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EMOTIONAL REGULATION INTERVENTIONS FOR CHILDREN AND YOUNG ADULTS: A COMPARATIVE ANALYSIS OF MINDFULNESS, MOVEMENT, AND CREATIVE MODALITIES

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ABSTRACT

This review examines the developmental and therapeutic significance of emotional regulation across childhood, adolescence, and young adulthood by comparing mindfulness-based, movement-based, and creative or expressive interventions. Using a structured narrative review approach, the study synthesizes developmental, neurobiological, contextual, and intervention-focused evidence drawn from diverse international settings, including African contexts, to evaluate mechanisms, outcomes, moderators, and implementation considerations. The findings indicate that emotional regulation is shaped by interacting cognitive, physiological, relational, cultural, and environmental processes that evolve across developmental stages. Mindfulness-based strategies primarily enhance attentional awareness, non-reactivity, and metacognitive control; movement-based approaches support physiological modulation, embodied awareness, behavioral activation, and social engagement; while creative modalities facilitate symbolic expression, emotional externalization, narrative processing, and relational connection. Across all three modalities, benefits extend beyond symptom reduction to emotional, behavioral, interpersonal, educational, and functional outcomes, although effectiveness varies according to age, developmental readiness, intervention intensity, cultural relevance, delivery context, participant preference, and practitioner competence. The review further identifies important limitations in the current evidence base, including methodological heterogeneity, inconsistent outcome measures, limited long-term follow-up, insufficient culturally validated instruments, and a lack of direct comparative trials. It concludes that no single modality is universally superior and that mechanism-informed, developmentally tailored, and culturally responsive multimodal approaches may offer the greatest practical value. Particular attention is warranted to accessibility, workforce preparation, family participation, and sustained transfer of regulatory skills into everyday life. Future research should prioritize adequately powered head-to-head trials, longitudinal follow-up, standardized yet culturally sensitive measurement, implementation science, and assessment of real-world functioning to strengthen the evidence base and guide scalable practice across schools, communities, families, and clinical settings.

Keywords: emotional regulation; mindfulness; movement interventions; creative modalities; child development; young adults.

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1. INTRODUCTION

1.1 Developmental Importance of Emotional Regulation

Emotional regulation is a developmental capacity through which children and young adults monitor, interpret, and modify emotional responses in ways that support goal-directed behaviour, interpersonal functioning, and psychological adaptation. Its importance lies not in suppressing emotion, but in developing flexible control over emotional intensity, expression, duration, and behavioural consequences. During early childhood, regulatory capacity is closely interwoven with broader self-regulatory systems, including attention, inhibitory control, executive functioning, and effortful control. These systems enable children to delay impulsive responses, redirect attention from emotionally salient stimuli, and select actions that are proportionate to situational demands. Consequently, emotional regulation becomes a developmental bridge between affective experience and competent behaviour, helping young people participate effectively in learning, relationships, and complex social environments (Gagne *et al.*, 2021).

The developmental course of emotional regulation is neither linear nor uniform. As children mature, they generally acquire larger repertoires of cognitive and behavioural strategies; however, adolescence introduces biological, cognitive, and social changes that can temporarily destabilise regulatory functioning. Evidence from children and adolescents aged 8–18 indicates a developmental shift during early to middle adolescence characterised by reduced use of adaptive strategies and increased reliance on maladaptive responses, illustrating why regulatory competence cannot be assumed to improve automatically with age (Cracco *et al.*, 2017). Adolescence therefore represents a period of vulnerability and an important window for intervention, because young people are simultaneously confronting stronger affective experiences, greater autonomy, peer evaluation, and demands for independent decision-making.

A developmental perspective also requires attention to the evolving complexity and contextual flexibility of regulation. Adolescents increasingly move beyond externally supported regulation toward deliberate strategies such as reappraisal, acceptance, attentional deployment, problem solving, and selective emotional expression. Yet the effectiveness of these strategies depends on age, context, emotional intensity, and available social support. Developmental evidence emphasises that adolescence should be understood as a period in which regulatory repertoires are reorganised rather than simply strengthened, with different strategies becoming more or less accessible as cognitive and socio-affective capacities mature (Fombouchet *et al.*, 2023). This plasticity provides a rationale for comparing mindfulness, movement, and creative modalities, because each may engage different pathways to awareness, physiological regulation, behavioural control, and emotional expression.

