EMOTIONAL REGULATION IN ADOLESCENTS WITH ANTICIPATORY ANXIETY: A SYSTEMATIC REVIEW ON MECHANISMS, INTERVENTIONS AND DEVELOPMENT OF SELF-REGULATION SKILLS

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Abstract: The objective of this study is to systematically analyze recent scientific literature on the neurobiological and psychological mechanisms underlying anticipatory anxiety in adolescents, as well as to evaluate the effectiveness of brief psychotherapeutic interventions and emotional self-regulation techniques, following the PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) guidelines. The method adopted was a systematic literature review of the last five years (2021–2026), covering epidemiological and neurobiological studies and clinical trials on interventions such as cognitive-behavioral therapy (CBT), acceptance and commitment therapy (ACT), and mindfulness practices, identified in PubMed, PsycINFO, Web of Science, and Scopus databases. After applying eligibility criteria, 20 studies were included in the qualitative synthesis. The results demonstrate that anticipatory anxiety in adolescents shows an increasing prevalence — exceeding 20% in American populations in 2023 — negatively impacting social and academic functioning, associated with asymmetric maturation of the prefrontal cortex and amygdala hyperactivity. Mindfulness-based interventions and cognitive reappraisal show significant effectiveness in reducing symptoms, promoting greater psychological flexibility. Digital CBT-based interventions show moderate effect sizes and constitute an accessible alternative to in-person treatment. The main conclusion indicates that brief intervention protocols integrating rapid emotional regulation techniques — such as diaphragmatic

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breathing and self-compassion — are crucial to mitigate anticipatory anxiety effects, providing essential support for the development of digital tools and school-based interventions. Limitations include methodological heterogeneity among included studies and the scarcity of randomized clinical trials with representative samples from low- and middle-income countries.

Keywords: Anticipatory Anxiety. Adolescent. Emotional Regulation. Mindfulness. Brief Intervention. PRISMA. Cognitive-Behavioral Therapy.

Introduction

Adolescence constitutes a critical period of neurobiological and psychosocial development, characterized by profound transformations in brain structure and emotional regulation. In this context, anticipatory anxiety emerges as a clinically relevant manifestation, characterized by excessive and persistent concern about potential future events that may or may not materialize. Recent epidemiological data show a substantial increase in the prevalence of mental and behavioral disorders in this age group.

According to the National Survey of Children's Health, the prevalence of diagnosed mental conditions among American adolescents aged 12 to 17 years increased significantly, reaching more than 20% of the population in 2023, with anxiety being the most frequently reported condition (SAPPENFIELD et al., 2024). In parallel, the meta-analytic review by Racine et al. (2021), published in JAMA Pediatrics, identified a global 25.2% increase in anxiety symptoms in children and adolescents during and after the COVID-19 pandemic, consolidating the perspective that this phenomenon constitutes a public health emergency of global proportions.

Anticipatory thinking, in its adaptive form, is a fundamental cognitive process that allows predicting future scenarios, planning actions, and regulating emotions (KAMARUDZAMAN et al., 2026). However, when dysregulated, it transforms into pathological anticipatory anxiety. Adolescents

with maladaptive anticipatory thinking frequently report elevated levels of stress and depression, showing an inverse relationship between proficiency in future-oriented cognitive skills and mental well-being (KAMARUDZAMAN et al., 2026). Anticipatory anxiety differs from acute fear by its prospective orientation, keeping the individual in a state of prolonged hypervigilance with substantial cognitive and emotional costs.

The impact on adolescents' daily functioning is multifaceted. In the academic domain, a direct correlation between high anxiety levels and school disengagement is observed: adolescents with anxiety diagnoses are more likely to miss classes for health reasons, show concentration difficulties, and frequently experience drops in performance (SAPPENFIELD et al., 2024). Socially, these youth face obstacles in forming and maintaining interpersonal relationships, as well as greater vulnerability to bullying situations (SAPPENFIELD et al., 2024). Systematic screening for anxiety in children and adolescents, as recommended by the US Preventive Services Task Force based on a review published in JAMA (VISWANATHAN et al., 2022), reinforces the urgency of effective, accessible, and evidence-based therapeutic approaches.

Given this need, the present article proposes a systematic literature review following the PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) criteria. The central objective is to synthesize current knowledge on the neurobiological mechanisms of anticipatory anxiety, evaluate the impact on psychosocial functioning, and analyze the evidence on brief psychotherapeutic interventions and rapid emotional self-regulation techniques, with a view to supporting the development of digital and school-based intervention protocols.

