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Culture, Cognition and ADHD: between Dysfunction and Functional Adaptation[1]

Cultura, Cognição e TDA/H: entre a Disfunção e a Adaptação Funcional

Cultura, Cognición y TDAH: entre la Disfunción y la Adaptación Funcional

Caio Morais[2]

ABSTRACT
This article discusses the hypothesis that some current diagnoses of Attention-Deficit/Hyperactivity Disorder (ADHD) may include individuals whose neuropsychological functioning reflects adaptations to cognitive transformations driven by digital technologies. Based on a theoretical review grounded in historical-cultural psychology and activity theory, it examines the impact of digital culture on attention, memory, and executive functions. The article argues that behaviors commonly viewed as dysfunctional may, in fact, represent emergent forms of adaptive cognition, particularly within interactive, fast-paced, and multimodal environments. It advocates for the revision of diagnostic criteria and neuropsychological assessment practices to embrace neurocognitive diversity in the face of contemporary sociotechnological changes.

Keywords: ADHD; Cultural-historical Psychology; Neurocognitive diversity.

RESUMO
Este artigo discute a hipótese de que parte dos diagnósticos contemporâneos de Transtorno de Déficit de Atenção com Hiperatividade (TDA/H) pode incluir indivíduos cujo funcionamento neuropsicológico reflete adaptações às transformações cognitivas impulsionadas pelas tecnologias digitais. A partir de uma revisão teórica fundamentada na psicologia histórico-cultural e na teoria da atividade, examinam-se os impactos da cultura digital sobre a atenção, a memória e as funções executivas. Argumenta-se que muitos dos comportamentos hoje classificados como disfuncionais podem, na verdade, representar formas emergentes de cognição adaptativa, especialmente em ambientes interativos, velozes e multimodais. O artigo defende a necessidade de rever critérios diagnósticos e práticas avaliativas, valorizando a diversidade neurocognitiva no contexto das mudanças sociotecnológicas atuais.

Palavras-chave: TDA/H; Psicologia histórico-cultural; Diversidade neurocognitiva.

[1] English version by Caio Morais. E-mail: morais_caio@yahoo.com.br.

[2] Master's degree in Neuropsychological Diagnosis and Rehabilitation from the Benemérita Universidad Autónoma de Puebla (Puebla, Mexico). Co-founder and Managing Director of the Instituto Luria de Neuropsicologia (Salvador, Bahia, Brazil). Orcid: https://orcid.org/0000-0002-0839-0854. E-mail: morais_caio@yahoo.com.br.

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RESUMEN
Este artículo discute la hipótesis de que parte de los diagnósticos contemporáneos del Trastorno por Déficit de Atención con Hiperactividad (TDAH) puede incluir individuos cuyo funcionamiento neuropsicológico refleja adaptaciones a las transformaciones cognitivas impulsadas por las tecnologías digitales. A partir de una revisión teórica basada en la psicología histórico-cultural y la teoría de la actividad, se examinan los impactos de la cultura digital sobre la atención, la memoria y las funciones ejecutivas. Se argumenta que muchos de los comportamientos hoy clasificados como disfuncionales pueden representar formas emergentes de cognición adaptativa, especialmente en entornos interactivos, veloces y multimodales. El artículo defiende la necesidad de revisar los criterios diagnósticos y las prácticas de evaluación, valorando la diversidad neurocognitiva en el contexto de los cambios sociotecnológicos actuales.

Palabras clave: TDAH; Psicología histórico-cultural; Diversidad neurocognitiva.

1 Introduction

In recent decades, academic debate regarding the impact of digital technologies on human cognitive functioning has intensified. The growing ubiquity of electronic devices, multimedia platforms, and interactive digital environments has profoundly reshaped patterns of attention, memory, language, and behavior, particularly among children and adolescents. Within this context, possible parallels can be observed between contemporary cognitive patterns and the criteria traditionally associated with Attention-Deficit/Hyperactivity Disorder (ADHD).

