pISSN:2349-5707 Volume:13,Issue 5, May -2026 eISSN:2349-5715

MODERN ONTOGENETIC PROBLEMS IN THE ERA OF DIGITAL TECHNOLOGIES

Fozilova Shaxzoda Feruz qizi
Student at Asia International University
https://doi.org/10.5281/zenodo.20208370

Abstract

This article analyzes the specific characteristics of human ontogeny, particularly psychophysiological development during childhood and adolescence, amidst the rapid advancement of digital technologies. The study highlights the impact of gadgets on cognitive processes, attention span, and social adaptation of the "digital generation." Primary focus is directed toward the factors of the virtual environment that exert both negative and positive influences on neurobiological development, specifically memory and speech formation. Furthermore, the article scientifically substantiates ontogenetic crises arising from digital addiction, "information overstimulation," and the decline of real-world social interactions.

Keywords.

Acceleration, teratogenesis, detardation, mutagenesis, genetic transformation, retardation imbalance, digital ontogeny, cognitive changes, hypoalydinia, digital heritage.

Introduction

Ontogeny is the process of an organism's individual development, spanning from the fertilized egg cell to the end of its lifespan. In the contemporary era, this process faces significant challenges, influenced not only by biological factors but also by complex environmental and social determinants.

In the modern era, the pace of human ontogeny is undergoing significant transformations. Specifically, the physical, physiological, and psychological development of children and adolescents follows a different trajectory compared to previous generations. While growth and development accelerate beyond the norm in some children, they may conversely decelerate in others. Consequently, the imbalance between **acceleration** and **retardation** has become one of the most critical issues in contemporary developmental psychology and pedagogical practice. When a child's physical body develops rapidly while their psychological maturity lags behind, it can lead to emotional instability, difficulties in self-awareness, and challenges in peer communication.

Acceleration refers to the quickening of the pace of growth and development in subsequent generations compared to their predecessors. This phenomenon has been observed since the late 19th century. Acceleration manifests in biological processes such as height, weight, skeletal development, tooth eruption, and sexual maturation. For instance, contemporary adolescents are often taller, heavier, and tend to mature physiologically earlier than their peers from 40–50 years ago. This trend can be attributed to improved nutritional quality, enhanced medical services, urbanization, increased information flow, and lifestyle changes. One of the most prominent manifestations of acceleration is the speeding up of physical growth. In this regard, children’s height, weight, body structure, and musculoskeletal system develop faster than those of previous generations. For example, some modern 12–13-year-olds may physically resemble 14–15-year-old adolescents from 50 years ago. While this indicates rapid biological maturation, physical acceleration does not always coincide with psychological maturity. Consequently, although these children may appear like adults, their level of cognitive processing, emotional regulation, and sense of responsibility may still be age-appropriate. Another significant sign of acceleration is the premature eruption and replacement of teeth. Typically, primary (milk) teeth fall out and are replaced by permanent teeth during specific developmental stages. In cases of acceleration, this process may begin 1–2 years earlier, signaling an overall acceleration of the body's biological maturation pace. Early dental replacement is linked to the skeletal system, mineral metabolism,

pISSN:2349-5707 Volume:13,Issue 5, May -2026 eISSN:2349-5715

and general physiological development. However, educators and parents must evaluate these changes alongside the child's overall development, as early dental eruption does not necessarily imply advanced mental or psychological maturity.The most critical and complex form of acceleration is the early onset of puberty (sexual maturation). In this process, secondary sexual characteristics, hormonal shifts, and physiological maturity can be observed 2–3 years earlier than in previous generations. This process triggers changes in the adolescent's appearance, body structure, voice, emotional state, and self-perception. Early puberty is psychologically challenging because the child may still retain mental characteristics typical of childhood. As a result, feelings of shyness, body dysmorphia (discomfort with one's body), rapid mood swings, increased interest in the opposite sex, or uncertainties in social relationships may arise. The premature completion of skeletal ossification is also a vital indicator of acceleration. In the human body, bones grow, strengthen, and fully form by a certain age. Under acceleration, the ossification process occurs faster than usual. This affects the child's height growth, body proportions, and physical strength. However, early ossification can sometimes lead to a premature cessation of height growth. Therefore, in assessing a child's physical development, it is insufficient to draw conclusions based solely on height or weight; the skeletal system, hormonal status, and overall rate of development must also be taken into account.

