Giftedness: An Analysis of Symptoms and Their Genetic and Neurological Bases

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Resumo

Decompensated giftedness is a concept that describes a cognitive and behavioral profile in individuals with high intellectual abilities, characterized by a series of psychological and emotional symptoms that compromise functional balance and well-being. This study identifies and characterizes 12 specific symptoms, including the incessant search for new stimuli, rumination on pending issues, a high decision -making capacity contrasted by emotional overload and intense emotional oscillations . Inspired by the diagnostic criteria of manuals such as the DSM-5, we propose an exploratory criterion to identify decompensated giftedness, which includes the presence of at least 5 or 6 of the 12 symptoms, encompassing both core and additional symptoms. This criterion seeks to capture individual variability while ensuring specificity in characterization. Based on a review of the literature in neuroscience and behavioral genetics, this article examines the neurobiological and genetic bases of these symptoms and explores the hypothesis of uncompensated giftedness. This preliminary approach proposes a path for future empirical research and the development of tailored interventions to promote emotional and functional balance in gifted individuals.

Keywords: decompensated giftedness; elevated cognition; behavioral genetics; neuroscience; exploratory diagnosis

Abstract

Unbalanced giftedness is a conceptual framework that describes a cognitive and behavioral profile in individuals with high intellectual abilities, marked by specific psychological and emotional symptoms that compromise functional balance and well-being. This study identifies and characterizes 12 key symptoms, including the relentless pursuit of new stimuli, rumination over pending tasks, high decision-making capacity contrasted by emotional overload, and intense emotional oscillation. Drawing on diagnostic criteria from manuals such as the DSM-5, we propose an exploratory criterion for identifying unbalanced giftedness, which includes the presence of at least 5 or 6 out of 12 symptoms, covering both primary and additional symptoms. This criterion seeks to capture individual variability while ensuring specificity in characterizing the condition. Based on a literature review in neuroscience and behavioral genetics, this article examines the neurobiological and genetic underpinnings of these symptoms and explores the hypothesis of unbalanced giftedness. This initial approach suggests pathways for future empirical research and the development of tailored interventions to support functional and emotional balance in gifted individuals.

Keywords: unbalanced giftedness; high cognition; behavioral genetics; neuroscience; exploratory diagnosis

Introdução

Giftedness is traditionally associated with high cognitive abilities and the ability to solve complex problems, which often result in high academic and professional performance. However, recent evidence suggests that giftedness , although linked to cognitive advantages, may also be associated with emotional and behavioral challenges that impact the well-being and functional balance of individuals . This profile, which we call uncompensated giftedness , involves emotional and cognitive decompensations that are not widely addressed in the scientific literature and do not have a formal definition in diagnostic manuals , such as the DSM-5.

giftedness is characterized by a specific set of psychological and emotional symptoms that exceed the typical characteristics of giftedness. These symptoms include the incessant search for new stimuli and achievements, rumination on pending issues, a high decision-making capacity that coexists with emotional fatigue, and intense emotional swings. In addition to the 8 main symptoms , we identified 4 additional symptoms , including exacerbated sensitivity to feedback, motivation swings , discomfort with rigid social norms , and a heightened perception of time and efficiency . These symptoms appear to worsen in individuals with high cognitive ability due to neurobiological and genetic factors , such as limbic system hyperactivity and genetic predispositions that influence emotional and cognitive processing.

Inspired by diagnostic criteria from manuals such as the DSM-5, we suggest an exploratory criterion to identify decompensated giftedness . This criterion includes the presence of at least 5 or 6 of the 12 symptoms identified, encompassing both core and additional symptoms, to capture the individual variability characteristic of giftedness profiles without compromising the specificity needed to distinguish decompensated giftedness from other disorders or conventional giftedness profiles.

This study uses a literature review in neuroscience and behavioral genetics to investigate the neurobiological and genetic bases of these symptoms . Three case studies are presented to illustrate how these symptoms manifest in practice , verifying the applicability of the proposed criteria . The objective is to validate the hypothesis of uncompensated giftedness and offer an initial basis for the recognition of this profile, guiding the development of clinical interventions that favor the balance between cognitive performance and emotional well-being.

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This study aims to investigate and characterize decompensated giftedness through a systematic analysis of the scientific literature and an empirical approach based on case studies. First, we conducted a literature review in renowned databases, including PubMed, Scopus and Web of Science, with a specific focus on studies on neuroscience , behavioral genetics and psychology applied to the characteristic symptoms of giftedness . The review included articles that address biological, psychological and genetic factors that may contribute to the understanding of the symptoms and mechanisms underlying the decompensated giftedness picture .