Method

Protocol and Registration

This systematic review was conducted in accordance with the PRISMA guidelines (PAGE et al., 2021) and followed a pre-defined protocol. The study was not registered on a prospective platform

(PROSPERO), which constitutes one of the recognized methodological limitations.

Eligibility Criteria

Inclusion and exclusion criteria were defined according to the PICOS framework (Population, Intervention, Comparison, Outcome, and Study Type), as presented in Table 1.

Table 1 – Eligibility criteria according to PICOS framework

PICOS Component	Inclusion / Exclusion Criteria
Population (P)	Adolescents (10–19 years), of both sexes, with anticipatory anxiety or diagnosed or subclinical anxiety disorders. Excluded: adults (≥20 years) and children (<10 years).
Intervention (I)	Cognitive-Behavioral Therapy (CBT), Acceptance and Commitment Therapy (ACT), mindfulness, emotional self-regulation techniques (diaphragmatic breathing, self-compassion, cognitive reappraisal), digital interventions.
Comparison (C)	Waitlist control groups, usual care, or alternative active conditions. Studies without a comparator group were included when they were systematic reviews.
Outcome (O)	Reduction of anxiety symptoms, improvement in emotional regulation, psychological flexibility, social and academic functioning.
Study Type (S)	Randomized controlled trials (RCTs), systematic reviews and meta-analyses, neurobiological and epidemiological studies. Excluded: case reports, qualitative studies, publications in languages other than English, Portuguese, or Spanish, and articles prior to January 2021.

Information Sources and Search Strategy

The systematic search was conducted in PubMed/MEDLINE, PsycINFO, Web of Science, and Scopus databases, covering the period from January 2021 to April 2026. The search strategy combined controlled terms (MeSH/Thesaurus) and free terms, using the following descriptors and Boolean operators: (“anticipatory anxiety” OR “adolescent anxiety” OR “anxiety disorder” AND “adolescent”) AND (“emotion regulation” OR “self-regulation” OR “cognitive reappraisal” OR

"mindfulness" OR "acceptance and commitment therapy" OR "cognitive behavioral therapy") AND ("intervention" OR "treatment" OR "randomized controlled trial" OR "systematic review")

The reference lists of included articles were additionally consulted to identify relevant studies not captured by the electronic search (snowballing).

Selection Process — PRISMA Flowchart

Study selection followed the four phases of the PRISMA flowchart: (1) Identification, (2) Screening, (3) Eligibility, and (4) Inclusion. Two independent reviewers conducted the screening of titles and abstracts, with disagreements resolved by consensus or by a third reviewer. Figure 1 presents the selection flowchart.

Figure 1 – PRISMA Study Selection Flowchart

IDENTIFICATION — Records identified in databases (n = 1,847): PubMed (n = 643) | PsycINFO (n = 512) | Web of Science (n = 421) | Scopus (n = 271)
▼
SCREENING — Records after duplicate removal (n = 1,384). Screened by title and abstract → Excluded (n = 1,198): outside age range (n = 412), outside period (n = 287), irrelevant outcome (n = 317), ineligible language (n = 182)
▼
ELIGIBILITY — Full-text articles assessed (n = 186). Excluded after full reading (n = 166): no adequate control group (n = 48), exclusively adult clinical samples (n = 39), no emotional regulation measures (n = 44), insufficient methodological quality (n = 35)
▼
INCLUSION — Studies included in qualitative synthesis: n = 20

Methodological Quality Assessment

The quality of randomized clinical trials was assessed using the RoB 2 tool (Revised Cochrane Risk of Bias Tool for Randomized Trials). Systematic reviews were assessed with the AMSTAR-2

instrument (A MeaSurement Tool to Assess systematic Reviews). Observational neurobiological studies were assessed using the Newcastle-Ottawa scale. Risk of bias was classified as low, moderate, or high, and high-risk studies were maintained in the synthesis with appropriate interpretive caveats.

Neurobiological and Psychological Mechanisms of Anticipatory Anxiety

Asymmetric Maturation of the Adolescent Brain

Understanding anticipatory anxiety in adolescence requires in-depth analysis of the neurobiological transformations characteristic of this phase. The adolescent brain undergoes a process of asymmetric maturation, in which limbic structures, particularly the amygdala, develop more rapidly than prefrontal regions. The amygdala plays a central role in processing emotional stimuli and detecting threats, being hyperactivated in individuals with anxiety disorders (OHI, 2025).

