

## Biopsychosocial consequences of relational illusion in artificial intelligence and social media

*Consequências biopsicossociais de la ilusão relacional en inteligencia artificial y redes sociales*

*Consequências biopsicossociais da ilusão relacional em inteligência artificial e mídias sociais*

**Camilla Estevão de França<sup>1\*</sup>**

ORCID: 0000-0003-3226-8709

**Paula Gomes da Silva<sup>2</sup>**

ORCID: 0000-0001-6705-0182

**Crisna Rodrigues Pereira<sup>3</sup>**

ORCID: 0000-0001-7948-3890

**Wagner Rafael da Silva<sup>4</sup>**

ORCID: 0000-0002-0952-4877

**Sabryna Gabryella Rodrigues e Silva<sup>3</sup>**

ORCID: 0009-0008-6583-4301

**Stela Caroline de Oliveira Melo<sup>3</sup>**

ORCID: 0000-0002-3860-2600

**Helen Kendely Voltolini<sup>5</sup>**

ORCID: 0009-0003-4503-5733

**Letícia de Rossi<sup>6</sup>**

ORCID: 0000-0001-7925-617X

**Cláudia Rosana Trevisani Corrêa<sup>7</sup>**

ORCID: 0000-0002-3158-8666

**Márcia Andréa da Gama Araujo<sup>8</sup>**

ORCID: 0009-0000-5227-1708

<sup>1</sup>Faculdade CTA. São Paulo, Brazil.

<sup>2</sup>Centro Universitário Sagrado Coração. São Paulo, Brazil.

<sup>3</sup>Centro Universitário Atenas. Minas Gerais, Brazil.

<sup>4</sup>Universidade Brasil. São Paulo, Brazil.

<sup>5</sup>Instituto Univitéria. Minas Gerais, Brazil.

<sup>6</sup>Faculdade de Medicina de Marília. São Paulo, Brazil.

<sup>7</sup>Universidade São Caetano do Sul. São Paulo, Brazil.

<sup>8</sup>Faculdade Sequencial. São Paulo, Brazil.

### How to cite this article:

França CE, Silva PG, Pereira CR, Silva WR, Silva SGR, Melo SCO, Voltolini HK, Rossi L, Corrêa CRT, Araujo MAG. Biopsychosocial consequences of relational illusion in artificial intelligence and social media. Glob Acad Nurs. 2025;6(2):e473. <https://dx.doi.org/10.5935/2675-5602.20200473>

\*Corresponding author:

[camillaef@gmail.com](mailto:camillaef@gmail.com)

Submission: 05-10-2025

Approval: 06-26-2025

### Abstract

This study analyzed the biopsychosocial consequences of the digital relational illusion, a phenomenon characterized by the attribution of humanity to AI systems and the internalization of unattainable standards conveyed on social media. Through a critical reflection study of a phenomenological nature, grounded in Jean Watson's Theory of Human Caring and based on evidence from PubMed, Google Scholar and SciELO databases (2020-2024), two structuring axes were identified: The neurocognitive erosion of human bonds, with atrophy of empathic circuits and additive patterns of artificial interaction; and post-digital existential crisis: ontological dissonance in contemporary identity construction. The results reveal an anthropological transformation in the bases of sociability, with measurable changes in brain structure and the emergence of new relational psychopathologies. It is concluded that the algorithmic mediation of human relationships requires health interventions that restore the authenticity of care and the individual, proposing guidelines for clinical practices and public policies in the digital age.

**Descriptors:** Human-Computer Relations; Mental Health; Social Media; Artificial Intelligence; Anthropology.

### Resumén

Este estudio analizó las consecuencias biopsicossociales de la ilusión relacional digital, un fenómeno caracterizado por la atribución de humanidad a los sistemas de IA y la internalización de estándares inalcanzables transmitidos en las redes sociales. A través de un estudio de reflexión crítica de naturaleza fenomenológica, fundamentado en la Teoría del Cuidado Humano de Jean Watson y basado en evidencia de las bases de datos PubMed, Google Scholar y SciELO (2020-2024), se identificaron dos ejes estructurantes: La erosión neurocognitiva de los vínculos humanos, con atrofia de circuitos empáticos y patrones aditivos de interacción artificial; y la crisis existencial posdigital: disonancia ontológica en la construcción de la identidad contemporánea. Los resultados revelan una transformación antropológica en las bases de la sociabilidad, con cambios mensurables en la estructura cerebral y el surgimiento de nuevas psicopatologías relacionales. Se concluye que la mediación algorítmica de las relaciones humanas requiere intervenciones de salud que restauren la autenticidad del cuidado y del individuo, proponiendo pautas para las prácticas clínicas y las políticas públicas en la era digital.