Proposed Diagnostic Criteria

The operational definition of uncompensated giftedness is based on the presence of at least five of the ten core symptoms identified, such as: incessant search for novel stimuli , rumination on pending issues , intense emotional swings, and self-confident perfectionism. To reinforce the diagnosis , additional symptoms such as heightened sensitivity to feedback and heightened temporal perception may be considered, although they are not essential for a preliminary diagnosis . This criterion was formulated based on findings in the literature, which suggest the need for flexibility to encompass the individual variability of gifted individuals with regard to the intensity and expression of symptoms .

Case Studies

To illustrate the applicability of the diagnostic criteria and the variability of symptoms, we have included three detailed case studies. Each case study was selected to exemplify different manifestations of the core and additional symptoms, as well as to assess the intensity, frequency , and impact of these symptoms on the emotional and cognitive functioning of the individuals . These accounts provide a qualitative analysis of the subjective experience and challenges faced by individuals with uncompensated giftedness , exploring the impact of high cognitive ability on their mental and social health .

The following case studies were selected to illustrate the complexity and variability of symptoms of decompensated giftedness across different individual profiles, providing an in-depth analysis of the practical manifestation and coping strategies adopted by each individual . These reports highlight the intensity, frequency and impact of symptoms on emotional well-being and cognitive functioning, reinforcing the applicability of the proposed diagnostic criteria .

Case Report 1: Decompensated Giftedness

The first case reports a satisfactory life , but is marked by periodic crises , described as "excessive thoughts" and an "unusual processing speed". These crises occur cyclically , varying in intensity and duration – from a few hours to entire days, with periods of calm lasting up to weeks . In particular, Mondays represent a peak of intensity: upon waking, he experiences a "mental switch" that activates a precise visualization of all pending matters , like an "internal calendar " . This phenomenon results in a state of heightened alert, where the urgency of resolving these pending matters generates overload and emotional swings .

Although the patient demonstrates remarkable decision - making ability , he often experiences procrastination , moments of low mood, and a need for isolation. During these episodes , he manifests an exacerbated sensitivity to sensory and emotional stimuli – sounds and textures become uncomfortable , and trivial comments provoke physical reactions , such as “ butterfliesin the stomach ” and a feeling of rejection . The volume of thoughts is high and brings about “subjective and cerebral ” anxiety, related to the excess of ideas and pending tasks. In search of relief , he resorts to pleasurable activities, alternating with selective procrastination of less priority activities , in addition to focusing on complex tasks as a strategy to regulate the state of cognitive hyperarousal .

Case Report 2: Decompensated Giftedness

In the second case, the volunteer identifies with several symptoms, especially anxiety, perfectionism, and high responsiveness to stimuli . Previously, he felt misunderstood and frustrated when practical advice he offered was disregarded, because he anticipated negative outcomes that could have been avoided. This pattern of " negative anticipation " and seeking control reflects a constant concern with anticipating and avoiding problems, although others often interpret this as "negativity."

Today, after several years of self-knowledge and therapy, he reports a more balanced management of these traits . While maintaining his original inclinations , he now directs them toward specific focuses , such as personal satisfaction, family relationships , and social impact. He realizes that the desire for appreciation is central to his emotional balance, understanding that other people have different values and perspectives and that this diversity is intrinsic to human coexistence . The patient's experience emphasizes the importance of self - knowledge and reassessment of expectations to moderate the anxiety and frustration associated with unbalanced giftedness .

Case Report 3: Decompensated Giftedness

The third report highlights a volunteer who , although reporting variations in the intensity of symptoms, constantly seeks to maintain balance through adaptation strategies . In a low-demand environment, he voluntarily seeks additional tasks that generate complexity, ending up creating an overload of activities. This willingness to fill the “ complexityvoid ” leads to the accumulation of unfinished tasks and a cycle of oscillation between the search for challenges and frustration when facing external obstacles , such as the dependence on collaboration from others to complete his ideas.

98th percentile of giftedness , the patient also reflects on the intensity of his experience compared to peers at higher percentiles. He wonders whether the perceived differences in emotional intensity and cognitive challenges are proportional to the level of ability, given that individuals at the 99th percentile face an even more intense emotional and cognitive environment.

These three reports provide a richer and more diverse understanding of unbalanced giftedness , highlighting how different traits and coping mechanisms manifest individually and how the intensity of giftedness can influence the emotional and behavioral picture. The analysis of these cases reinforces the validity of the diagnostic criteria and the relevance of personalized management strategies to meet the unique needs of each gifted individual.

Development

Decompensated giftedness is characterized by a set of specific symptoms that emerge in individuals with **high** cognitive capacity, impacting both emotional functioning and behavioral balance . In this development, each symptom will be **analyzed** in depth, based on evidence from the neuroscientific and genetic literature , seeking to explore the possible biological and behavioral bases that support these manifestations .

Among the central symptoms of decompensated giftedness , the incessant search for new stimuli and the achievement of multiple achievements stand out, often resulting in the accumulation of unfinished tasks and generating mental overload. In addition , it is common to observe rumination on pending matters and an exacerbated state of anxiety, where recurring thoughts about unfulfilled responsibilities promote constant restlessness and make concentration difficult . Although individuals with decompensated giftedness present a remarkable decision - making capacity , this ability is accompanied by significant fatigue and an increase in cortisol levels , resulting from the accumulation of responsibilities and constant tension (AGRELA RODRIGUES et al., 2024).