Kenwood et al. (2022), in a review published in Neuropsychopharmacology, demonstrated that the prefrontal cortex, especially its ventromedial subdivision (vmPFC), is fundamental for fear extinction and top-down emotional regulation, but remains functionally immature during adolescence. This immaturity creates a window of neurobiological vulnerability to emotional dysregulation, in which amygdalar hyperactivity is not adequately modulated by cortical inhibitory mechanisms. During anticipatory anxiety episodes, the vmPFC frequently fails to modulate the amygdala's hyperactive response, perpetuating the cycle of chronic worry.

In a work published in Neuropsychopharmacology in 2025, Goodpaster et al. (2025) described that the maturational development of the medial prefrontal cortex (mPFC) is regulated by both genetic programs and activity-dependent processes, creating an extended window in which adverse experiences — including repetitive anticipatory stress — can permanently alter the developmental trajectory of prefrontal circuits, increasing the risk of anxiety disorders and depression in adult life.

HPA Axis and Neurotoxicity of Chronic Stress

The relationship between cortisol and the adolescent hippocampus is considerably more complex than a simple linear causal chain. Current literature critically distinguishes between acute and chronic cortisol exposure: punctual and transient elevations in glucocorticoids — such as those occurring in response to a delimited stressor — can, in fact, facilitate the consolidation of emotionally salient memories, a well-documented adaptive function (ROMEO, 2013). It is chronic, prolonged, and dysregulated cortisol exposure — typical of pathological anticipatory anxiety — that compromises hippocampal neuroplasticity. In this scenario of sustained HPA axis hyperstimulation, persistent activation of glucocorticoid receptors in the hippocampus suppresses neurogenesis in the dentate gyrus region, reduces dendritic spine density in CA1 and CA3 regions, and compromises long-term synaptic plasticity — negatively impacting the consolidation of new memories and learning. Furthermore, the magnitude of these effects critically depends on moderating variables underexplored in the adolescent population: the temporal window of exposure within the brain maturation period, the presence of genetic factors that modulate the density and sensitivity of glucocorticoid receptors, and the availability of social support and coping resources that buffer the HPA response. The study by Ohi (2025) mapped some of these genetic substrates, identifying polymorphisms in the serotonergic and dopaminergic systems that amplify amygdalar stress reactivity and increase susceptibility to anticipatory anxiety, signaling that neurobiological vulnerability to these effects is not uniform in the adolescent population.

Psychological Flexibility Deficits and Maladaptive Strategies

From a psychological perspective, anticipatory anxiety is closely linked to deficits in psychological flexibility. Acceptance and Commitment Therapy (ACT) posits that psychological inflexibility — characterized by cognitive fusion with negative thoughts about the future and

experiential avoidance of uncomfortable emotions — is a central mechanism in the maintenance of anxiety (PETERSEN; PIMENTEL, 2024). Anxious adolescents tend to fuse with anticipated catastrophic scenarios, treating them as imminent realities rather than passing mental events.

Maladaptive strategies, such as expressive suppression and rumination, are commonly used by anxious adolescents. Nguyen et al. (2025) demonstrated, in an Australian sample of adolescents, that self-compassion acts as a moderator of the relationship between emotional regulation strategies and anxiety symptoms: adolescents with higher self-compassion scores showed less impact of maladaptive strategies on mental well-being, suggesting that this dimension functions as a protective factor of significant clinical relevance.

Muris et al. (2024), in a review published in the Clinical Child and Family Psychology Review, identified strong associations between negative self-compassion (excessive self-criticism) and symptoms of anxiety and depression in young people, consolidating self-compassion as a priority therapeutic target in intervention protocols for adolescents.

Brief and Evidence-Based Psychotherapeutic Interventions

Cognitive-Behavioral Therapy (CBT)

Cognitive-Behavioral Therapy (CBT) remains the gold standard for treating juvenile anxiety. Brief interventions based on this approach focus on identifying and restructuring cognitive distortions related to future events, combined with gradual exposure techniques. Cognitive reappraisal, a core skill taught in these interventions, involves reformulating anxiogenic thoughts to alter their emotional impact, demonstrating significant negative prediction of anxiety and depression symptoms (NGUYEN et al., 2025).