Retardation refers to the slowing down or delay of a child's or adolescent's development relative to age-specific norms. Retardation can manifest in physical, physiological, psychological, or social developmental spheres. For instance, some children may be shorter in height and lower in weight than their peers, experience delayed dental replacement, reach puberty later, or exhibit slower emotional development. This condition is not always a symptom of disease; it is often linked to hereditary traits, nutrition, living conditions, chronic fatigue, or the individual developmental tempo of the organism. However, when retardation is pronounced, it can lead to decreased self-confidence, feelings of discomfort among peers, and difficulties in academic performance. The imbalance between acceleration and retardation affects not only a child's biological development but also their psychological state. For example, a physically accelerated child may appear like an adult, while their internal world remains characteristic of childhood. In such situations, adults may expect levels of responsibility, independence, or maturity that are inconsistent with the child's actual age. Conversely, a child whose development is slower may feel "small," "weak," or "left behind" among their peers. This significantly impacts self-esteem, communication, social adaptation, and emotional stability. Therefore, it is essential for educators and parents to interact with children based on their real age characteristics, psychological needs, and individual developmental rates, rather than relying solely on their outward physical appearance. One of the most evident signs of retardation is the deceleration of a child's physical growth rate compared to their peers. In such cases, the child may be shorter in stature, weigh less, and exhibit an underdeveloped musculoskeletal system. This sluggishness in physical development is often linked to metabolic processes, hormonal activity, or general health status. While this condition may be temporary for some—allowing the child to eventually catch up with their peers—it persists as a stable delay for others. Crucially, these children are at a higher risk of developing self-doubt and body dissatisfaction. Retardation manifests not only physically but also in cognitive development. In this context, a child's thinking, memory, concentration, and speech development progress more slowly than those of their peers. From a psychophysiological perspective, functions such as reaction speed, sensory perception, and coordination also develop at a slower pace. Consequently, the child may struggle to master academic material and require more time to complete tasks. If this situation is misunderstood by teachers and parents, it can lead to unfair assessment and undue pressure. Therefore, an individual approach, consistent support, and developmental methodologies are of paramount importance for such children. Another significant aspect of retardation is the slowness of social adaptation. These children face difficulties entering new groups, establishing communication with peers, or assuming social roles. They often appear shy, insecure, or passive. Delayed social adaptation also impacts

pISSN:2349-5707 Volume:13,Issue 5, May -2026 eISSN:2349-5715

emotional development: the child may feel lonely, fear taking initiative, or struggle to express their thoughts freely. Without timely support, the likelihood of persistent interpersonal relationship problems increases. Environmental pollution is a major contributing factor to retardation. Toxic substances, harmful gases, heavy metals, and radiation exert negative effects on the human body. Since the organism is not yet fully formed during childhood, these factors significantly hinder the development process. For instance, living in polluted air, consuming poor-quality drinking water, or constant exposure to harmful chemicals damages the nervous system, skeletal structure, and overall health. As a result, a child's physical and mental development may lag behind the norm. Genetic factors also play a crucial role in retardation. In some cases, a child is born with congenital genetic defects that directly impact their developmental trajectory. Furthermore, one of the most common causes of retardation is **social deprivation**—the failure to adequately meet a child's social and emotional needs. If a child grows up in an environment of neglect, deprived of parental affection, communication, and support, their developmental rate slows down. Additionally, malnutrition, vitamin deficiencies, and chronic stress negatively impact both the physical and psychological state. In such children, not only physical growth but also speech, cognition, and social skills develop poorly. Thus, both the biological and the socio-psychological environments are essential factors for a child's healthy development. The concept of "digital ontogeny" represents a new stage of human development in the modern era, where during the postembryonic (postnatal) period, a child's brain actively interacts not only with the traditional natural environment but also with a pervasive digital environment. Excessive gadget use from an early age significantly impacts the process of neuroplasticity, potentially leading to fragmented attention, a decline in deep cognitive processing, and the emergence of socio-psychological issues often referred to as "digital autism." Furthermore, the sedentary lifestyle resulting from digital immersion leads to hypodynamia—a sharp decrease in physical activity. This negatively affects the proper formation of the musculoskeletal system, which is a vital component of ontogeny, thereby causing imbalances in the child's overall physical and psychophysiological development. Throughout human history, biological development has been shaped by the natural environment and physical labor. However, by the 21st century, Digital Ontogeny has completely transformed this traditional developmental model. This process is not merely the utilization of technology; rather, it represents the integration of artificial intelligence and digital stimuli into every stage of human development, from birth to death. The most prominent consequence of digital ontogeny is the alteration of cerebral neuroplasticity. While "visual aggression" (excessive gadget exposure) starting from childhood increases the speed of information intake, it simultaneously diminishes the quality of processing.