Task overlap and willingness to act are notable characteristics of individuals with uncompensated giftedness , contributing to physical and mental overload due to the tendency to take on multiple responsibilities simultaneously. This trait is often accompanied by intense emotional swings and frustrations , especially when expected results are not achieved or when the individual perceives that others do not share the same sense of urgency . A recurring pattern of thoughts about probabilities and alternative scenarios is also observed , which can generate discomfort and subjective anxiety, often intensified by procrastination and excessive cognition and constant mental analysis (AGRELA RODRIGUES et al., 2024).

Individuals with uncompensated giftedness often demonstrate constant dissatisfaction associated with perfectionism that, although characterized by high self-confidence in their abilities, generates frustration when the results achieved do not correspond to the established ideal. This perfectionism is accompanied by intense internal pressure and cortical hyperactivity, leading to hyperactivation of the limbic system and the prefrontal cortex , which, in turn , intensifies stress and promotes significant cognitive impairment (AGRELA RODRIGUES; CARVALHO; DO ESPIRITO SANTO, 2024).

Subjective anxiety

Subjective anxiety, characterized by internal tension linked to excessive information processing and high cognitive demand, can interfere with attentional control, becoming more intense in situations of mental overload, as observed in studies on anxiety and cognitive load (Najmi et al., 2015).

Core Symptoms of Decompensated Giftedness

1. Incessant Search for New Stimuli and Multiple Achievements

The constant search for new stimuli and achievements is closely related to the corticostriatal reward circuit, especially involving the nucleus accumbens (NAc) and prefrontal cortex . This process is intensified by the release of dopamine, which acts on D1 and D2 receptors in the NAc, amplifying the motivational response to novelty and positive reinforcement (Haber & Knutson, 2010). The orbitofrontal cortex (OFC), although not specifically addressed by Haber & Knutson, is highlighted in other studies as a critical region for the evaluation of rewards and adaptation of behaviors based on expectations (Wallis, 2007). Individuals with genetic variants in the *DRD4* gene exhibit greater responsiveness to new and challenging stimuli , reinforcing exploratory behaviors and the desire for constant achievement (Ebstein et al., 1996).

These patterns of novelty seeking and high responsiveness to rewarding stimuli are often observed in gifted individuals , in whom heightened curiosity and the need for constant challenge are common traits , associated with increased activity in the reward circuit and a continuous search for learning and achievement (Dabrowski, 1964; Piechowski, 1997).

To moderate the relentless pursuit of stimulation and achievement in gifted individuals , an effective approach may involve interventions that promote dopaminergic self-regulation and conscious management of reward cycles. It is suggested that cognitive diversion practices , distraction seeking , and meditation , by strengthening cognitive control and emotional regulation , help reduce the hyperactivation of the reward circuit, allowing a more balanced state of satisfaction , less dependent on external stimuli. The introduction of activities that integrate controlled challenges and long-term goals can provide intrinsic and satisfying rewards , which contributes to minimizing the constant need for new achievements. Furthermore , psychoeducation strategies on reward mechanisms and positive reinforcement can favor the development of greater awareness of motivational impulses and behavioral adaptation. These practices and lifestyle adjustments have the potential to reduce the overload of the dopaminergic system and favor a more lasting state of fulfillment and emotional balance , attenuating the tendency towards exhaustion and compulsive search for stimuli .

2. Rumination on Pending Issues and Exacerbated Anxiety

Rumination involves brain regions such as the anterior cingulate cortex (ACC) and the amygdala , which are critical for emotional processing and stress response. In patients with depression , prolonged rumination increases activity in these regions , especially in response to self-referential thoughts and negative autobiographical memories , creating a cycle of heightened emotional response and difficulty in interrupting the flow of negative thoughts. In addition , the amygdala exhibits heightened reactivity, amplifying the processing of negative emotional material and contributing to the persistence of rumination . These mechanisms are supported by neurotransmitter signaling, such as glutamate, and by intracellular CREB activation pathways , which reinforce the maintenance of attention to stimuli associated with anxiety and stress.

In the context of giftedness , extrapolating these findings may help to understand how rumination and anxiety about unfinished tasks are reinforced by these brain circuits. Uncompensated giftedness may therefore share features with rumination patterns seen in depression , albeit with a focus on specific performance concerns and personal goals rather than a global negative bias . Rumination in gifted individuals can also be intensified by high glutamate responsiveness , which, according to Agrela Rodrigues, Carvalho and Espírito Santo (2024), is associated with accelerated cognitive processing and the incessant search to resolve cognitive issues , making mental disconnection difficult.