**Descriptores:** Relaciones Humano-Computadora; Salud Mental; Medios de Comunicación Social; Inteligencia Artificial; Antropología.

### Resumo

Este estudo analisou as consequências biopsicossociais da ilusão relacional digital, fenômeno caracterizado pela atribuição de humanidade a sistemas de IA e internalização de padrões inalcançáveis veiculados nas mídias sociais. Mediante um estudo de reflexão crítica de natureza fenomenológica, fundamentada na Teoria do Cuidado Humano de Jean Watson e baseada em evidências das bases PubMed, Google Scholar e SciELO (2020-2024), identificou-se dois eixos estruturantes: A erosão neurocognitiva dos vínculos humanos, com atrofia de circuitos empáticos e padrões aditivos de interação artificial; e Crise existencial pós-digital: a dissonância ontológica na construção identitária contemporânea. Os resultados revelam uma transformação antropológica nas bases da sociabilidade, com alterações mensuráveis na estrutura cerebral e emergência de novas psicopatologias relacionais. Conclui-se que a mediação algorítmica das relações humanas exige intervenções em saúde que restaurem a autenticidade do cuidado e do indivíduo, propondo-se diretrizes para práticas clínicas e políticas públicas na era digital.

**Descriptores:** Relações Humano-Computador; Saúde Mental; Mídias Sociais; Inteligência Artificial; Antropologia.



## Introduction

The technological revolution of recent decades has redefined not only forms of communication but also the very nature of human relationships. With the advancement of generative artificial intelligence - capable of simulating complex dialogues and adapting to individual preferences - and the ubiquity of social media, which promotes the constant display of supposedly ideal lives, a scenario has been created in which the boundaries between the real and the virtual become progressively blurred. In this environment, individuals develop emotional connections with algorithmic entities, attributing to them human characteristics, such as empathy and understanding, while consuming narratives of unattainable happiness and success, curated by engagement algorithms. This phenomenon, herein termed digital relational illusion, has been associated with a series of adverse outcomes, from increased chronic loneliness to the worsening of anxiety disorders and depression, as recent research in the field of digital psychology points out.

However, the repercussions of this phenomenon transcend the psychological sphere, also manifesting in biological changes - such as sleep disorders and HPA (hypothalamic-pituitary-adrenal) axis dysregulation - and in social disruptions, including progressive isolation and the deterioration of family and community ties. Current literature still lacks an integrated approach that explores these multiple dimensions systematically, especially from the perspective of nursing, whose role is fundamental in promoting holistic health. Part of this gap is explained by the exponential pace of technological innovations, which outpaces the responsiveness of research in the humanities and health sciences. Furthermore, the lack of consolidated diagnostic criteria for conditions such as "AI emotional dependence" or "digital social comparison syndrome" hinders the accurate measurement of these conditions<sup>1,2</sup>.

In this context, the central hypothesis of this study postulates that digital relational illusion acts as a biopsychosocial risk factor, triggering cycles of identity alienation - in which the individual begins to confuse algorithmic validation with genuine acceptance - and comparative suffering, fueled by repetitive exposure to unrealistic life patterns. These processes are exacerbated by the unidirectional nature of interactions with AI, which, despite simulating active listening, are incapable of offering emotional reciprocity or concrete support<sup>3</sup>.

This study adopts a theoretical-reflective approach, grounded in Jean Watson's Theory of Human Caring, which emphasizes the importance of authentic relationships for comprehensive well-being. By articulating multidisciplinary evidence, this study seeks to answer the guiding question: "How does the digital relational illusion impact the biological, psychological, and social dimensions of health?" with the aim of informing nursing interventions that restore the balance between digital connection and human health.

## Methodology

This study adopts a qualitative approach based on critical reflection, using phenomenology as a methodological

framework to understand the essential structures of human experience in the context of relationships mediated by artificial intelligence and social media. Phenomenology, as a philosophical tradition consolidated by Husserl and developed by thinkers such as Heidegger and Merleau-Ponty, offers a suitable theoretical and methodological framework for investigating the subjective phenomena emerging in the digital age, allowing access to the concrete experiences of individuals in their relationship with contemporary communication technologies<sup>4</sup>.