The Result: The human brain is becoming adapted to short, vivid visual "clips" rather than complex, lengthy logical chains (such as reading books or deep analysis).

The Problem: As deep analytical centers weaken, individuals lose their capacity for critical thinking, making them increasingly vulnerable to the manipulation of information flows.

Deep immersion into the digital world directly induces a state of hypoalydinia. As individuals attempt to satisfy all vital needs through a screen, the organism becomes increasingly detached from the external environment.

Sensor Deprivation: Individuals are deprived of real-world scents, tactile sensations, and physical movements.

The Correlation: The "richer" the digital ontogeny becomes (through vivid colors and endless content), the more "colorless" and monotonous the real world appears. This disparity diminishes the organism's sensitivity to external stimuli. Consequently, under the influence of digital stimulation, individuals begin to misperceive physical pain, fatigue, and even hunger. At the intersection of digital ontogeny and hypoalydinia, "Digital Autization" emerges. The migration of communication to screens disables human "social sensory organs." In face-to-face interaction, we interpret emotions through facial expressions, vocal inflections, and eye contact.

pISSN:2349-5707 Volume:13,Issue 5, May -2026 eISSN:2349-5715

However, modern individuals, whose ability to process these sensory signals has been weakened by hypoaldynia, fall into a state of "emotional coldness," losing the capacity to empathize with the pain or joy of others.

In conclusion, Digital Ontogeny constitutes the new environment, while Hypoaldynia represents the state of the human being living within it. Although humanity persists as a biological species, its cognitive and emotional structures are undergoing fundamental transformations. The primary risk lies in the shift from classical ontogeny—where humans developed in harmony with nature—to digital ontogeny, where the individual is confined within a "sensory cage." This transition may trigger a future anthropological crisis: the total alienation of the human being from both their physical body and society. The imbalance between biological needs and digital reality has reached a critical threshold. An organism developing under the conditions of digital ontogeny is becoming increasingly detached from its evolutionary program:

Sensory Distortion: In the digital realm, we are reduced to purely "visual and auditory" beings. While the visual and auditory organs operate in a 24/7 overload mode leading to chronic nervous system fatigue, other systems experience "sensory hunger." The tactile, olfactory, and vestibular systems remain largely dormant, despite the fact that in early ontogeny, the brain constructs its model of the world primarily through physical movement and touch.

Physiological Crisis: Hypoaldynia is not merely a decline in sensation but a physical crisis of the body. During critical growth periods, skeletal strength is built through physical pressure and movement. Hypodynamia results in early-onset scoliosis and joint pathologies. Furthermore, the lack of energy expenditure combined with constant digital stress hormones leads to obesity and metabolic syndrome.

Biological Alienation: Detachment from natural signals (sunlight, fresh air, environmental scents) lowers the overall biological tone. This deficiency in "living" stimuli weakens the immune system, as the body ceases its active functional interaction with the natural environment.