To mitigate to-do rumination and heightened anxiety in gifted individuals , a combined approach of emotion regulation techniques and control of glutamatergic excitability may be effective. Cognitive shifting practices and relaxation techniques focused on present -moment awareness help reduce anterior cingulate cortex (ACC) hyperactivity and amygdala reactivity , minimizing the cycle of intrusive thoughts and heightened emotional response. Also , strategies that promote task prioritization and realistic goal setting may help reduce the volume of mental to -do , channeling focus toward gradual and less overwhelming achievements. The inclusion of physical activities and the development of self-care routines also contribute to modulating glutamate levels , stabilizing the stress response and facilitating the mental detachment necessary to interrupt continuous rumination . By integrating these practices , gifted individuals can achieve a more balanced emotional adaptation , which promotes concentration on the present and diminishes the impact of recurring worries and unfinished business .

3. Decision -Making Capacity Contrasted with Fatigue and Anxiety

Effective decision-making, mediated by the dorsolateral prefrontal cortex (DLPFC) , is facilitated by a dopaminergic balance that maintains focus and adaptability. However, the

accumulation of responsibilities activates the hypothalamic-pituitary-adrenal (HPA) axis , triggering the release of cortisol that negatively impacts emotional resilience (Arnsten, 2009). The *COMT* (catechol-O-methyltransferase) gene variant , especially the methionine158 version, reduces dopamine degradation in the prefrontal cortex , resulting in heightened focus but at the cost of increased susceptibility to burnout under high cognitive demands (Goldman-Rakic et al., 2000).

In gifted individuals, variation in the COMT gene , particularly the valine (Val158) and methionine (Met158) alleles, plays a crucial role in dopaminergic regulation and in emotional and cognitive responses under high-demand conditions. The Val158 allele, which encodes a more active version of the COMT enzyme, facilitates faster dopamine degradation , resulting in lower levels of this neurotransmitter in the prefrontal cortex . This pattern has been associated with greater resilience to stress and a reduced tendency to ruminate , although it may slightly compromise focus accuracy in low - stimulation contexts . In contrast, the Met158 allele, more common in gifted individuals, reduces the activity of the COMT enzyme, leading to higher and more prolonged levels of dopamine in the prefrontal cortex , which favors deep focus and heightened analytical capacity (Solís - Ortiz et al., 2015). This dopaminergic profile in gifted individuals is often associated with a self-confident and demanding perfectionism, which, in highly demanding environments, can intensify, generating tension between high performance expectations and susceptibility to mental and emotional exhaustion (Mier et al., 2010; Rosenberg et al., 2006). Moriguchi and Shinohara (2018) complement this perspective by highlighting that prefrontal activation is modulated by the COMT genotype , suggesting that the presence of the Met158 allele contributes to a more focused but, at the same time, more sensitive brain response to intense cognitive pressures . This genetic predisposition , combined with continuous demands , reinforces the contrast between a high decision-making capacity and a vulnerability to burnout under pressure , a typical characteristic of uncompensated giftedness .

However, even with the *GG (Val158) variant* , which tends to be associated with a lower predisposition to emotional fatigue in high-pressure contexts , other neurobiological , environmental, and psychological factors may still predispose to dysregulated giftedness . These individuals may experience high emotional and cognitive sensitivity, perfectionism, need for control, and striving for excellence , characteristics often observed in gifted individuals. This combination of high intellectual ability and perfectionism may still lead to burnout patterns, even without the dopamine accumulation characteristic of the Met / Met genotype . Furthermore , studies suggest that giftedness involves multiple neuromodulatory *systems* and processes beyond COMT , including the hypothalamic-pituitary-adrenal (HPA) axis and the glutamatergic *system* . Thus , although the GG genotype may confer some advantages in terms of emotional regulation, it does not prevent a gifted person from experiencing the cycle of hyperdemand and stimulus seeking that characterizes dysregulated giftedness .

To mitigate the contrasting effects of high decision-making ability and emotional fatigue in gifted individuals, emotional self-regulation strategies and cognitive load management techniques can be highly beneficial . Interventions such as scheduled breaks, cognitive detours, and the use of deep breathing techniques help reduce cortisol levels and maintain alertness without overexerting the dorsolateral prefrontal cortex (DLPFC). For those with the Met158 allele, who have slower dopamine degradation and thus a tendency toward perfectionism and intensive analysis , setting clear limits on the time spent on cognitively demanding tasks can prevent the accumulation of fatigue. Organizational practices that prioritize task delegation and the use of lists with intermediate goals can also alleviate continuous performance pressure , allowing a balance between high performance and maintaining mental health . Furthermore , in cases of chronic overload , guidance with mental health professionals to develop stress management skills specific to gifted individuals can promote resilience and mitigate susceptibility to burnout .