The mental-health significance of these capacities is substantial. Longitudinal evidence among young adolescents shows that patterns of emotion regulation are associated not only with psychological symptoms but also with social wellbeing, indicating that regulation contributes to functioning across intrapersonal and interpersonal domains (Chervonsky & Hunt, 2019). Meta-analytic evidence similarly demonstrates that adaptive strategies such as acceptance, problem solving, and reappraisal tend to relate to fewer depressive and anxiety symptoms, whereas avoidance, suppression, and rumination are associated with greater symptom burden (Schäfer *et al.*, 2017). Emotional regulation is therefore relevant to prevention as well as treatment: strengthening regulatory flexibility before entrenched maladaptive patterns emerge may support resilience, social competence, and healthier responses to developmental stressors.

Developmental regulation must be interpreted within cultural and socioeconomic environments. Cross-cultural evidence indicates that the relationship between particular emotion-regulation strategies and mental health varies across cultural contexts, challenging universal assumptions about which strategies are invariably adaptive or maladaptive (Chen *et al.*, 2025). This is especially pertinent in low-resource settings, where exposure to chronic stress, constrained services, family adversity, and unequal educational opportunities may influence both emotional demands and available regulatory supports. Among older adolescents from low-income communities in South Africa, difficulties in emotion regulation were significantly associated with depression, anxiety, post-traumatic stress symptoms, risky alcohol use, gender, and self-esteem, underscoring the interaction between regulatory capacity and contextual vulnerability (Ward-Smith *et al.*, 2024). Evidence from Nigeria further reinforces the developmental relevance of self-regulatory capacities within African adolescent populations. In a study of secondary-school adolescents in Oyo State, effortful control and parenting styles were associated with mental health, with effortful control making a positive contribution to adolescents' psychological functioning (Oyarekua & Sabboh, 2021). Such findings position emotional regulation as a developmental competence shaped by both individual capacities and relational environments. For a comparative analysis of mindfulness, movement, and creative modalities, this perspective is essential: interventions should be evaluated not merely by symptom reduction, but by their capacity to strengthen flexible, age-appropriate, culturally responsive regulation across childhood, adolescence, and the transition into young adulthood.

1.2 Dysregulation Across Childhood and Young Adulthood

Emotional dysregulation describes difficulty in identifying, modulating, and expressing affect in ways that remain proportionate to contextual demands. Across development, its presentation changes as cognitive control, social expectations, autonomy, and exposure to stress become more complex. In childhood, dysregulation may appear through intense affective reactivity, poor recovery from frustration, impulsive behaviour, or difficulty shifting attention away from emotionally salient events. Longitudinal evidence from the United Kingdom indicates that dysregulation evident at age seven can prospectively contribute to internalising difficulties across adolescence, highlighting early regulatory problems as developmentally consequential rather than transient features of immaturity (Murray *et al.*, 2025).

The meaning and expression of dysregulation are culturally situated. Comparative research involving children from Ghana, Kenya, and the United States demonstrates cross-national and within-country variation in how anger and sadness are managed, indicating that developmental expectations for emotional control are shaped by socialisation practices, ecological conditions, and culturally patterned display rules (Morelen *et al.*, 2012). Such variability is important when evaluating mindfulness, movement, and creative modalities because intervention targets and acceptable forms of emotional expression may differ across communities.

During adolescence, dysregulation increasingly intersects with peer influence, self-concept, family resources, and behavioural risk. Nigerian evidence from junior secondary schools in Delta State found that parental socioeconomic status, peer influence, and self-esteem were significantly associated with juvenile delinquency, illustrating how behavioural difficulties emerge within interacting psychological and social conditions rather than from intrapersonal processes alone (Balogun & Sabboh, 2021). This developmental period therefore requires interventions capable of addressing emotional processes without separating them from the relational environments in which regulation succeeds or fails.

By young adulthood, dysregulation may be expressed less through overt behavioural volatility and more through persistent distress, disengagement, maladaptive coping, or impaired functioning across educational and interpersonal domains. Among Nigerian undergraduates, teaching styles and parental bonding significantly predicted academic boredom, demonstrating that emotional disengagement in emerging adulthood remains sensitive to instructional and familial relationships (Sabboh & Olugbade, 2021). These findings broaden dysregulation beyond clinical symptomatology to include affective states that undermine participation, motivation, and adaptive functioning.