ADHD is commonly described as a neuropsychiatric condition characterized by persistent inattention, impulsivity, and hyperactivity, with onset in childhood and significant repercussions in academic, social, and professional domains (American Psychiatric Association, 2022; World Health Organization, 2022). However, the exponential increase in diagnoses over recent decades raises important questions regarding the criteria of neurocognitive normality currently adopted, especially within sociocultural contexts marked by rapid technological transformation. The hypothesis guiding the present study proposes that some individuals currently diagnosed with ADHD may, in fact, exhibit a cognitive style that is aligned with the demands and characteristics of the contemporary digital environment—more multimodal, interactive, and fragmented than traditional normative frameworks.

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2 Methodology

The present study aims to investigate the hypothesis that some diagnoses of Attention-Deficit/Hyperactivity Disorder (ADHD) may include individuals whose neuropsychological functioning is aligned with patterns of attention and behavior considered normative within contemporary sociocultural configurations.

To this end, a theoretical study was conducted based on an exploratory and descriptive literature review. The selection of materials involved the use of search terms such as "new technologies and cognition," "transgenerational cognitive changes," and "new labor market demands," with the aim of mapping transformations in cognitive processes associated with recent historical and cultural changes. The literature review was carried out through searches in scientific databases relevant to the fields of psychology, neuroscience, and cognitive science, with particular emphasis on Google Scholar, PubMed, and ScienceDirect, in addition to consulting specialized books and academic journals.

Data analysis was grounded in the theoretical frameworks of cultural-historical psychology and activity theory, which served as the basis for the critical interpretation of the collected material. Books, book chapters, and scientific articles published across different periods were consulted, with priority given, whenever possible, to studies published within the last five years in order to ensure the relevance and timeliness of the information.

3 Characterization of Attention-Deficit/Hyperactivity Disorder

Attention-Deficit/Hyperactivity Disorder (ADHD) is described as a neurodevelopmental disorder characterized by persistent patterns of inattention, hyperactivity, and impulsivity. Although the DSM-5-TR (American Psychiatric Association, 2022) and the ICD-11 (World Health Organization, 2022) provide diagnostic criteria, current research indicates that ADHD is a multifactorial phenomenon with neurobiological, cognitive, and contextual foundations.

Neuroimaging studies have revealed alterations in brain networks related to attention and executive control, including the prefrontal cortex, the striatum, and the cerebellum, which are associated with functional immaturity and difficulties in behavioral regulation (Castellanos & Proal, 2012; Cortese et al., 2012). Dopaminergic and noradrenergic dysfunctions directly affect attentional focus, inhibitory control, and reward responsiveness (Volkow et al., 2009; Arnsten, 2009).

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At the cognitive level, variability has been observed in executive functions such as working memory and planning, indicating distinct profiles among individuals with the disorder (Willcutt et al., 2005; Kofler et al., 2019). In addition, significant fluctuations in performance over time have been identified as a characteristic feature of ADHD (Karalunas et al., 2014). Recent models, such as the multiple pathway model, propose different etiological trajectories for ADHD symptoms, involving inhibitory deficits, delay aversion, and motivational dysfunctions (Sonuga-Barke et al., 2016).

From the theoretical framework of cultural-historical psychology, the debate surrounding Attention-Deficit/Hyperactivity Disorder (ADHD) has been enriched by contrasting perspectives, such as those advanced by Koutsoklenis, Solovieva, and Quintanar-Rojas (2025) and by Akhutina (2025). Although both positions are grounded in the tradition of Vygotsky, Luria, and Leontiev, they present opposing views regarding the role of diagnosis in clinical practice.

Koutsoklenis, Solovieva, and Quintanar-Rojas (2025) propose abandoning the categorical diagnosis of ADHD, criticizing its descriptive basis, the circular logic of its criteria, and the absence of objective markers supporting its validity. They argue that the category homogenizes a highly heterogeneous population and obscures the specific neuropsychological mechanisms underlying the observed difficulties. Instead of relying on diagnosis, they advocate for qualitative assessment based on structural and functional analyses capable of identifying factors such as deficits in regulation, control, and spatial functions. This approach also seeks to avoid the stigmatization and medicalization associated with diagnostic labeling.