4. Task Overlap and Willingness to Act, Resulting in Overload

The tendency to manage multiple tasks simultaneously involves collaboration between the prefrontal cortex and the parietal cortex, which facilitates the prioritization of information and adaptation to competing demands. Studies by Pessoa (2013) on the emotional -cognitive brain suggest that overload occurs when excessive stimulation of dopaminergic circuits in the NAc makes it difficult for the prefrontal cortex to filter tasks , contributing to mental and physical overload . The effectiveness of GABAergic interneurons , which play an inhibitory role , may be limited, exacerbating the stress response and intensifying feelings of exhaustion .

In gifted individuals, this tendency to multitask is even more pronounced due to their high cognitive processing capacity and constant pursuit of challenges. Hyperactivity of dopaminergic circuits , especially in the nucleus accumbens (NAc), can amplify the reward response to completing complex tasks, encouraging the individual to take on multiple responsibilities simultaneously. However, the high intensity of excitation in the prefrontal cortex , in combination with the variability in the effectiveness of GABAergic interneurons , makes these individuals more vulnerable to cognitive and physical overload . This overload is intensified by the need for perfection and the heightened sense of responsibility often observed in gifted individuals, resulting in a cycle of exhaustion and relentless pursuit of optimal performance. This pattern , while allowing a high level of achievement , also predisposes the gifted to burnout, as the limited inhibitory capacity of the GABAergic systems makes emotional regulation and adaptation to excessive demands difficult (Pessoa, 2013).

Based on clinical experience and the literature on neuroscience applied to the management of cognitive overload, one approach to improving the efficacy of GABAergic interneurons in gifted individuals may involve strengthening inhibitory pathways , which are essential to moderate excessive cortical excitation . It is suggested that interventions that increase GABA availability or modulate the activity of its receptors, including relaxation techniques, cognitive shifting, and emotional regulation training , could help reduce unnecessary activation of the prefrontal cortex , promoting a more balanced adaptation to intense demands . Furthermore, regular physical exercise and a diet rich in GABA precursors (such as L-theanine, present in green tea) can contribute to the elevation of GABA levels in the nervous system, producing a natural calming effect. In some specific cases , supplementation with agents that modulate GABA action, under professional supervision , is another promising possibility. These strategies , by reducing chronic excitability , could favor greater resilience to stress and attenuate susceptibility to burnout in contexts of high cognitive demand, characteristics of gifted individuals .

5. Emotional Swings and Intense Frustrations

Emotional swings and frequent frustrations are modulated by the amygdala and the orbitofrontal cortex , both involved in the processing of negative feedback and in the evaluation of expectations versus reality. The release of norepinephrine in response to stressors intensifies these emotional reactions , while a reduced inhibitory activity of GABAergic interneurons allows an amplification of the state of frustration , exacerbating the emotional response to failure (Arnsten, 2009; Haber & Knutson , 2010).

Individuals with profound giftedness , characterized by a significantly high IQ (above 3 standard deviations from the mean) , present an intensification of emotional oscillations , resulting from a greater involvement of the amygdala and the orbitofrontal cortex in the processing of feedback and in the constant evaluation of expectations versus reality. According to the study by Fabiano

de Abreu Agrela Rodrigues et al. (2024), profound giftedness leads to more pronounced activity in these brain regions , which increases emotional intensity and reactivity in the face of frustrating and challenging situations . This increase in emotional intensity is exacerbated by the release of norepinephrine in response to stressful stimuli , leading to an amplification of emotions and a prolongation of the response to failure, especially when high personal expectations clash with less favorable outcomes . The lower level of inhibition , resulting from the quantitative discrepancy , offered by GABAergic interneurons in these individuals makes it difficult to control this emotional response, making them more susceptible to emotional ups and downs throughout their cognitive and social experiences . The reduced inhibition provided by GABAergic interneurons in gifted individuals may compromise the control of emotional response, making them more vulnerable to emotional fluctuations in cognitive and social contexts. Studies indicate that deficits in the inhibitory activity of GABAergic interneurons in the prefrontal cortex , as discussed by Bissonette et al. (2014), are associated with a reduced capacity for emotional regulation and cognitive stability, suggesting that the reduction of this inhibition facilitates emotional reactivity and hinders adjustment to complex emotional and cognitive demands.

To mitigate these effects, strategies focused on strengthening emotional resilience and adapting to high cognitive demands can be implemented. Techniques such as meditation , cognitive shifting , and self-awareness training help reduce excessive activation of the amygdala , promoting a more balanced emotional response. Regular exercise also helps modulate norepinephrine levels , while relaxation and emotional regulation strategies , such as cognitive-behavioral therapy focused on restructuring expectations , can help redefine goals and reduce frustrations resulting from results perceived as insufficient.