Evidence from Italian emerging adults further suggests that emotion dysregulation is connected with psychological symptoms during periods of heightened uncertainty and developmental transition, while mentalizing processes may influence how distress is interpreted and managed (Charpentier Mora *et al.*, 2024). Accordingly, dysregulation across childhood, adolescence, and young adulthood is best understood as a shifting developmental phenomenon shaped by maturation, context, relationships, and stress exposure. This perspective supports age-sensitive comparison of mindfulness, movement, and creative interventions according to the regulatory demands characteristic of each developmental stage.

1.3 Review Scope, Objectives, and Comparative Approach

This review examines emotional regulation interventions for children, adolescents, and young adults, with particular emphasis on three broad therapeutic and developmental modalities: mindfulness-based practices, movement-oriented approaches, and creative or expressive interventions. The scope is intentionally comparative, recognizing that these modalities engage different regulatory pathways while often pursuing overlapping outcomes such as improved emotional awareness, reduced reactivity, stronger coping capacity, enhanced behavioral control, and better psychosocial functioning.

The review aims to clarify how each modality conceptualizes and targets emotional regulation across developmental stages, while also considering the influence of age, context, individual differences, and implementation setting. Mindfulness approaches are considered in relation to attentional control, present-moment awareness, and non-reactive engagement with emotional experience. Movement-based interventions are assessed for their capacity to influence physiological arousal, embodied awareness, stress regulation, and behavioral activation. Creative modalities are examined through their use of symbolic expression, imagination, narrative, art, music, drama, and other non-verbal or semi-verbal processes that may facilitate emotional processing and communication.

The comparative approach does not assume that one modality is universally superior. Instead, it evaluates relative strengths, limitations, mechanisms, developmental suitability, accessibility, and potential for integration. Attention is also directed toward differences in intervention intensity, delivery format, cultural responsiveness, practitioner requirements, and feasibility across schools, community programs, clinical services, and family-based settings. By organizing the literature around these dimensions, the review seeks to identify convergent findings, important distinctions, evidence gaps, and areas where multimodal intervention design may offer added value for supporting emotional regulation across childhood and young adulthood. Particular emphasis is placed on whether benefits generalize beyond immediate intervention sessions to everyday emotional functioning, relationships, educational participation, resilience, and adaptive responses to stress during transitions between major developmental periods and contexts.

2. FOUNDATIONS OF EMOTIONAL REGULATION INTERVENTIONS

2.1 Developmental Models of Emotion Regulation

Developmental models of emotion regulation conceptualise regulatory competence as an evolving system rather than a fixed psychological trait. Across childhood and adolescence, regulation emerges through interactions among temperament, cognitive maturation, social learning, attachment, and environmental demands. An influential account is the tripartite family model, which proposes that children acquire regulatory patterns through observation of caregivers, emotion-related parenting practices, and the emotional climate of family life. This framework is important for intervention research because it locates regulation within relationships and developmental contexts rather than treating emotional control as an intrapersonal skill (Morris *et al.*, 2007).

Developmental change also involves shifts in the strategies available to young people and in the situations for which particular strategies are effective. Evidence spanning early adolescence, emerging adulthood, and middle adulthood indicates that regulation varies by age, gender, and emotion, challenging models that portray development as a simple progression toward increasingly adaptive control. Instead, regulatory repertoires become differentiated as individuals encounter changing social roles, emotional demands, and capacities for reflection (Zimmermann & Iwanski, 2014). This perspective is especially relevant when comparing mindfulness, movement, and creative modalities, because each may engage regulatory capacities differently at successive developmental stages.

Cognitive models further emphasise that strategies such as reappraisal depend on developing capacities to reinterpret emotional events, hold alternative meanings in mind, and modify responses before they become behaviourally dominant. A systematic review of cognitive reappraisal from early childhood through adolescence demonstrates substantial developmental variation in both implementation and effectiveness, indicating that interventions requiring complex cognitive reframing should be calibrated to developmental capability rather than chronological age (Willner *et al.*, 2022).

More recent person-centred models extend this argument by conceptualising regulation as a repertoire of interacting strategies instead of isolated techniques. Longitudinal evidence from Dutch youth transitioning from childhood into adolescence identified stable cognitive-regulation profiles alongside meaningful movement between more and less adaptive patterns. Such findings indicate that developmental models should accommodate both continuity and change, while recognising that regulatory flexibility may depend on the configuration of strategies available to the individual (Karreman *et al.*, 2025).