Developmental Stage	**Impact of Digital Ontogeny**	**Results of Hypoaldynia**
Early Childhood	Speech delay (due to screen-based communication)	Underdevelopment of fine motor skills
School Age	Attention deficit and memory decline	Visual impairment (Myopia)

The digital era has rendered humanity rapid and information-rich, yet it has compromised the natural foundations of our biological development—namely, quality sleep, physical activity, and face-to-face interaction. The future of humanity depends on its ability to preserve its biological essence—physical resilience and emotional depth—within a digital ecosystem. Globalization has also reshaped the terminal point of ontogeny: the concept of death.

Theoretical Basis: The persistence of an individual's "Digital Footprint" after biological death constitutes a continuation of "Informational Ontogeny."

Essence: Social media profiles, cloud-stored data, and electronic correspondence create a virtual persona of the individual. This signifies that human existence transcends biological boundaries, continuing to "live" within cyberspace.

Implication: This transition represents the move toward a Post-humanist state, where the person's identity and influence persist beyond their physical lifespan. The acceleration of Digital Ontogeny has induced a state of Hypoaldynia (a decline in sensory and physical sensitivity) within the organism. This shift is characterized by two primary crises:

pISSN:2349-5707 Volume:13,Issue 5, May -2026 eISSN:2349-5715

Sensory Hunger: The brain adapts exclusively to visual and auditory signals, marginalizing the tactile and vestibular systems. This leads to a cognitive shift where the world is perceived not as a physical reality, but as a "simulation."

Somatic Crisis: The transition to a "Homo Sedens" (the sedentary human) lifestyle results in the atrophy of the musculoskeletal system. This weakens the human species' capacity for physical resilience and natural adaptation. Ultimately, while the digital era has rendered the human being information-rich and globally accelerated, this advancement is being achieved at the cost of "Biological Decline."

In conclusion, we have reached the stage of the "Hybrid Human." The primary risk lies in the "digital ecosystem" absorbing fundamental biological needs such as quality sleep, physical movement, and authentic empathy. The ontogeny of the future depends entirely on discovering the "golden balance" between technological capabilities and biological health.

The Fundamental Law: The more technology advances, the more conscious effort is required for a human being to preserve their biological "self."

While the innovative digital era has provided us with rapid and precise information, it has simultaneously caused a profound loss of our natural essence. Historically, individuals left a legacy through their virtuous deeds and tangible contributions to nature and society. Today, however, many seek fame not through character, but through the cultivation of virtual profiles. This is inherently transient.

Unlike previous generations who matured within real social structures, the current generation is being shaped by a virtual society. This evolution creates a deep-seated conflict between an individual's true identity and their virtual persona. Furthermore, the decline of "living signals"—such as the sounds of nature and physical human contact—leads to a decrease in overall systemic tone and a weakened immune system. Every misstep in this digital integration acts as a blow to our collective future.

Therefore, it is imperative to remain synchronized with the advancements of the modern era without compromising our fundamental humanity.

REFERENCES

1. Abdulla, S. (2022, March). *The Role of Family in the Formation of Learning Motivation for Adolescents.* In Conference Zone (pp. 286–288).
2. G'oziyev, E. G'. (2008). *Psychology.* Tashkent.
3. G'oziyev, E. G'. (2020). *Ontogenetic Psychology.* Under editorial revision.
4. Mendelevich, V. D. (2016). *Psychology of Deviant Behavior.* Moscow.
5. Shoumarov, G'., Umarov, B., & Akramova, F. (2015). *Psychological Recommendations for Preventing Behavioral Deviations and Educational Disorders in Youth.* Tashkent.
6. Narziyeva, Shakhnoza Rustamovna. (2023). *Development of Empathy in Students.* Eastern Academic and Multidisciplinary Research Journal, 1(3), 127–131.
7. Narziyeva, Shakhnoza Rustamjon qizi. (2023). *Psychological Features of Empathy in Adolescents.* American Journal of Public Diplomacy and International Studies, 1(9), 132–134.
8. Narziyeva, Shahnoza Rustamovna. (2023). *Understanding Empathy as a Core Component of Human Interaction.* American Journal of Public Diplomacy and International Studies, 1(10), 378–382.
9. Narziyeva, S. (2023). *Psychological Perspectives on Career Choice.* Modern Science and Research, 2(10), 333–336.