Hudson et al. (2023), in a double-blind randomized clinical trial published in Psychological Medicine, investigated the combination of CBT with sertraline in anxious youth, demonstrating that CBT alone presents robust efficacy and that pharmacological addition did not produce statistically

significant incremental benefits, endorsing the primacy of psychotherapeutic interventions. Wickersham et al. (2022), in a meta-analysis published in the Journal of Medical Internet Research (JMIR), demonstrated that computerized CBT (cCBT) significantly reduces anxiety and depression symptoms in adolescents, with moderate to large effect sizes (d = 0.43–0.71), especially when some level of human support is associated.

Acceptance and Commitment Therapy (ACT)

ACT has gained prominence as a transdiagnostic effective intervention for adolescents. Unlike focusing on direct symptom reduction, it aims to increase psychological flexibility through six core processes: acceptance, cognitive defusion, present-moment awareness, self as context, values, and committed action (PETERSEN; PIMENTEL, 2024). Cognitive defusion is particularly useful in anticipatory anxiety, as it teaches adolescents to observe their worrying thoughts without becoming entangled in them.

Petersen and Pimentel (2024) documented that specific adaptations for youth — such as the DNAV model (Direction, Noticing, Opening Up, Values) — use accessible metaphors to teach these skills, promoting acceptance of uncomfortable internal experiences while encouraging actions based on personal values. Recent clinical trials indicate that ACT interventions of 8 to 12 sessions produce significant reductions in anticipatory anxiety and avoidance behaviors in adolescents, with maintenance of gains at 3 to 6 month follow-ups (PETERSEN; PIMENTEL, 2024).

Mindfulness-Based Interventions

Mindfulness-based interventions (MBIs) have demonstrated notable efficacy in managing anxiety in adolescents and young adults. Hue et al. (2025) conducted a systematic review on the application of Mindfulness-Based Stress Reduction (MBSR) in adolescents and young adults aged

13 to 26 years, published in the Asian Journal of Psychiatry, documenting significant reductions in anxiety levels, as well as improvements in emotional regulation and coping skills.

The practice of mindfulness acts directly on the mechanisms of anticipatory anxiety, training the individual to anchor their attention in the present moment, interrupting the cycle of rumination about the future. The proposed mechanisms of action include reduction of stress reactivity and increase of metacognitive awareness, which allows the adolescent to identify worrying thoughts as passing mental events without identifying with them (HUE et al., 2025). The review by Wright et al. (2023), published in the Journal of Youth and Adolescence, confirmed that digital mindfulness interventions show comparable effects to in-person interventions in adolescents aged 11 to 18, with the additional advantage of accessibility.

Self-Compassion as a Therapeutic Component

Self-compassion has emerged as a vital component in adolescents' emotional regulation. Nguyen et al. (2025) demonstrated that the compassionate response to oneself acts as a protective factor, negatively predicting anxiety, while the non-compassionate response acts as a risk factor. Tali et al. (2023), in a study published in the journal Children, compared adolescents with and without anxiety disorder, identifying significantly lower levels of self-compassion in the clinical group, with self-compassion explaining a substantive proportion of variance in anxiety scores.

The integration of self-compassion in brief protocols represents a promising frontier in adolescent clinical psychology: teaching youth to treat themselves with kindness and understanding during moments of anticipatory distress can potentiate the effects of other therapeutic interventions (MURIS et al., 2024).

Rapid Emotional Self-Regulation Techniques and Digital Applications

Diaphragmatic Breathing and Parasympathetic Activation

Diaphragmatic breathing, characterized by a slow and controlled rhythm involving diaphragm contraction, is a potent physiological technique. It stimulates the vagus nerve and activates the parasympathetic nervous system, counterbalancing the fight-or-flight response mediated by the sympathetic nervous system. Czub et al. (2024), in a study published in Stress & Health, investigated how respiratory rate and inhalation/exhalation ratio influence self-reported anxiety during a single slow diaphragmatic breathing exercise, finding that rates of 4–6 breaths per minute with prolonged exhalation ratio (1:2) produce more expressive reductions in state anxiety.

The application of focused breathing exercises can rapidly reduce heart rate and muscle tension, providing immediate somatic relief that facilitates subsequent cognitive regulation. These physiological effects make diaphragmatic breathing a first-line technique in emergency intervention protocols for adolescents in a state of anxious hyperactivation.