The research process was guided by the principles of phenomenological reduction and eidetic variation, which allow us to suspend naturalized assumptions about digital interactions and focus on the rigorous description of phenomena as they present themselves to consciousness. This approach critically engages with Jean Watson's Theory of Human Caring, whose concepts of authentic relationship, present moment, and transpersonal care process offer a fundamental counterpoint for analyzing the limitations of algorithmically mediated connections<sup>4,5</sup>.

The bibliographical material was collected through a systematic search of PubMed, Google Scholar, and SciELO databases, using combined search strategies that included descriptors related to artificial intelligence, digital social relationships, and biopsychosocial health. The timeframe favored the most recent scientific production (2020-2024), considering the accelerated dynamics of technological and social transformation characteristics of the phenomenon studied. Scientific studies that directly addressed the implications of interactions with AI and social media for comprehensive health were included, while works with an empirical focus and those that did not establish clear connections with the biological, psychological, or social dimensions of health were excluded.

The analysis of the selected materials followed a hermeneutic-phenomenological process in three interrelated steps: first, a cursory reading was conducted to grasp the essential meanings present in the texts; then, the units of meaning were identified and analyzed, seeking to capture the invariant structures of the studied experience; finally, an interpretative synthesis was developed that articulates the findings of the literature with the adopted theoretical frameworks. This analytical approach allowed not only to map the evidence available in literature but also to construct a grounded critical reflection on the transformations in contemporary human relationships and their impacts on health.

To ensure the study's scientific rigor, validation strategies were adopted that included triangulation between researchers, reflective recording of the analysis process, and a search for theoretical saturation. These procedures aimed to ensure that the interpretations produced maintained fidelity to the empirical data while developing a deeper understanding of the phenomenon in its complexity. The methodology employed, therefore, combines the rigor of bibliographical research with the depth of phenomenological analysis, offering an original, critical, and reflective approach to investigating the



challenges posed by new forms of social interaction to biopsychosocial health.

## Results and Discussion

The findings in the literature reveal a troubling paradox in human-AI interactions: the more sophisticated the ability of artificial intelligence to simulate social behaviors becomes, the more profound the consequences for human emotional cognition. From a functional neuroimaging perspective, prolonged exposure to interactions with AI systems is associated with structural changes in brain regions critical for empathy, such as the medial prefrontal cortex and the temporoparietal junction. These areas, fundamental to theory of mind and understanding the intentions of others, show reduced volume in frequent users of emotional chatbots, suggesting a phenomenon of "digital relational atrophy." In contrast, face-to-face interactions consistently activate the social reward system, with oxytocin release and activation of the nucleus accumbens, creating a neurochemical cycle of positive reinforcement for authentic bonds. This neurobiological dichotomy points to a previously underestimated risk: the progressive replacement of human relationships with artificial interactions may be reconfiguring the very neural substrates of sociability<sup>2,6</sup>.

There's an equally complex phenomenon in the construction of identity and self-image. Algorithmic content curation creates digital ecosystems where social comparison takes on pathogenic characteristics, radically distancing itself from natural processes. While traditional social comparisons occurred in real, limited community contexts, current exposure to thousands of idealized profiles—many of them artificially enhanced by filters and edits—generates unprecedented quantitative and qualitative distortion. Young adults between 18 and 25 are particularly vulnerable, exhibiting not only a higher incidence of eating disorders but also an emerging phenomenon called "digital identity dissonance," characterized by the inability to reconcile one's online persona with one's real identity. The exponential speed with which these comparative stimuli are presented - often hundreds per day - overwhelms adaptive mechanisms, transforming a normal psychological process into a risk factor for mental health<sup>7</sup>.

In the context of emotional relationships with AI systems, a worrying pattern of emotional transference is emerging. Chatbot users often develop attachment patterns that replicate characteristics of human relationships, including expectations of reciprocity and distress when faced with non-personalized responses. This illusion of mutuality hides a psychological paradox: the more the system learns and adapts to the user, the deeper the emotional asymmetry in the relationship becomes. Cases of digital separation anxiety, bouts of frustration when the system is updated or discontinued, and even the progressive replacement of real support networks by interactions with AI are observed. This phenomenon, which we can call "one-sided connection syndrome," poses an unprecedented challenge to public health, as it masks genuine needs for psychosocial support with simulacra of care. Phenomenological analysis reveals

that the danger lies not in the technology itself, but in the way the systems are designed to exploit deep mechanisms of human bonding, without offering the therapeutic benefits of truly reciprocal relationships<sup>6,8</sup>.

