of this period of life is to mature into an independent adult in the context of an unstable and changing social world. It is proposed that, for adolescents, the social risk of being rejected by peers outweighs other potentially negative outcomes of decisions, such as threats to health or the prospect of being caught. Furthermore, peer influence in adolescence can lead to both pro-social and anti-social behaviors. The neuro-cognitive mechanisms of peer influence include the social reward of being accepted by the peer group, arousal, and increased mentalization, which is associated with the development of the brain's social network¹¹⁽¹¹⁶⁾.

The way in which the evolution of social interactions, the construction of identity, and the production of autonomy occur during adolescence constitutes the fundamental element for thinking about public policies for this phase of life. It involves observing, problematizing, reflecting on, and contributing to the adolescent's own awareness of how these three processes have occurred throughout their lives and how they can be reorganized so that

adolescents can achieve their personal goals through social practices grounded in an ethic of respect for others, for their humanity, and therefore for their dignity and their lives.

All these developmental processes in adolescence occur within a social, economic, regional, ethnic-racial, and cultural context. Therefore, when discussing this phase of life, it is necessary to refer to it in the plural. In fact, there are many adolescences, each with different meanings in various contexts.

Contrary to most assumptions made by neuroscience up to twenty years ago, more recent research has proven that the brain does not stop changing in childhood. Robust findings from studies on the structural development of the brain show that the human brain develops throughout adolescence and early adulthood. In particular, after the age of eight/nine, there is no further growth in brain size, but changes in its internal composition continue to occur. Gray matter decreases by an average of 15% during adolescence, while white matter increases linearly by about 1% per year during the same period. All studies conducted so far take into account the average adolescent, but recognize the importance of individual differences created by genetic and environmental factors in the volumes of white and gray matter. Currently, a large area of research is focusing on the hypothesis that specific trajectories of brain development may determine the development of certain mental health problems¹³⁽⁷⁾.

In addition to neuroscience, other fields of knowledge are conducting studies and research that contribute to updating our understanding of adolescence and adolescents.

During a workshop on adolescent pregnancy, an adolescent said: "Do you want to understand teenage pregnancy? Then you need to look beyond our bellies, listen to our heads and our hearts too"¹⁴⁽¹¹⁾.

In the context of the complementarity of life cycles, adolescents present themselves as specific subjects who require specialized public

policies to realize their rights and promote their integral development. Considering the aspects highlighted in this essay – notably, interaction, autonomy, and identity – it is necessary to emphasize that the proposal, development, and implementation of public policies for this phase of life will only be effective with the engagement and active and

conscious participation of the adolescents themselves.

Authorship contributions

Volpi M (0009-0002-6942-0911)* is responsible for the preparation of the manuscript. ■

References

1. UNICEF Office of Research – Innocenti. The adolescent brain: a second window of opportunity. Florence: UNICEF Office of Research – Innocenti; 2017.
2. Instituto Brasileiro de Geografia e Estatística [Internet]. [Rio de Janeiro]: IBGE; 2022. Panorama do Censo 2022; 2022 [acesso em 2026 fev 27]. Disponível em: <https://censo2022.ibge.gov.br/panorama/?localidade=BR>
3. Fundo das Nações Unidas para a Infância. Pobreza Multidimensional na Infância e Adolescência no Brasil – 2017 a 2023. Brasília, DF: UNICEF; 2025.
4. Volpi M. O princípio da “pessoa em desenvolvimento” como definidor de oportunidades para a ação do Estado na vida dos adolescentes autores de atos infracionais [Internet]. In: Minas Gerais, Governo do Estado, Secretaria de Estado de Defesa Social, Subsecretaria de Atendimento às Medidas Socioeducativas. Medidas Socioeducativas: contribuições para a prática. Organizado por: Carolina Proietti Imura e Elaine Rocha Maciel. Belo Horizonte: Editora FAPI; 2012 [acesso em 2026 fev 27]. 234 p. Disponível em: https://site.mppr.mp.br/sites/hotsites/arquivos_restritos/files/migrados/File/publi/mse/mse_contribuicoes_para_a_pratica_seds_mg_2012.pdf
5. Piaget J. O Juízo Moral na Criança. 1ª ed. São Paulo: Summus; 1994.
6. Revista Mente e Cérebro. O olhar adolescente – Espelhos da sociedade. São Paulo: Duetto Editorial; [2014];(4):25.
7. Coelho EP, organizador. Lev Semionovich Vygotsky. Recife: Fundação Joaquim Nabuco, Editora Massangana; 2010.
8. Ozella S. Adolescências construídas: a visão da psicologia sócio-histórica. São Paulo: Cortez Editora; 2008.
9. Mayer H. Tres teorías sobre desarrollo del niño: Erikson, Piaget y Sears. Buenos Aires: Amorrortu Editores; 1989. p. 19-82.
10. Damásio A. O erro de Descartes: Emoção, Razão e o Cérebro Humano. São Paulo: Companhia das Letras; 1996.
11. Blakemore SJ. Avoiding Social Risk in Adolescence. *Curr Dir Psychol Sci.* 2018;27(2):116-22. DOI: <https://doi.org/10.1177/0963721417738144>

*Orcid (Open Researcher and Contributor ID).

12. Volpi M. Sem liberdade, sem direitos: a privação de liberdade na percepção do adolescente. São Paulo: Cortez; 2002.
13. Blakemore SJ. Inventing ourselves: the secret life of the teenage brain. New York: PublicAffairs; 2018.
14. Instituto dos Direitos da Criança e do Adolescente; Fundo das Nações Unidas para a Infância; Fundo de População das Nações Unidas. Gravidez na Adolescência no Brasil – Vozes de Meninas e de Especialistas [Internet]. Brasília, DF: Indica; 2017 [acesso em 2026 fev 27]. Disponível em: <https://www.unicef.org/brazil/relatorios/gravidez-na-adolescencia-no-brasil-vozes-de-meninas-e-de-especialistas>

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