In contrast, Akhutina (2025) argues that diagnosis, as formulated by Luria and Vygotsky, constitutes an essential component of syndrome analysis and of the causal interpretation of symptoms. In her view, eliminating diagnosis would compromise both the scientific investigation of ADHD mechanisms and access to clinical and educational resources. She acknowledges the importance of individualized assessment but emphasizes that such assessment should culminate in a well-grounded diagnostic formulation consistent with a rigorous scientific and clinical approach.

In summary, whereas Koutsoklenis et al. (2025) advocate for an explanatory and individualized approach without the use of diagnostic labels, Akhutina (2025) maintains that diagnosis, when properly formulated, remains an essential tool of cultural-historical neuropsychology.

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4 Instrumento e signo no desenvolvimento infantil

According to Van der Veer and Valsiner (2014), cultural-historical theory emerged as a response to the limitations of the dominant psychological currents of the early twentieth century, particularly behaviorism and introspective psychology. Its theoretical core rests on three fundamental principles: (1) the socially mediatized nature of psychological development, (2) the central role of cultural tools—both technical and semiotic—in the formation of the mind, and (3) the process of internalization as a mechanism for the transformation of psychological functions. One of the central concepts explored in this framework is semiotic mediatization, the process through which cultural signs (especially language) reorganize elementary mental functions, transforming them into higher psychological processes. According to these authors, Vygotsky demonstrated how the relationship between thought and language undergoes qualitative transformation throughout development.

According to these authors, Vygotsky established a distinction between two types of mediatizing elements that radically transform the relationship between human beings and their environment. On the one hand, there are cultural tools—concrete artifacts such as hammers, computers, or writing instruments—that actively modify the external world, enabling human beings to transform their physical environment. On the other hand, there are psychological tools, primarily sign systems such as language, mathematical notation, and graphic representations, which operate a revolution in the internal world by reorganizing basic mental processes. The development of higher psychological functions occurs precisely through the appropriation and mastery of these cultural tools (Van der Veer & Valsiner, 2014).

Language emerges as the psychological tool par excellence in this process. Its development follows a characteristic trajectory: from external communicative function (social speech), it passes through a phase of self-regulatory vocalization (egocentric speech) until becoming an internal instrument of thought (inner speech). This trajectory illustrates how semiotic tools are initially mastered on the interpersonal plane before being internalized as intrapsychological functions. The authors emphasize how this instrumental approach allows us to understand the genesis of complex functions. Memory, for example, evolves from a natural associative process into a logical system mediatized by signs. Likewise, attention is transformed from involuntary to voluntary through the use of symbolic tools such as reminders, lists, and other forms of mediatization (Van der Veer & Valsiner, 2014).

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Vygotsky (1991) argues that the human relationship with the world is never direct, but always mediatized. This perspective demonstrates that higher psychological processes—voluntary attention, logical memory, and abstract thinking—are not simply products of biological maturation, but rather the result of the active appropriation of cultural tools available within a given historical and social context. Learning, from this perspective, ceases to be a passive process of assimilation and becomes a culturally mediatized activity in which the use of signs qualitatively transforms mental functions. This approach contrasts with associationist theories of memory, which understood recall as a simple connection between elements. Sign-mediatized memory, for example, is an active process of reconstruction in which cultural tools enable individuals to reorganize and master their own psychological processes. Likewise, attention ceases to be understood as a mere natural focus and comes to be viewed as a function that can be deliberately controlled through symbolic mediatizers (Vygotsky, 1991).

Vygotsky and Luria (2007) present studies on mediatized memory showing how children move from natural recall to logical memory organized by signs; concept formation experiments demonstrating how different symbolic systems produce distinct forms of thinking; and studies on attention showing its evolution from an involuntary process to a voluntary function through the use of external mediatizers. They identify sequential stages in instrumental development: initially, the child uses psychological functions in a natural way; subsequently, external signs begin to be used as support; progressively, these semiotic tools are internalized; finally, the child achieves self-regulated mastery of mediatized functions. Language emerges as the central semiotic system in this process, evolving from a communicative function into inner speech that structures thought.