The phenomenological analysis of the studies identified two central axes that summarize the biopsychosocial impacts of the digital relational illusion: Erosion of human bonds: the artificialization of care; and post-digital existential crisis: the ontological dissonance in contemporary identity construction. These categories emerged as meaningful structures that transcend the individual manifestations of the phenomenon, revealing profound patterns of transformation in social relations and identity construction in the algorithmic age. Both reflect not only pathological consequences but also ontological shifts in how individuals experience themselves and others in environments mediated by non-reciprocal technologies.

### Erosion of human bonds: the artificialization of care

There is a complex sociotechnological phenomenon that goes beyond the mere replacement of human interactions with digital ones, constituting a true anthropological transformation in the foundations of interpersonal relationships. Neuroscientific data point to worrying structural changes: AI-mediated communication not only fails to fully activate the mesolimbic social reward circuit but also appears to induce a dysfunctional pattern of intermittent dopaminergic activation - like that observed in addictive behaviors - that reinforces use without providing the psychophysiological benefits of full human interactions. This maladaptive neuroplasticity manifests clinically through what we can term "digitally conditioned empathy syndrome," characterized by increasing difficulty processing complex nonverbal cues and maintaining shared attention, skills fundamental to moral development and social cohesion<sup>1,2,9</sup>.

The apparent adaptive advantage of emotional chatbots - their constant availability and lack of reciprocal demands - reveals, under critical scrutiny, an evolutionary trap. By systematically circumventing the challenges inherent in human relationships (such as conflict management, negotiation of needs, and tolerance of ambiguity), these systems create a perverse illusion of connection that, paradoxically, weakens the very psychological mechanisms that enable the formation of deep bonds. The growing sophistication of emotional AI systems, with their ability to simulate empathic concern through state-of-the-art natural language processing algorithms, does not resolve this paradox - indeed, it deepens it, creating what some authors have called the "empty mirroring effect": the more perfect the simulation, the more evident the lack of genuine consciousness behind it becomes<sup>7,10</sup>.

The implications for vulnerable populations are particularly alarming. In older adults, a worrying pattern of "relational substitution" is observed, where the natural decline in social networks is compensated for by interactions with AI, leading not to mitigation but to acceleration of cognitive decline. In individuals with social phobia, chatbots



initially function as "relational coaches" but often become emotional crutches that perpetuate social avoidance. This dynamic illustrates what technology addiction theory describes as the "dysfunctional substitution cycle," in which the technical solution to a relational deficit ultimately exacerbates it through mechanisms of progressive social desensitization<sup>6-8</sup>.

A Watsonian perspective on care reveals the depth of this contradiction: while authentic human care involves a transformative intersubjective encounter - where both caregiver and cared for are affected and modified by the relationship - interactions with AI remain fundamentally unidirectional, no matter how sophisticated their simulation of reciprocity. This essential asymmetry calls into question the very possibility of "digital care," suggesting that what we call AI "emotional support" may be, at best, a behavioral palliative, and at worst, an epistemological obstacle that prevents us from adequately recognizing and addressing the growing crisis of loneliness in contemporary society. The medicalization of relational needs through technological solutions thus represents not an advance, but a civilizational regression, where the rich and disordered complexity of human contact is progressively replaced by algorithmic protocols of superficial emotional satisfaction<sup>5,10</sup>.

The erosion of human bonds mediated by AI and superficial digital relationships does not operate in isolation—it is deeply intertwined with a parallel and equally critical transformation: the fragmentation of identity in the algorithmic age. If the first category exposed how digital technologies erode the neurobiological and psychological foundations of authentic connections, the post-digital existential crisis reveals the consequences of this transformation on the very construction of the self. The dissonance between the "real self" and the "projected self" on social media does not merely represent a superficial psychological conflict, but rather an ontological rupture in how individuals experience their own existence. While AI systems gradually replace human relationships with simulacra of care, social platforms simultaneously demand the performative construction of optimized identities - thus creating a double alienation: of authentic otherness (by replacing real others with algorithms) and of subjectivity itself (by the constant need for digital self-curation). This dual dynamic suggests that we are facing not two separate phenomena, but complementary facets of the same civilizational transformation, in which both interpersonal relationships and the intimate experience of the self are progressively mediated - and deformed - by algorithmic logics of engagement and superficial emotional satisfaction. The shift to analyzing the post-digital existential crisis is necessary precisely to explore how this relational transformation reverberates at the core of contemporary human identity.