Cognitive and Sensory Anchoring Techniques

Rapid cognitive reframing, derived from cognitive reappraisal, is another crucial tool. It involves training the adolescent to quickly identify the catastrophic thought and replace it with a more balanced or realistic perspective. Sensory anchoring techniques, such as the five senses rule (5-4-3-2-1), help redirect attention from the feared future to concrete stimuli in the present environment. These adaptive distraction and anchoring strategies are highly effective for interrupting the escalation of anticipatory anxiety before it culminates in a panic attack or severe behavioral avoidance.

Digital Interventions: Access, Efficacy, and Personalization

The delivery of these techniques through digital platforms has revolutionized access to mental health support. Csirmaz et al. (2024) conducted a systematic meta-analysis demonstrating that digital CBT-based interventions are effective in reducing anxiety in children and adolescents, with significant and consistent effect sizes regardless of geographic context.

Walder et al. (2025), in a meta-analysis published in JMIR, specifically assessed digital interventions for social anxiety disorder in youth, identifying a significant effect (Hedges g = 0.508; 95% CI: 0.308–0.707) in favor of digital interventions over control conditions, involving 22 randomized clinical trials. Reynard et al. (2022) demonstrated that digital games with emotional regulation elements reduce negative emotional experience with a small but significant effect size in youth at risk for anxiety.

Ji et al. (2024), in a comprehensive meta-analysis published in European Psychiatry, assessed different modalities of digital interventions — including virtual reality, mobile apps, and internet-based interventions — for anxiety disorders, identifying that the level of human therapeutic involvement significantly moderates outcomes. Wright et al. (2023) corroborated that the most effective digital interventions incorporate gamification elements to maintain engagement, provide guided mindfulness and breathing exercises, and use algorithms to personalize coping strategies based on user-reported emotional state.

Ethical and Structural Considerations for Digital Interventions with Adolescents

The efficacy of digital tools does not exhaust the relevant issues for their responsible development. Four ethical and structural dimensions are especially critical when the target population are adolescents in emotional distress, and are consistently underrepresented in the reviewed literature.

Data privacy and protection of minors. Mental health applications collect sensitive health

data, behavioral patterns, and emotional information from users under 18 years of age, which imposes specific legal and ethical obligations beyond those applicable to adults. In Brazil, the General Data Protection Law (LGPD, Law No. 13,709/2018) establishes, in Article 14, that the processing of personal data of children and adolescents must be conducted with the specific and highlighted consent of at least one parent or legal guardian. At the international level, the European General Data Protection Regulation (GDPR) and the Children's Online Privacy Protection Act (COPPA) impose similar safeguards. Any digital tool for adolescent mental health must therefore adopt privacy by design architecture, minimize data collection to what is strictly necessary, clearly specify processing purposes, and establish auditable parental consent mechanisms.

Safety in acute crisis situations. A critical gap in the literature on mental health apps for adolescents concerns what happens when a user in acute emotional crisis — including suicidal ideation — accesses the tool and finds no human support available. The absence of robust crisis escalation protocols in digital tools represents a serious clinical risk and an ethical failure that cannot be minimized by scalability considerations. Responsible development of apps for this audience requires the prior definition of validated risk detection algorithms, immediate referral flows to support lines, and clear indications of the tool's limits of action when the level of distress exceeds the scope of self-sufficient digital support.

Risk of substituting professional care. The reviewed literature consistently frames digital interventions as complements — not substitutes — to specialized clinical care. However, the way these tools are positioned in the market and perceived by adolescents and families does not always reflect this distinction. In scenarios of limited access to mental health services — which characterize the reality of most Brazilian cities and low- and middle-income countries — there is a real risk that the app will be used as the only form of support by youth who would require professional follow-up.

Equity of access and digital inequality. A central paradox of digital mental health interventions is that the adolescents who would benefit most from the accessibility of digital tools are often those with the least access to them. In Brazil, IBGE data (2023) indicate that approximately 17% of young

people aged 10 to 17 do not have home internet access, with marked disparities by region, race, and income. Dependence on high-performance smartphones, stable connectivity, and digital literacy constitutes an equity barrier that must be considered in the design and efficacy assessment of these tools.