6. Overthinking about Probabilities and Alternative Scenarios

The evaluation of future scenarios and the consideration of multiple probabilities are complex tasks that rely heavily on the medial prefrontal cortex , a region crucial for the integration of information and the anticipation of outcomes. This process is significantly modulated by the interactions between dopamine and glutamate, which intensify cortical activity and promote a state of cognitive anxiety, characterized by constant restlessness in the face of a continuous stream of thoughts . Dopaminergic signaling , especially through D4 receptors, modulates the activity of NMDA receptors in the prefrontal cortex , regulating synaptic plasticity and the response to complex stimuli (Wang, Zhong, & Yan, 2003). This mechanism allows the combination of dopamine and glutamate to increase the excitation of pyramidal neurons , reinforcing the constant analysis and reevaluation of alternatives. Sustained activity in these circuits can also overload the limbic system , increasing the predisposition to repetitive processing cycles and potentially intensifying vulnerability to emotional and cognitive exhaustion.

In gifted individuals , this tendency to analyze future scenarios is amplified , in part due to high activity in subcortical regions responsible for anticipating consequences and making complex decisions . The efficiency of subcortical structures, including the nucleus accumbens and striatum, supports a preventive and organized response, allowing these individuals to anticipate challenges and adapt quickly. Genetic studies indicate that variants in the COMT and DRD4 genes are associated with more efficient processing of rewards and risks, influencing the ability to evaluate scenarios in advance and promoting a more intense preventive awareness , often observed in gifted individuals with high conscientiousness scores.

To moderate the impact of excessive analysis of alternatives and reduce associated subjective anxiety, emotion regulation techniques , such as mindfulness training and targeted relaxation practices, can be implemented to limit cognitive overload. Cognitive strategies , such as clearly

defining priorities and using regular breaks for mental breaks, can also help to control the constant flow of thoughts, favoring a more balanced adaptation to complex situations and high cognitive demands.

7. Constant Dissatisfaction Due to Perfectionism Not Insecure

Perfectionism characterized by high self-confidence is facilitated by the dorsolateral prefrontal cortex , which maintains goal control and critical evaluation of performance . Studies indicate that the *BDNF gene* (brain-derived neurotrophic factor) plays a key role in synaptic plasticity , allowing individuals with high BDNF expression to respond adaptively to complex challenges. However, this plasticity can intensify dissatisfaction by reinforcing the pursuit of high ideals, generating frustration when these are not achieved (Kabbaj et al. , 2014).

individuals often present a neurobiological profile that facilitates the response to cognitive challenges and the pursuit of ambitious goals. This pattern is , in part, supported by the action of the BDNF gene, which encodes the brain-derived neurotrophic factor , essential for synaptic plasticity and cognitive adaptation . In particular, the Met66 variant of BDNF is associated with greater perseverance in complex activities, modulating activity in the dorsolateral prefrontal cortex , responsible for goal control and critical evaluation of performance (Sakata et al., 2013). In gifted individuals, this mechanism may intensify self-confident perfectionism, as enhanced synaptic plasticity reinforces the pursuit of optimal performance and high ideals. However, this same characteristic can also lead to an intensification of dissatisfaction and frustration when results do not meet expectations, creating a cycle of high demand and emotional vulnerability in the face of failure (Barbey et al., 2014).

To mitigate the impacts of perfectionism and striving for high ideals in gifted individuals, one recommended approach involves practices that promote emotional self-regulation and ongoing goal reassessment . Cognitive shifting techniques , leisure activities, and long-term habits, for example, can help with self-observation , promoting a more objective and less critical perception of performance. In addition, the practice of setting incremental goals that can be revised based on progress can facilitate a more gradual experience of achievement, reducing pressure and emotional distress. In some cases, specialized psychological guidance to address perfectionism and the valuing of process over final results can be especially effective in balancing the desire for excellence with a more sustainable approach to emotional well-being.

8. High Internal Charge and Cortical Hyperactivity

pressure and constant demands are related to the activation of the prefrontal cortex and the limbic system , where intracellular pathways, such as those mediated by c-Fos and CREB, intensify the prolonged response to stress. Individuals with genetic variants in the *MAOA* gene demonstrate greater emotional reactivity, promoting an exacerbated response to internal challenges and making it difficult to return to a state of emotional homeostasis (Alia-Klein et al., 2008).

In gifted individuals, high internal demands often emerge as a response to the constant search for performance and standards of excellence that transcend the average . This phenomenon is closely related to the functioning of the prefrontal cortex and the limbic system , regions responsible for evaluating goals and the emotional response to internal and external demands. The low-activity variant of the *MAOA gene* , as described by Alia-Klein et al. (2008), can amplify emotional reactivity in these individuals , facilitating an exacerbated response to stress and reinforcing the state of continuous alertness . This cortical hyperactivity, combined with an overload of intracellular signaling mediated by c-Fos and CREB, sustains a cycle of prolonged activation in

the face of challenging stimuli , making it difficult to return to homeostasis. Gifted individuals with this genetic predisposition tend to experience limited emotional self-regulation , intensifying internal demands and pressure for self-actualization , which makes relaxation and contentment with achievements especially challenging.