Menary and Gillett (2022) argue that cognitive tools—such as symbolic systems, sensory instruments, and tracking devices—not only simplify cognitive tasks but also transform individuals' cognitive capacities when incorporated into socially transmitted normative practices. They maintain that cultural learning structurally transforms cognitive systems through coordinated interactions, cognitive practices, bodily manipulations, and cognitive transformations. The authors criticize the view that cognitive tools merely

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reduce cognitive load or function as temporary supports, arguing instead that, when manipulated within culturally normative practices, they become constitutive of human cognition and promote lasting transformations in neurocognitive profiles. For these authors, the model of cognitive integration through enculturation provides a more robust framework for understanding how humans develop complex and unique cognitive capacities.

According to Koziol, Budding, and Chidekel (2012), tool use is a fundamental aspect of human cognitive evolution, reflecting advanced levels of executive and motor development. Tools, ranging from the simplest to the most complex (such as computers and smartphones), are extensions of the body that require planning, anticipation, and continuous adjustment of actions. The ability to create and manipulate tools involves executive functions such as mental simulation of action sequences ("off-line" processing), sequential processing, and motor adaptation, demonstrating how action control is intrinsically linked to thought. The development of tool use, such as the use of cutlery, illustrates how practice leads to automaticity. Initially, children experiment with various forms of grasping until they master precise and adaptable movements. This process not only strengthens motor skills but also contributes to the formation of semantic knowledge (for example, understanding that a knife and a fork serve distinct functions). This interaction between procedural and declarative learning exemplifies embodied cognition, in which knowledge is grounded in sensorimotor experience (Pezzulo, 2011; Koziol, Budding, & Chidekel, 2012).

From a neuroanatomical perspective, skilled tool use depends on cortical and subcortical networks. The temporal cortex is associated with object recognition, whereas parietal and frontal regions (the dorsal processing pathway) coordinate the motor skills required for tool use. In addition, the cerebellum plays a crucial role in this process, particularly through its internal control models (forward and inverse models), which allow anticipation of the sensorimotor consequences of actions. Furthermore, the relationship between tool use and language suggests that similar brain circuits (such as Broca's area and the mirror neuron system) may be involved in both functions, reinforcing the idea that motor actions and communication evolved in an interconnected manner (Stout et al., 2008; Koziol, Budding, & Chidekel, 2012).

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Wilson (2010) argues that culturally invented cognitive tools become part of mental architecture, influencing everyday thought processes. Practices such as the use of maps, writing, or musical notation illustrate how culture can "reprogram" the human mind. Cultures with advanced numerical systems, for example, develop abstract calculation abilities, whereas groups such as the Pirahã, who lack words for exact numbers, experience difficulties in quantitative tasks. Children trained in the use of the abacus internalize a spatial representation of numbers that activates specific visuomotor networks even in the absence of the instrument.

The perception of time also varies across cultures. For the Aymara of South America, the past lies "in front" because it can be "seen," whereas the future lies "behind." This inversion is not merely linguistic but reflects differences in the neural processing of time. Writing, in turn, triggered one of the deepest cognitive revolutions, creating specializations in the visual cortex and strengthening executive functions such as working memory. What began as an external record became a mental scaffold for abstract thought (Wilson, 2010).

Spatial navigation provides another example. Maps and orientation systems have altered our relationship with space. London taxi drivers, for example, exhibit enlarged hippocampi due to intensive navigation, whereas Polynesian navigators use strategies based on natural landmarks that activate distinct neural networks. In music, musical notation not only preserved compositions but also fostered the development of specific cognitive abilities. Expert musicians show structural changes in the planum temporale and unique patterns of brain activation during improvisation, demonstrating how a cultural invention can reshape our neural hardware (Wilson, 2010).

These transformations rely on three mechanisms: neural plasticity, embodiment, and intergenerational transmission. Culture does not merely provide information to the mind; it continuously shapes it. Each cultural innovation—from writing to symbolic mathematics—redefines the parameters of human thought (Wilson, 2010).