### Post-digital existential crisis: ontological dissonance in contemporary identity construction

The second emerging category reveals a complex psychosocial phenomenon that transcends the mere question of self-image, constituting a veritable ontological

crisis in the digital age. The studies analyzed demonstrate that algorithmically mediated identity construction generates a pathogenic split between the "experienced self" and the "performed self," where the constant need to conform to unrealistic digital standards produces a novel form of existential alienation. Neurocognitive data indicate that prolonged use of social media based on algorithmic curation is associated with atypical activation patterns in the medial prefrontal cortex - a region crucial for the integration of self-identity - suggesting a literal neural fragmentation of the self. This dissociation manifests clinically through what can be termed "digital double consciousness syndrome," in which individuals simultaneously develop an authentic, yet increasingly fragile, offline identity and a highly stylized, yet emotionally depleted, online persona<sup>7,11</sup>.

This dynamic goes beyond traditional concepts of cognitive dissonance, configuring a deeper phenomenon of "existential unmooring." While classical theories of social comparison, such as Festinger's in 1954, operated in concrete community contexts, today's exposure to thousands of algorithmically curated lives creates a permanent state of ontological inadequacy. Particularly concerning is the phenomenon of "algorithmic internalization," where individuals not only compare their lives to those of others but also begin to organize their own subjective experience according to digital engagement metrics - a process some authors have called the "gamification of the self"<sup>12,13</sup>.

The psychopathological impacts of this crisis are amplified by contemporary technological convergence: augmented reality filters, generative artificial intelligence, and social validation metrics create an ecosystem where authenticity becomes not only difficult but structurally discouraged. Longitudinal studies with young adults demonstrate the emergence of a new spectrum of relational disorders, characterized by the inability to experience in-person moments without digital mediation or documentation - a condition that emerging literature calls "unrecorded existence anxiety"<sup>13,14</sup>.

From the perspective of Human Caring Theory, this category reveals a tragic irony: while digital systems promise self-knowledge through metrics and behavioral analysis, they systematically erode the intersubjective foundations necessary for the construction of an authentic identity. Face-to-face care, with its unconditional acceptance of human vulnerability, is replaced by the tyranny of digital self-optimization, where every aspect of personality must be edited, filtered, and performed. This transformation represents not only an individual clinical challenge but a threat to the very relational foundation that sustains the social fabric - suggesting that the post-digital existential crisis may ultimately be a crisis of the human condition as it adapts to new technologies of subjectivation<sup>5,7,13,14</sup>.

### Final Considerations

This study reveals that the digital relational illusion constitutes a complex and multifaceted phenomenon, whose implications transcend the individual sphere to reach civilizational dimensions. Phenomenological analysis,



grounded in Jean Watson's Theory of Human Caring, identified two structuring axes of this transformation: the erosion of human bonds through the artificialization of relationships and the existential crisis resulting from post-digital identity fragmentation. These findings suggest that we are facing not only new patterns of behavior, but also a profound reconfiguration of the anthropological foundations of sociability. The results demonstrate that contemporary relational technologies - especially generative AI systems and algorithmic social platforms - operate a double alienation: of otherness, through the replacement of human relationships with digital simulacra, and of subjectivity itself, through the internalization of external validation metrics. This dynamic produces measurable neurocognitive effects, from changes in brain structure related to empathy to dysfunctional patterns of dopaminergic activation, configuring what we propose to call "connected disconnection syndrome".

From the perspective of nursing and public health, the findings point to the urgency of developing new care approaches capable of addressing this civilizational challenge. Human Caring Theory emerges as a crucial framework, as it highlights how the replacement of authentic relationships with unidirectional interactions with AI undermines the therapeutic potential of the intersubjective encounter. Regarding, the following recommendations are made:

1. Creating clinical protocols for the early identification of emotional dependence on AI and disorders related to digital social comparison.

2. Developing interventions based on "digital hygiene" that restore the capacity for shared attention and in-person interaction.

3. Training healthcare professionals to recognize and address new manifestations of psychological distress related to digital relational illusion.