To mitigate the effects of cortical hyperactivity and internal pressure in gifted individuals, a combination of behavioral and neuroadaptive strategies that promote emotional regulation and stress relief is recommended. Deep muscle relaxation techniques can help reduce limbic activity , providing a state of emotional balance . In addition , aerobic exercise , known to increase GABA and endorphin levels, can help reduce cortical hyperactivity and accumulated tension . Training in self-regulation skills , such as realistic goal setting and establishing internal limits for self-pressure , has also been shown to be effective. In cases of greater intensity, it may be beneficial to consider neuropsychological approaches , such as biofeedback, which allow the individual to monitor and adjust cortical activity, promoting more efficient adaptation to high emotional and cognitive demands .

Additional Symptoms (more common in gifted individuals and widely described in studies)

Although the core symptoms of decompensated giftedness , such as the incessant search for stimuli , exacerbated rumination , and the oscillation between high decision-making ability and fatigue, are crucial to understanding the condition, it is essential to recognize the presence of additional symptoms that complement and contextualize this condition . These symptoms, such as exacerbated sensitivity to external feedback, oscillations in motivation , discomfort with social conformity, and heightened perception of time, are frequently observed in gifted individuals and contribute to the complexity of their functioning. The inclusion of these additional symptoms in this article aims to broaden the understanding of uncompensated giftedness by providing a more complete and in-depth view of its manifestations and implications for the well-being of gifted individuals . By considering these additional symptoms, we seek to validate the experiences of those who identify with uncompensated giftedness , offering a broader and more information -rich overview of this complex condition .

9. **Heightened Sensitivity to External Feedback**
   Sensitivity to criticism is linked to activation of the amygdala and ventromedial prefrontal cortex , which process negative feedback as personal threats . The release of norepinephrine during rejection events intensifies the emotional response, creating a cycle of rumination and self - criticism (Murray et al., 2011).

10. **Motivation and Interest Fluctuations** Motivational fluctuations reflect variations in dopamine between the prefrontal cortex and the nucleus accumbens . Low-stimulation environments result in a reduction in dopaminergic activity , **generating** apathy, while exposure to new challenges restores dopamine levels (Salamone & Correa, 2012) .

11. **Discomfort with Social Conformity and Rigid Rules Discomfort with**
    social norms is mediated by the dorsomedial prefrontal cortex , which evaluates moral judgments and the value of autonomy. Activation of the amygdala in situations of social constraint reinforces resistance to these norms, especially in individuals with greater emotional sensitivity (Decety et al., 2012).

12. **Heightened Perception of Time and Efficiency The** sense of continuous urgency is modulated by the anterior cingulate cortex, responsible for monitoring performance . The interaction between dopamine and norepinephrine intensifies this perception , **promoting** constant attention to efficiency and productivity (Posner & Rothbart, 2007).

These 8 + 4 symptoms represent the characterization of decompensated giftedness , and are essential for the diagnosis and understanding of this profile. The analysis of each point, accompanied by scientific evidence , will provide a deeper understanding of the concept, facilitating the development of interventions that promote the emotional and behavioral balance of these individuals .

Difference Between Gifted Depression and Decompensated Giftedness

Depression in gifted individuals and decompensated giftedness share some emotional symptoms, but differ substantially in their neuropsychological origins and in their impact on behavior and cognitive functioning. Depression , as outlined in the DSM-5, is characterized by a persistent state of anhedonia, low mood, loss of energy and motivation , negatively interfering with the individual 's decision -making and adaptation capacities (AMERICAN PSYCHIATRIC ASSOCIATION, 2013). In contrast, decompensated giftedness manifests as an episodic and dynamic dysfunction , resulting from cognitive and emotional hyperarousal that overloads the neural system in a non - continuous manner . This condition results from an intense activation of neural circuits involved in the processing of stimuli and the projection of future scenarios , including the prefrontal cortex and the limbic system , which regulate emotional responses and decision-making (DOUGLAS ; BAILEY, 2017).

Uncompensated giftedness introduces a state of **subjective anxiety** , which is distinguished from conventional anxiety by not including feelings of fear or physical restlessness . This subjective anxiety is a persistent mental tension, characterized by cognitive overload and the need to control outcomes and anticipate scenarios , which is common among individuals with high information processing capacity (ACKERMAN; HILLIARD, 2014). In everyday life, this experience manifests itself in a constant difficulty in relaxing, a need for intellectual stimulation, and a detailed concern with possibilities and consequences . Such patterns generate continuous activation of the prefrontal cortex , responsible for evaluating scenarios and controlling impulses, while the limbic system responds intensely to stimuli that challenge the self-image of competence and control , exacerbating the state of cognitive alert.