Lotem et al. (2017) demonstrate how innovations such as language and toolmaking acted as selective forces on cognition. The development of language, for example, shaped working memory not through expansion but through optimization, allowing efficient segmentation of linguistic patterns. Paleolithic toolmaking required

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increasing sophistication, promoting frontoparietal modifications detectable in comparison with other species. Brain plasticity, in responding to specific cultural challenges, extends across generations as part of the coevolution of mind and culture.

This approach challenges fixed views of human cognition. Culture acts as a cognitive niche that transforms our mental capacities through cumulative modifications across generations. Human uniqueness lies precisely in this continuous plasticity, which explains both our cultural diversity and our adaptive potential in the face of future challenges (Lotem et al., 2017).

Menary and Gillett (2022) further emphasize that enculturation—the internalization of cultural practices and values—transforms cognitive capacities. Symbolic tools such as writing and maps do not merely assist in tasks; they restructure cognition. For example, map use enables an allocentric perspective of space, while measurement systems introduce abstractions that make spatial cognition more precise. In child development, practices such as finger counting or the use of blocks are essential for the formation of abstract mathematical thinking.

The relationship between language and cognition has been the subject of scientific interest for decades, especially since the hypothesis of linguistic relativity proposed by Edward Sapir and Benjamin Lee Whorf. This hypothesis suggests that languages not only express thoughts but also structurally shape individuals' ways of thinking. Recent research has expanded this notion, providing empirical evidence that languages influence everything from basic perceptual processes to semantic memory and culturally mediatized decision-making.

According to Rodríguez Jordá and Di Paolo (2025), linguistic relativity can be understood from an enactive perspective, in which language and cognition are viewed as mutually constituted processes emerging through social and perceptual interaction. In this sense, language is not merely an instrument of representation but actively participates in the construction of meaning and in the direction of attention and action.

In the field of memory and semantics, Johns (2024) investigated how meanings attributed to words vary among individuals within the same linguistic community using computational models of personalized semantic memory. His findings indicate that individual language use directly influences how concepts are organized and accessed in the mind, supporting a dynamic and experiential view of cognition.

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At the intercultural level, Vaishnav (2025) argues that linguistic differences have important implications for communication across cultures. The structure of language conditions the conceptual frameworks speakers use to interpret the world, which may generate misunderstandings or, alternatively, foster multiple and complementary perspectives depending on the communicative context.

Finally, a comprehensive review by Flusberg et al. (2024) highlights how linguistic framing affects judgment, social behavior, and even economic decisions. The words chosen to describe a situation have the potential to modulate emotional reactions and rational decisions, demonstrating the profound influence of language on cognition and action.

Thus, recent findings reinforce the idea that language is more than a means of expression: it is constitutive of experience and thought. The evidence discussed supports the hypothesis that languages shape the ways in which individuals perceive, remember, categorize, and act in the world, making the study of language a central field for understanding human cognitive and cultural differences.

5 New Technologies and Cognitive Functioning in Contemporary Society

The report *Pigmalión: Informe sobre el impacto de la televisión en la infancia* (del Río, Álvarez, & del Río, 2004), grounded in Vygotsky's cultural-historical psychology, analyzes the effects of television on child development from a perspective that considers media as mediatizing instruments of psychological functioning. Commissioned by the Spanish Ministry of Education, the study highlights that television, by functioning as a tool of symbolic mediatization, directly impacts domains such as attention, perception, cognition, imagination, identity, and morality.

One of the report's main conclusions concerns the way television programs—especially those characterized by rapid pacing, intense visual effects, and frequent scene changes—induce patterns of reactive and unplanned attention. This type of stimulation hinders the development of voluntary attention, an essential component of academic learning and deep cognitive engagement. Furthermore, continuous exposure to techniques of "attentional exploitation" may compromise intelligent perception and intentional control of attentional focus, favoring a state of physiological arousal rather than genuine concentration. The use of television as an

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"electronic babysitter" also limits the role of adults as cultural mediatizers, reducing the development of joint attention—a fundamental stage in the formation of attentional regulation and reflective thought.