Integrated Brief Digital Intervention Protocol

The development of a brief digital intervention protocol for anticipatory anxiety should integrate a multifaceted approach: (1) physiological stabilization through diaphragmatic breathing techniques; (2) promotion of mindfulness for present-moment anchoring; (3) cognitive defusion to alter the young person's relationship with anxiogenic thoughts; and (4) cultivation of self-compassion to reframe the experience of suffering. This integrated model should be accompanied, from conception, by the ethical and structural safeguards described in the previous section — data privacy, crisis protocols, delimitation of scope of action, and equity of access — so that the scientific robustness of the protocol is inseparable from the ethical responsibility of its implementation.

Limitations of the Systematic Review

The present systematic review presents methodological limitations that should be considered in the interpretation and generalization of results:

• Absence of prospective registration: The protocol of this review was not previously registered in PROSPERO or equivalent platform, which limits transparency and the possibility of identifying deviations from the original plan.

• Methodological heterogeneity: The included studies present considerable heterogeneity regarding anxiety assessment instruments (GAD-7, SCARED, STAI, RCMAS), operational definitions

of anticipatory anxiety, and the number and duration of intervention sessions, which hampers direct comparison between studies and formal quantitative meta-analysis.

• Publication bias: Studies with positive results are more likely to be published. Despite efforts to include grey literature, publication bias risk cannot be excluded, which may inflate efficacy estimates.

• Underrepresentation of low- and middle-income countries: The vast majority of included studies come from high-income countries (USA, UK, Australia, European countries), which limits the generalization of findings to contexts of lesser resource availability and different cultural settings, including Brazil and other Latin American countries.

• Imprecise definition of anticipatory anxiety: Anticipatory anxiety as a specific construct does not have standardized diagnostic criteria in the DSM-5-TR or ICD-11, being frequently operationalized differently across studies.

• Limitation of long-term follow-ups: Most studies evaluate outcomes immediately after interventions or at follow-ups of up to 6 months, with a scarcity of data on the maintenance of therapeutic gains over the long term (12 months or more).

• Language exclusion: Restriction to articles published in English, Portuguese, and Spanish may have excluded relevant studies published in other languages, particularly in the Asian literature.

• Variability in samples: Included studies show significant variations in sample size (from N < 30 to N > 1,000), the exact age range within adolescence (10–19 years), and sex proportion.

• Self-report assessment: Most studies rely on self-report instruments for measuring anxiety and emotional regulation outcomes, which may be affected by social desirability biases.

• Absence of cost-effectiveness assessment: None of the included studies conducted formal cost-effectiveness analysis of the evaluated interventions.

Conclusion

Anticipatory anxiety represents a significant challenge for adolescent mental health, with profound impacts on neurobiological development, academic performance, and social functioning. The interaction between the immaturity of the prefrontal cortex and amygdala hyperactivity — supported by vast recent neurobiological literature (OHI, 2025; KENWOOD et al., 2022; GOODPASTER et al., 2025) — creates a vulnerability that is frequently exacerbated by deficits in psychological flexibility and the use of maladaptive emotional regulation strategies.

The present systematic review, conducted according to PRISMA criteria with analysis of 20 studies selected after a rigorous screening and eligibility process, demonstrates that brief psychotherapeutic interventions — grounded in CBT (WICKERSHAM et al., 2022; HUDSON et al., 2023), ACT (PETERSEN; PIMENTEL, 2024), and mindfulness practices (HUE et al., 2025; WRIGHT et al., 2023) — are highly effective in mitigating these symptoms. Digital interventions based on these approaches demonstrate moderate to large effect sizes and constitute an accessible alternative that overcomes traditional barriers of cost, stigma, and geographic availability of specialized services (CSIRMAZ et al., 2024; WALDER et al., 2025; REYNARD et al., 2022; JI et al., 2024).

The integration of rapid emotional self-regulation techniques — diaphragmatic breathing (CZUB et al., 2024), cognitive defusion (PETERSEN; PIMENTEL, 2024), cognitive reappraisal (NGUYEN et al., 2025), and self-compassion (TALI et al., 2023; MURIS et al., 2024) — constitutes an essential therapeutic framework for the immediate management of anticipatory anxiety. The development of evidence-based intervention protocols that combine the scientific rigor of neurophysiology and cognitive psychology with the accessibility of mobile technology is fundamental to equip the new generation with the necessary skills to navigate in a world characterized by uncertainty, promoting resilience and long-term psychological well-being.

Future investigations should prioritize randomized clinical trials with representative samples from low- and middle-income countries, long-term follow-up assessments, and cost-effectiveness

studies that support the implementation of school-based mental health public policies on a global scale.

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