Development is also inseparable from culture and adversity. Research embedded in a South African birth cohort illustrates a neurodevelopmental approach that integrates longitudinal developmental histories, behaviour, caregiver reports, and neuroimaging to investigate resilient emotion regulation among adolescents exposed to adversity. This framework broadens dominant models by emphasising how regulatory development is shaped by cumulative environmental conditions and culturally situated experiences, particularly in populations underrepresented in developmental neuroscience (Yates *et al.*, 2025).

Within Nigerian adolescent contexts, psychosocial processes similarly illuminate how self-regulation is embedded in social and moral development. Evidence linking psychosocial factors with moral disengagement among in-school adolescents suggests that regulatory development intersects with social cognition, peer environments, and behavioural standards, all of which may influence how young people interpret and manage emotionally charged situations (Sabbah, 2021).

Self-evaluative development provides an additional layer. The development and validation of a revised self-esteem measure for Nigerian adolescents and youths highlights the importance of culturally appropriate assessment when examining psychological constructs that interact with emotional functioning across developmental stages (Sabbah, 2022). Taken together, developmental models suggest that emotional regulation reflects coordinated maturation across cognitive, relational, embodied, and contextual systems. For comparative intervention analysis, this supports evaluating mindfulness as an attentional and awareness pathway, movement as an embodied and arousal-regulation pathway, and creative modalities as expressive and meaning-making pathways, while recognising that their effectiveness may vary according to developmental readiness, regulatory profile, social ecology, and cultural context.

2.2 Neurobiological Mechanisms Supporting Self-Regulation

Self-regulation is supported by neurobiological systems that allow young people to detect emotionally salient information, regulate physiological arousal, inhibit impulsive responses, and select behaviour consistent with longer-term goals. During childhood and adolescence, these capacities depend on interactions between prefrontal, parietal, temporal, limbic, and subcortical networks rather than on any single brain region. Meta-analytic evidence indicates that explicit emotion regulation in adolescents and emerging adults recruits frontal, temporal, and parietal regions, whereas emotion reactivity and implicit regulation engage the amygdala and posterior temporal areas, illustrating the interplay between top-down control and bottom-up affective processing (Pozzi *et al.*, 2021).

Electrophysiological evidence demonstrates that regulatory strategies are reflected in patterns of cortical activity. Among Chinese adolescents, habitual cognitive reappraisal was associated with left frontal EEG asymmetry during real-time enhancement or reduction of negative emotion, suggesting that use of adaptive strategies may influence how frontal systems are recruited during emotionally demanding situations (Yang *et al.*, 2021). Such findings provide a neurocognitive basis for interventions that practise attentional redirection, reframing, and controlled emotional engagement.

Mindfulness may operate partly through coordination among large-scale neural networks. Functional neuroimaging of children and adolescents showed that trait mindfulness was associated with dynamic transitions among brain states and state-specific differences in connectivity between salience/emotion and central executive networks. These patterns suggest that flexible switching between internally and externally oriented processing may support adaptive regulation rather than rigid control of emotional experience (Marusak *et al.*, 2018).

Autonomic regulation is another pathway. In Nigerian adolescents, lower socioeconomic status was associated with lower resting heart-rate variability, a peripheral index interpreted as reflecting reduced autonomic flexibility under chronic stress exposure. This finding is important for movement and embodied approaches because regulatory functioning involves physiological as well as cognitive processes, particularly where environmental adversity repeatedly activates stress systems (Egbuniwe *et al.*, 2025).

However, biological indicators should not be treated as universal proxies for self-regulatory competence. A cross-national study involving adolescents in Colombia, Nepal, and South Africa found no consistent association between resting heart-rate variability and self-regulation or psychopathology, underscoring developmental, contextual, and measurement considerations (Sinichi *et al.*, 2025). Accordingly, mindfulness, movement, and creative modalities are best

conceptualised as potentially engaging overlapping neural, autonomic, attentional, and embodied mechanisms whose expression substantially varies across individuals and environments.

2.3 Contextual Influences on Regulatory Capacity

Emotional regulation develops within social ecologies that continually shape how children and young adults interpret, express, and manage affect. Family socioeconomic conditions, household organisation, and relational climate can either strengthen or constrain regulatory development by altering exposure to stress and access to supportive co-regulation. Longitudinal evidence among adolescents in the United States shows that socioeconomic risk influences regulatory growth partly through the family emotional context, including parental regulation, parenting practices, and parent–adolescent relationship quality (Herd *et al.*, 2020).