Contemporary research reinforces this analysis by suggesting that excessive and dysregulated use of digital media tends to negatively affect cognitive functions. Firth et al. (2019) examined how intensive internet use affects core functions such as attention, memory, and self-regulation. The authors point out that constant exposure to multiple digital stimuli is associated with reduced sustained attention, greater susceptibility to distraction, and difficulties in inhibitory control, with changes observed in frontoparietal networks. In the domain of memory, they discuss so-called "digital amnesia," characterized by the tendency to remember where to find information rather than retaining the information itself, which compromises memory consolidation and affects the hippocampus and prefrontal cortex. From a neurofunctional perspective, changes are also observed in areas associated with decision-making and emotional processing, suggesting that the internet may reshape brain circuits through plasticity. Despite these risks, the authors acknowledge that conscious and intentional use of technology may promote cognitive development, especially when mediatized by balanced educational and social practices.

Ophir, Nass, and Wagner (2009), in turn, investigated heavy media multitaskers and found reduced ability to filter irrelevant stimuli, greater vulnerability to distraction, and lower efficiency in maintaining focus during cognitively demanding tasks. Although these individuals showed equivalent performance in neutral tasks, heavy media multitaskers demonstrated more fragile cognitive control under conditions of informational overload.

Similarly, Zheng (2021), in an analysis of U.S. cohorts between 1996 and 2014, observed a negative inflection in the trajectory of cognitive functioning beginning with later Baby Boomers. Even with higher educational levels and better childhood conditions, these generations showed cognitive decline compared with previous generations, attributable to multiple factors including poor health, social isolation, and constant exposure to digitalized and fragmented environments. From a neuroscientific perspective, these transformations suggest changes in the functional engagement of key regions such as the prefrontal cortex (executive functions), the

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hippocampus (long-term memory), and the parietal cortex (selective attention and spatial orientation). Beyond cognitive impacts, the authors also reported emotional consequences such as anxiety, insomnia, and impoverishment of interpersonal relationships — especially among younger individuals whose social interactions are largely mediatized by screens.

However, it is important to recognize that the effects of digital technologies are not exclusively negative. Recent studies highlight that, when used in a balanced manner and for structured educational or recreational purposes, technology may foster the development of various cognitive functions. In children, digital games contribute to strengthening sustained attention, working memory, and motor planning (Melo & Silva, 2022). In adolescents, the use of social media and interactive games may stimulate inhibitory control, cognitive flexibility, and logical reasoning (Przybylski & Weinstein, 2022), while also activating the dopaminergic reward system, thereby promoting motivation and learning in gamified contexts.

During the pandemic, online games and interactive environments played a fundamental role in maintaining cognitive and emotional engagement, particularly cooperative games and experiences such as Pokémon GO, which integrated spatial memory and urban mobility (Althoff et al., 2016). Sociological studies further suggest that everyday technology use may enhance cognitive agility and task-switching capacity—provided such use is mediatized by conscious rather than compulsive practices (Costa & Andrade, 2023).

Nevertheless, it is important to consider that, although there is little doubt that excessive use of new technologies may negatively affect younger generations, many researchers may also be inclined to interpret their findings through an overly negative lens. After all, the perception that young people are “in decline” is a recurring phenomenon throughout history. This judgment is not restricted to popular culture but also appears in institutionalized discourses such as those of the media and educational systems. Studies on ageism and intergenerational conflict suggest that tensions between generations are intensified by factors such as accelerated cultural change, technological transformation, and the prolongation of adulthood (North & Fiske, 2013; Drury, Hutchison, & Abrams, 2016). Chronocentrism—the tendency to judge other generations based on one’s own cultural standards—further reinforces distorted views of emerging youth cultures (Marques, 2020; Muller & Santos, 2020).

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The evidence presented here appears to converge on the conclusion that attention, memory, and executive functions are highly sensitive to the type of stimulation promoted by digital technologies. Fragmented and intensive use tends to impair these functions, whereas structured and balanced use may enhance them. Nevertheless, in one way or another, the cultural tools of each era both reflect and dialectically structure human cognitive and behavioral functioning within each historical period. The contemporary challenge, therefore, is to promote a more critical digital culture—one that recognizes both the risks and the opportunities for cognitive, emotional, and social development across the lifespan.