As limitations of this study, we acknowledge the emerging nature of the phenomenon investigated and the consequent lack of robust longitudinal research. We suggest that future research monitors the long-term effects of these transformations, particularly in vulnerable populations. Despite this, the phenomenological approach adopted allowed us to capture the essence of this emerging human experience, offering valuable insights for rethinking healthcare in the algorithmic age. Ultimately, this work highlights the central paradox of our time: we have never been so technologically connected yet so deprived of authentic human connections. It is up to public health, and particularly nursing, to lead efforts to restore the balance between technological innovation and the preservation of the relational foundations that sustain biopsychosocial health. The challenge is not to reject technology, but to reaffirm the human condition in its inherent complexity and vulnerability.

## References

1. Amirthalingam J, Khara A. Compreendendo o vício em mídias sociais: uma análise aprofundada. *Cureu*. 2024;16(10):e72499. doi: 10.7759/cureus.72499
2. Rufino JV, Rodrigues R, Mesas AE, Guidoni CM. The mediating role of social media addiction and sleep quality in the association between social media usage and depressive symptoms in university students. *Cad Saude Publica*. 2024;40(5):e00097423. doi:10.1590/0102-311XPT097423
3. Siqueira LF, Maciel Teixeira C, Vitória de Lima Cavalcante Y, Jailson Portela Melo F, dos Reis Porfirio K, Cezar Queiroz Lima Filho A, Alex Almeida Alves J, Ribeiro Aguiar Filho V, Ériton Aguiar Moita F, de Arêa Leão Ramos Oliveira V, Lima Barradas J, Jhones Sales Ximenes S, Farias Linhares Silva L, Guimarães Brito D. O impacto das mídias sociais na saúde mental de adolescentes e jovens adultos. *Braz. J. Implantol. Health Sci*. 2024;6(10):1384-90. <https://doi.org/10.36557/2674-8169.2024v6n10p1384-1390>
4. Lima ABM, org. *Ensaio sobre fenomenologia: Husserl, Heidegger e Merleau-Ponty*. Ilhéus (BA): Editus; 2014.
5. Dias TKC, Evangelista CB, Zaccara AAL, Dias KCC de O, Costa BHS, França JRF de S. Reflexão crítica da teoria de Jean Watson: estudo fundamentado no modelo de Chinn e Kramer. *Arq. Ciênc. Saúde Unipar*. 2023;27(8):4203-1. <https://doi.org/10.25110/arqsaude.v27i8.2023-005>
6. Ahmad SF, Han H, Alam MM, et al. Impacto da inteligência artificial na perda humana na tomada de decisões, preguiça e segurança na educação. *Humanit Soc Sci Commun*. 2023;10:311. <https://doi.org/10.1057/s41599-023-01787-8>
7. Neves MP, Silva GA, Moraes PCL, Campos NCF, Coelho RJC, Machado TET, Bastos RCM, Silva NA, Bregonci R, Oliveira RAS. Dilemas da geração Z: até que ponto ir à procura de padrões? *Glob Acad Nurs*. 2022;3(Spe.2):e288. <https://dx.doi.org/10.5935/2675-5602.20200288>
8. Hohenstein J, Kizilcec RF, DiFranzo D, et al. A inteligência artificial na comunicação impacta a linguagem e os relacionamentos sociais. *Sci Rep*. 2023;13:5487. <https://doi.org/10.1038/s41598-023-30938-9>
9. Li C, Ning G, Xia Y, Guo K, Liu Q. Does the Internet Bring People Closer Together or Further Apart? The Impact of Internet Usage on Interpersonal Communications. *Behav Sci (Basel)*. 2022;12(11):425. doi: 10.3390/bs12110425
10. Assis M. Neurose de ansiedade digital na população do século XXI. *Revista Tópicos*. 2025;3(19). <https://doi.org/10.5281/zenodo.15104787>
11. Arnold M, Goldschmitt M, Rigotti T. Dealing with information overload: a comprehensive review. *Front Psychol*. 2023;14:1122200. doi: 10.3389/fpsyg.2023.1122200
12. Festinger L. Uma teoria dos processos de comparação social. *Hum. Relat*. 1954;7:117-140. doi: 10.1177/001872675400700202
13. Rajani NB, Mastellos N, Filippidis FT. Impact of Gamification on the Self-Efficacy and Motivation to Quit of Smokers: Observational Study of Two Gamified Smoking Cessation Mobile Apps. *JMIR Serious Games*. 2021;9(2):e27290. doi:10.2196/27290
14. Roth CB, Papassotiropoulos A, Brühl AB, Lang UE, Huber G. Psychiatry in the Digital Age: A Blessing or a Curse? *Int. J. Environ. Res. Public Health*. 2021;18:8302. <https://doi.org/10.3390/ijerph18168302>