School and peer environments become increasingly influential during adolescence, when belonging, evaluation, and social comparison assume greater developmental salience. Nigerian evidence from secondary-school students in Ibadan demonstrates that school climate, self-efficacy, social-media exposure, and peer pressure are significantly associated with aggressive behaviour, underscoring how regulation-related behaviour is embedded within intersecting institutional and interpersonal influences rather than determined solely by individual disposition (Sabbah & Alausa, 2021).

Family participation also shapes adolescents' capacity to navigate consequential decisions and psychosocial demands. Among secondary-school students in Oyo State, parental involvement was positively associated with career decision-making, illustrating the broader developmental importance of structured guidance, communication, and relational support during periods requiring increasing autonomy (Ezeani *et al.*, 2023). For emotional-regulation interventions, such evidence supports attention to whether families reinforce, model, or inadvertently undermine skills acquired through mindfulness, movement, or creative practices.

Cultural context further determines which regulatory strategies are encouraged, acceptable, or effective. A cross-national study involving adolescents from Argentina, Ghana, India, and Zambia identified meaningful differences in cognitive reappraisal, expressive suppression, and perceived parent–child relationship patterns, demonstrating that regulation cannot be interpreted independently of cultural norms concerning autonomy, connectedness, and emotional expression (Hapunda *et al.*, 2019).

Similarly, research with early adolescents in urban India found that maternal socialisation goals and responses to children's anger and sadness were linked with children's emotion regulation and socioemotional functioning, highlighting how culturally situated parental practices organise emotional learning (Raval *et al.*, 2014). These contextual influences have direct implications for comparative intervention design. Mindfulness may require adaptation to culturally preferred forms of attention and emotional disclosure; movement approaches may depend on setting, safety, and social participation; and creative modalities may gain effectiveness when symbols, narratives, and expressive practices reflect participants' lived environments across home, school, clinical, and community settings over time.

2.4 Principles of Multimodal Intervention Design

Multimodal intervention design for emotional regulation should be guided by functional complementarity rather than the accumulation of techniques. Mindfulness, movement, and creative modalities engage distinct regulatory processes, including attentional control, physiological modulation, symbolic expression, and cognitive reframing. Evidence from a meta-

analysis of adolescent psychosocial interventions indicates that programmes targeting emotion regulation can improve regulatory outcomes, but effects vary according to intervention content, delivery characteristics, and participant needs. This supports designing multimodal programmes around specified mechanisms and developmentally appropriate targets rather than assuming that intervention complexity automatically produces greater benefit (Eadeh *et al.*, 2021).

A second principle is transdiagnostic coherence. Components should address shared processes underlying emotional difficulties while remaining flexible for heterogeneous presentations. A school-based adaptation of the Unified Protocol for adolescents illustrates how cognitive, behavioural, and emotion-focused strategies can be integrated within a single framework addressing overlapping anxiety and depressive processes. Such architecture is relevant to combining mindfulness, movement, and creative activities because each component can be organised around common regulatory goals while preserving distinct modes of engagement (García-Escalera *et al.*, 2020).

Contextual fit is equally essential. In Kenya, the Shamiri intervention combined growth mindset, gratitude, and value affirmation within a brief, lay-provider-delivered school programme and produced reductions in adolescent depression and anxiety symptoms. Its design demonstrates the value of low-cost delivery, culturally responsive framing, group accessibility, and intervention elements implemented without relying exclusively on specialist clinicians (Osborn *et al.*, 2021).

Implementation within educational systems also requires attention to mental-health literacy, stakeholder participation, and feasibility. A Nigerian school-based programme involving students and teachers improved knowledge, attitudes, and confidence concerning depression, illustrating how embedding intervention activity within existing school structures can strengthen reach and create supportive environments for recognising emotional difficulties and accessing assistance (Atilola *et al.*, 2022).

Finally, multimodal programmes benefit from coordinated professional roles when participants present complex or overlapping needs. Evidence on multidisciplinary collaboration demonstrates that communication, complementary expertise, and coordinated decision-making can improve care processes and outcomes, providing a service-design rationale for integrating psychological, behavioural, expressive, and activity-based inputs rather than delivering them as disconnected practices (Ohunyon *et al.*, 2023). Accordingly, strong multimodal design requires mechanism-based selection, developmental tailoring, cultural adaptation, feasible delivery, coordinated implementation, and outcome measurement capable of identifying modality-specific and shared regulatory effects.