6 New Technologies, Cognitive Functioning, and the Labor Market

The contemporary labor market has been profoundly transformed by the dynamics of globalization, digitalization, and automation, demanding increasingly complex and higher-order competencies from professionals. Among the most valued skills are critical thinking, complex problem-solving, cognitive flexibility, time management, logical reasoning, creativity, and the capacity for continuous learning (World Economic Forum, 2020; Fundação Dom Cabral, 2025).

Parallel to these demands, the cognitive neuroscience literature has documented significant changes in individuals' mental and brain functioning associated with the intensive use of new technologies. Digital environments characterized by multiple stimuli, high processing speed, and task overlap directly affect functions such as attention, memory, perception, language, and decision-making (Wilmer et al., 2017; Loh & Kanai, 2016).

These transformations are neither homogeneous nor unidimensional. On the one hand, studies suggest that frequent use of digital devices may induce a more superficial, fragmented, and reward-oriented processing style, resulting in reduced sustained attention, increased distractibility, and cognitive overload (Firth et al., 2019). On the other hand, evidence suggests that technological engagement may also enhance attentional switching, accelerate reaction time, stimulate visuospatial reasoning, and promote greater functional connectivity in brain networks involved in distributed attention and working memory (Kühn & Gallinat, 2014; Takeuchi et al., 2016).

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This duality makes the contemporary scenario particularly challenging: the very same context that demands greater focus, self-regulation, and analytical thinking also induces, through the everyday use of technology, a more dispersed and impulsive cognitive style. This creates a potential dissonance between the cognitive capacities fostered by daily digital practices and the cognitive demands required by formal professional environments. However, this relationship is not solely characterized by conflict. Recent research indicates that regular exposure to interactive and technologically rich environments may stimulate skills such as cognitive flexibility, multitasking reasoning, navigation in complex environments, and the capacity to deal with ambiguity—abilities that are central to professional performance in contexts of high complexity and rapid change (Seddon et al., 2021).

Furthermore, familiarity with digital tools has enabled the emergence of a new form of literacy—digital literacy—which encompasses, beyond traditional reading and writing, skills such as multimodal interpretation, active information seeking, critical evaluation of sources, and the strategic use of external memory (Sparrow, Liu, & Wegner, 2011). This reconfiguration of cognitive functions, although different from the classical linear and analytical model, may be more aligned with contemporary forms of production, innovation, and distributed learning.

Thus, it can be inferred that the demands of the labor market and the cognitive effects of new technologies are not necessarily contradictory; rather, they express an ongoing paradigmatic transition in the way human skills are configured. The challenge for professionals and institutions lies in recognizing this transition and promoting strategies that reconcile attentional self-regulation, inhibitory control, and information management with digital creativity, continuous learning, and effective navigation in complex technological environments.

7 Discussion

Contemporary cognitive functioning, intensely influenced by the everyday use of digital technologies, shows notable convergences with patterns frequently observed in individuals with Attention-Deficit/Hyperactivity Disorder (ADHD). Among these similarities are the constant search for stimulation, rapid attentional shifting, and a preference for multimodal, interactive, and short-duration tasks. Although ADHD is

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typically associated with attentional deficits, impulsivity, and disorganization (American Psychiatric Association, 2022; World Health Organization, 2022), the literature also recognizes in these individuals a set of cognitive strengths that may be positively mobilized in technologically mediatized contexts.

One of the most significant parallels concerns cognitive agility. Both individuals with ADHD and intensive technology users demonstrate the ability to switch between multiple tasks, process simultaneous stimuli, and adapt rapidly to dynamic contexts (Ophir, Nass, & Wagner, 2009). This characteristic, often interpreted as distractibility, may constitute an adaptive advantage in gamified and immersive digital environments, where mental flexibility, processing speed, and high responsiveness are required. It is important to emphasize that this attentional switching does not exclude the presence of hyperfocus—intensely sustained attention directed toward activities of high personal interest—which is frequently observed in ADHD, particularly during stimulating and rewarding tasks.