Cognitive hyperarousal in decompensated giftedness involves components such as hyperfocus, the ability to maintain concentrated attention for prolonged periods , and an increased perception of details and interconnections . This phenomenon can lead to a cycle of emotional overload and mental fatigue, particularly evident in situations that require high performance or complex decisions. Individuals with decompensated giftedness often feel compelled to solve problems autonomously and with high rigor, which aggravates the overload and perpetuates a state of tension (LOOSLI et al., 2020).

To cope with this overload, individuals **with** decompensated giftedness employ control **and prevention strategies that aim** to manage internal pressure and maintain high functioning. These strategies include meticulous organization , detailed planning, the constant search for new knowledge to anticipate problems, and the compartmentalization of tasks , which allows them to divide cognitive responsibilities into manageable blocks . Some also adopt relaxation or diversion techniques , seeking to minimize the impacts of mental hyperarousal and achieve more stable emotional regulation . These cognitive control strategies are effective in maintaining performance and functionality, but they can, paradoxically, intensify the cycle of hyperdemand and overload (DOUGLAS; BAILEY, 2017).

While depression in gifted individuals involves a generalized decrease in responsiveness and adaptability, decompensated giftedness allows the individual to maintain his or her performance, actively adapting to cognitive and emotional demands, but at a high cost to mental balance . This cyclical and momentary cycle reflects an intense response to continuous intellectual stimulation and the need for control, which, over time, results in decompensations that affect emotional and cognitive homeostasis without, however, characterizing a lasting depressive condition.

In gifted individuals, especially those with profound giftedness , it is observed that characteristics such as cognitive hyperarousal, need for control and subjective anxiety tend to be more intense and frequent. The higher the intellectual quotient (IQ), the greater the predisposition for a marked activation of neural networks, particularly in areas related to the processing of complex information and the anticipation of scenarios , which contributes to the amplification of these characteristics (ACKERMAN; HILLIARD, 2014; AGRELA RODRIGUES et al., 2024). The expression of these characteristics varies significantly according to the level of self-control and the demands of the external environment. High-pressure, demanding environments without adequate support tend to exacerbate these traits , while low-stress environments with family or educational support can mitigate the expression of these characteristics . In conditions of less pressure and with good emotional management, gifted individuals are able to achieve a functional balance that favors their performance and well-being.

Discussion

Uncompensated giftedness represents a new perspective on the emotional and cognitive implications of giftedness , which goes beyond the traditional view of cognitive advantages and potentialities. Based on the analysis of the literature in neuroscience and behavioral genetics , we observe that giftedness is not only a characteristic that facilitates performance, but also a condition that can generate significant challenges to well-being. The distinctive characteristics of uncompensated giftedness , such as the incessant search for new stimuli , rumination on pending issues , and high decision -making capacity accompanied by emotional overload, reflect a profile that integrates both high abilities and psychological and emotional vulnerabilities.

The literature review showed that the neurobiological basis of the symptoms of decompensated giftedness involves complex circuits, mainly in the prefrontal cortex , nucleus accumbens and limbic system , which regulate reward processing, emotion control and decision making . Associated genes, such as BDNF, COMT and MAOA, influence synaptic plasticity , dopamine regulation and stress response, making gifted individuals more susceptible to states of hyperarousal and emotional distress. This predisposition , combined with a high-demand environment and limited emotional self-regulation, can intensify symptoms of decompensated giftedness , such as emotional oscillation and subjective anxiety.

The case studies presented here illustrated the individual variability of symptoms and provided practical insights into the manifestation of decompensated giftedness . Each case highlighted different coping strategies, such as the use of organizational techniques , relaxation practices , and redefining expectations , which can help alleviate the impact of these symptoms. However, the contrast between high performance and emotional overload showed that these individuals face a constant challenge of reconciling their desire for achievement with the need for well-being. The proposed exploratory criterion , which suggests the presence of at least five of the twelve symptoms for a preliminary characterization, proved to be flexible enough to accommodate the diversity of gifted profiles, but specific enough to distinguish decompensated giftedness from other conditions.

Final Considerations

giftedness approach offers a new framework for understanding the interactions between high cognitive ability and emotional vulnerabilities. By integrating neuroscientific and genetic findings , this study lays the foundation for a more complex and holistic understanding of giftedness that does not see it simply as a set of abilities, but as a multidimensional profile that includes both strengths and risks to well-being.

The recognition of uncompensated giftedness as a distinct condition can foster new approaches in education and mental health , proposing personalized interventions that promote the balance between performance and quality of life. This study points to the need for future empirical work that explores specific interventions , such as the development of emotional self- regulation programs. and cognitive load management for gifted individuals . These interventions can provide essential support for these individuals to reach their potential without compromising their emotional well-being.

The empirical validation of diagnostic criteria and the analysis of effective interventions for uncompensated giftedness may not only improve the quality of life of these individuals , but also broaden the clinical and scientific understanding of the complex interactions between high cognitive ability and emotional vulnerabilities. With a careful and informed look, this study invites the construction of a future in which giftedness is understood and addressed in a more balanced and inclusive way.

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