3. COMPARING MINDFULNESS, MOVEMENT, AND CREATIVE MODALITIES

3.1 Mindfulness-Based Regulation Strategies

Mindfulness-based regulation strategies cultivate attention to present-moment experience while reducing automatic reactions to thoughts, sensations, and affective cues. This is developmentally relevant because children and young adults are still consolidating attentional control, metacognition, inhibition, and flexible responses to stress. Mindfulness practices use breath awareness, body scanning, sensory attention, and non-reactive observation to create space between emotional activation and behavioural response. A meta-analysis of preadolescent interventions found significant benefits across attention, emotional and behavioural regulation, positive self-appraisal, and social competence, indicating that mindfulness can support interdependent domains of self-regulation in middle childhood (Kander *et al.*, 2024).

School-based delivery embeds repeated practice within environments where emotional demands, peer interactions, and performance pressures naturally occur. Evidence synthesising interventions for children aged 7–12 years shows improvements in emotional awareness, positive emotion, and depressive symptoms, although effects varied by age, programme duration, and delivery format. These findings imply that mindfulness should not be implemented uniformly across childhood; exercises, session length, language, and expectations for introspection require developmental calibration, especially where younger participants have limited metacognitive vocabulary (Pickerell *et al.*, 2023).

Across child and adolescent populations, effectiveness remains promising but heterogeneous. An updated meta-analysis of randomised trials reported benefits for several cognitive and psychosocial outcomes, yet effects were generally modest and varied according to study quality and comparator conditions. This cautions against presenting mindfulness as a stand-alone solution for emotional dysregulation. Its strongest role may be as a structured skill that enhances awareness and response flexibility alongside relational, behavioural, educational, or clinical supports for complex needs (Dunning *et al.*, 2022).

Adolescent evidence also shows that outcomes are not uniformly positive. In a Swiss randomised trial involving young adolescents, an eight-week mindfulness intervention did not significantly alter self-reported stress, anxiety, depressive symptoms, affect, or emotion-regulation strategies. These findings suggest that baseline symptom severity, developmental readiness, intervention dose, practice adherence, and measurement sensitivity may determine whether mindfulness training produces observable regulatory change (Piguet *et al.*, 2025).

By contrast, research among adolescents exposed to chronic stressors in the United States indicates that mindfulness training can improve momentary mindfulness and aspects of emotion regulation under everyday stress. Ecological momentary assessment captures regulation as it unfolds outside intervention sessions, strengthening the argument that mindfulness should be evaluated by its capacity to alter real-time responses to emotionally demanding situations rather than through retrospective questionnaires (Miller-Chagnon *et al.*, 2024).

The strategy remains relevant in young adulthood, when regulatory demands involve academic performance, autonomy, and relationships. In China, a mindfulness-based emotion-management programme for college students improved emotional regulation and resilience, suggesting that structured mindfulness can support modulation of difficult affect and adaptive recovery from stress. For comparative analysis, this positions mindfulness as an attentional and metacognitive modality, distinguishable from the embodied activation of movement interventions and symbolic externalisation characteristic of creative approaches (Zhang *et al.*, 2022).

African evidence further supports contextual adaptation. Among vocational education students at Nigerian universities, mindfulness-based stress reduction was examined alongside cognitive-behavioural therapy for test anxiety and academic achievement, demonstrating the feasibility of contemplative practice within tertiary education. The findings support incorporating mindfulness into student-focused programmes while recognising that implementation should reflect local academic pressures, available personnel and culturally intelligible explanations of contemplative exercises rather than reproducing protocols without adaptation (Nwadi *et al.*, 2025).

Context also shapes how dispositional mindfulness relates to wellbeing when formal intervention is absent. Among Ghanaian college students, mindfulness and ego resilience were negatively associated with anxiety and depression amid academic stress, indicating that mindful awareness may function as a protective resource during educational transitions. Such evidence reinforces the need to judge mindfulness-based strategies through culturally responsive outcomes,

developmental appropriateness, practice engagement, accessibility, and transfer into daily functioning, while avoiding assumptions that identical techniques will produce equivalent effects across populations and settings (Cole *et al.*, 2015).