The literature also indicates that individuals with ADHD often display high creative potential, characterized by ideational fluency, unusual associations, and greater risk tolerance (White & Shah, 2006). Such attributes resonate strongly in digital environments such as social media, collaborative content production, and games based on divergent thinking. In these contexts, digital culture may function as a catalyst for creative expression, particularly in open-ended and minimally structured tasks.

In educational settings, the similarities between digital cognitive functioning and the ADHD profile represent an opportunity to rethink pedagogical practices. Strategies involving short-duration tasks, high levels of interactivity, audiovisual resources, and personalized learning tend to benefit both students with ADHD and those affected by cognitive transformations associated with digital culture.

In this sense, it is crucial to abandon the exclusively deficit-based perspective through which both ADHD and the effects of digitalized cognition are often approached. When placed in contexts that recognize their attentional specificities and value their creative energy, individuals with ADHD may excel in tasks requiring creative thinking, rapid reaction, simultaneous management of multiple information sources, and other related abilities.

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However, the ambivalence of cognitive changes associated with technology must also be considered. While such changes may foster mental agility, creativity, and multitasking capacity, they may also impair sustained attention, depth of processing, and retention of information in working memory—especially when there is excessive dependence on external sources (Greenfield, 2009; Ophir, Nass, & Wagner, 2009; Sparrow, Liu, & Wegner, 2011). The impacts, therefore, are not unidirectional and must be evaluated according to context, frequency, and intentionality of use.

In teaching practice, these transformations create new challenges: maintaining student engagement in prolonged tasks and fostering metacognitive skills now require active methodologies, mastery of digital tools, and sensitivity to emerging forms of attention (Lemos, 2020; Moran, 2015). In the labor market, increasingly characterized by volatility, complexity, and ambiguity, abilities such as creativity, adaptability, agile thinking, and emotional resilience are highly valued (World Economic Forum, 2020). In this scenario, traits frequently viewed as dysfunctional—impulsivity, restlessness, and mental hyperactivity—may become valuable resources, particularly in fields that demand innovation, spontaneity, and initiative (Lense & Iverson, 2020).

The capacity for hyperfocus, for example, may be a distinguishing advantage in fields such as programming, audiovisual production, design, and game development (Hupfeld et al., 2019). However, the full utilization of these competencies depends on environments that recognize and embrace cognitive diversity by providing adequate support, structure, and personalized strategies (Koziol, Budding, & Chidekel, 2012).

Recent studies further reinforce that neurodivergent individuals may achieve high professional performance when their specific characteristics are understood and respected (Gabrieli, 2016; Menon, 2020). This requires inclusive organizational policies, greater awareness of different modes of cognitive functioning, and continued investment in training and professional development.

Within this context, neuropsychological assessment must redefine its role. In the face of such profound changes in mental functioning, traditional assessment models—centered primarily on deficit detection—become insufficient. Decontextualized instruments and monotonous tasks risk generating overdiagnosis or misleading interpretations, especially when they fail to consider the impacts of digital culture.

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Assessment must therefore broaden its focus by incorporating more dynamic, ecological, and neurocognitively sensitive approaches. It is necessary to identify not only limitations but also strengths, learning styles, and adaptive potential, valuing different ways of thinking, acting, and learning. This repositioning of assessment practice is essential to ensure its relevance and effectiveness in a society marked by technological acceleration and by the coexistence of multiple legitimate cognitive styles.

8 Concluding Remarks

The cognitive transformations associated with the use of digital technologies pose significant challenges for education. The convergence between digital cognitive styles and characteristics commonly associated with ADHD highlights the inadequacy of traditional pedagogical practices grounded in linearity and passivity.

To respond to these changes, it becomes necessary to rethink teaching methods by incorporating more interactive, personalized, and neurocognitively sensitive strategies. Schools must invest in active methodologies, the intentional use of technology, the strengthening of students' metacognitive skills, and the recognition of emerging forms of cognitive functioning among children.

Training educators to work effectively with diverse learning styles and highly stimulating environments is essential. Only in this way will it be possible to promote a more inclusive, updated, and effective educational model—one capable of addressing both the difficulties and the competencies of individuals living in the digital era.

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