3.2 Movement-Based Regulation Strategies

Movement-based regulation strategies conceptualise emotional functioning as embodied, recognising that arousal, posture, breathing, rhythm, motor coordination, and social movement can influence how young people experience and modulate affect. Unlike approaches that depend on verbal reflection, movement interventions provide regulatory practice through bodily engagement, making them relevant for children and adolescents who may have limited capacity to articulate internal states. Meta-analytic evidence indicates that physical exercise can reduce depression, anxiety, and stress among adolescents, with effects varying according to exercise type, frequency, duration, and participant characteristics, supporting prescription rather than undifferentiated activity (Wang *et al.*, 2024).

Dance-based approaches extend these mechanisms by combining physical activation with rhythm, expression, interpersonal synchrony, and opportunities for non-verbal meaning-making. In Sweden, a randomized controlled intervention for adolescent girls with internalizing difficulties found that dance participation reduced somatic symptoms and emotional distress, suggesting that enjoyable, non-competitive movement may provide an accessible route to affective regulation and embodied self-confidence (Duberg *et al.*, 2020).

For children, dance movement psychotherapy may support emotional recognition and behavioural organisation through structured play, mirroring, improvisation, and relational attunement. A United Kingdom school-based pilot involving children aged seven to nine reported improvements in wellbeing, life functioning, sleep, and emotional and behavioural difficulties, while demonstrating the feasibility of delivering movement psychotherapy within educational settings (Moula *et al.*, 2022).

African evidence reinforces the need for contextual and trauma-sensitive design. Among Nigerian schoolchildren with abduction experiences, an interactive media-based study comparing dance and art therapy found that both approaches reduced post-traumatic symptoms, with dance offering an embodied channel through which distress could be processed without exclusive reliance on verbal disclosure. Such evidence is pertinent where traumatic experience may disrupt bodily safety, arousal regulation, and emotional communication (Ezeh *et al.*, 2023).

Contextual adaptation is important for adolescents living under socioeconomic adversity. In South Africa, a co-adapted emotion-regulation programme incorporating physical activity was perceived as feasible and acceptable among older adolescents from low-income schools, with participants describing benefits related to learning, mental health, and engagement. The programme illustrates how movement can be embedded within broader regulatory skills rather than treated as an isolated exercise prescription (Ward-Smith *et al.*, 2025). Across modalities, movement-based strategies operate through physiological regulation, embodied awareness, expressive release, mastery, and social connection. Their comparative value lies in offering an active regulatory pathway that may complement mindfulness-based attentional training and creative approaches centred on symbolic expression.

3.3 Creative and Expressive Regulation Strategies

Creative and expressive regulation strategies use artistic processes to externalise, organise, and transform emotional experience when verbal explanation is difficult or developmentally limited.

Drawing, painting, music, drama, storytelling, and mixed-media activities can create psychological distance from distress while enabling young people to represent affect symbolically. A systematic review of art therapy for children and adolescents identified art-making, sensory engagement, and the therapeutic relationship as mechanisms through which emotions may become observable, tolerable, and communicable, supporting regulation without requiring immediate verbal disclosure (Bosgraaf *et al.*, 2020).

Drama-based approaches extend this process through role, enactment, metaphor, improvisation, and perspective-taking. These techniques permit children to rehearse alternative responses, explore difficult experiences indirectly, and experiment with agency within a contained therapeutic space. Evidence synthesised across dramatherapy studies suggests potential benefits for emotional distress and psychosocial functioning, although methodological heterogeneity and small samples continue to limit certainty regarding comparative effectiveness (Keiller *et al.*, 2023).

Creative interventions may be particularly valuable for young people affected by displacement, trauma, or linguistic barriers. In Australia, a school-based creative arts programme for adolescents from refugee backgrounds produced reductions in emotional symptoms and behavioural difficulties, demonstrating how music, image-making, and creative expression can provide accessible channels for processing complex experiences while strengthening participation and relational safety (Quinlan *et al.*, 2016).

Nigerian evidence further demonstrates the relevance of culturally and technologically adaptable creative modalities. Among adolescents who had survived abduction, interactive audio-visual art and music therapies reduced post-traumatic stress symptoms, indicating that structured creative engagement can support emotional processing even where conventional specialist services may be difficult to access. The comparative findings also suggest that different expressive forms may not be interchangeable, reinforcing the need to match modality, participant preference, symptom profile, and delivery context (Iyendo *et al.*, 2024).

Mechanistic evidence from South Africa similarly highlights the importance of narrative, embodiment, and collective expression. An arts-based intervention for pregnant and parenting adolescents exposed to violence enabled participants to articulate previously difficult experiences, develop self-awareness, imagine positive futures, and experience mutual care within the group process (Woollett *et al.*, 2025). Within the wider comparison of regulation strategies, creative modalities therefore offer a distinctive pathway centred on symbolic communication, emotional externalisation, narrative reconstruction, relational witnessing, and imaginative experimentation. Their effectiveness is likely to depend on developmental readiness, cultural meaning, facilitator competence, psychological safety, accessibility, and whether creative gains transfer into everyday emotional functioning.

4. COMPARATIVE OUTCOMES AND MODERATING FACTORS

4.1 Emotional, Behavioral, and Functional Outcomes

Emotional-regulation interventions should be judged across emotional, behavioral, and functional domains because symptom relief alone does not establish developmental benefit. Emotional outcomes encompass changes in anxiety, depressive affect, stress, emotional awareness, reactivity, and recovery from distress. Behavioral outcomes concern observable self-control, conduct, interpersonal responsiveness, and engagement, while functional outcomes include participation in education, relationships, daily responsibilities and adaptive coping. This multidimensional perspective is supported by a meta-analysis of universal school-based social and emotional learning programmes, which found improvements in social-emotional skills, behavior, peer

relationships, school functioning, and academic achievement, demonstrating that effects can extend beyond internal emotional states (Cipriano *et al.*, 2023).

Mindfulness-based strategies primarily target emotional awareness, non-reactivity, and flexible response selection. Their benefits should therefore be assessed through reductions in dysregulated affect and improvements in deliberate regulation. A systematic review and meta-analysis of mindfulness-based emotion-regulation strategies found evidence that mindful acceptance can reduce emotional intensity and that mindful monitoring may influence subsequent regulatory processes, although effects vary by implementation and context. These findings indicate that mindfulness outcomes are best interpreted as changes in regulatory process rather than simple relaxation effects, particularly when evaluating adolescents and young adults across developmental contexts (Rough *et al.*, 2024).

Movement-based interventions provide a different route to adaptation by combining physiological activation, embodied regulation, competence, and social participation. An umbrella review of meta-analyses involving children and adolescents reported beneficial effects of physical-activity interventions across psychosocial outcomes, including depression, anxiety, self-esteem, and quality of life. These effects suggest that movement may influence emotional states and broader functioning, although heterogeneity in intervention type, participant characteristics, and programme dose limits claims that all forms of activity are equivalently effective (Purgato *et al.*, 2024).

Creative modalities similarly produce outcomes extending beyond immediate emotional expression. Meta-analytic evidence on art therapy for children and adolescents indicates significant reductions in anxiety, while heterogeneity highlights population, delivery method, and therapeutic structure. Creative interventions may be valuable when emotional improvement depends on externalising difficult-to-verbalise experiences, but outcome assessment should distinguish temporary expressive relief from sustained changes in regulation and everyday functioning (Zhang *et al.*, 2024).

Outcome evaluation must also account for geographical and service context. A systematic review of randomized school-based psychological interventions for adolescents in sub-Saharan Africa found reductions in depression, anxiety, and post-traumatic stress symptoms across multiple studies, while substantial heterogeneity in intervention content and delivery precluded simple pooling. This evidence emphasizes that emotional outcomes cannot be detached from implementation conditions, accessibility, cultural adaptation, and the realities of resource-constrained services (Tareke *et al.*, 2023).

African evidence demonstrates the importance of evaluating regulatory change within services. A South African proof-of-concept programme integrating emotional awareness, mindfulness, cognitive restructuring, interpersonal effectiveness, self-care, and goal setting produced improvements in depression, anxiety, and emotion regulation among adolescents, with gains sustained at three-month follow-up. Parental observations of improved empathy and self-awareness further indicate that clinically measured emotional changes may be accompanied by interpersonal and behavioral effects observable outside treatment sessions (Randeree *et al.*, 2025). Functional adaptation is important in young adulthood. Among undergraduates in Ibadan, Nigeria, academic buoyancy was examined in relation to self-efficacy and social support, placing adaptive recovery from routine academic setbacks within a broader psychosocial framework. Although not an intervention trial, this evidence is useful for defining meaningful functional endpoints: regulation-oriented programmes should help young people persist through ordinary challenges, maintain participation, mobilise support, and preserve goal-directed functioning rather than merely

report fewer negative emotions (Yusuf *et al.*, 2023). Across mindfulness, movement, and creative modalities, comparative effectiveness should therefore be evaluated through converging emotional, behavioral, relational, educational, and daily-functioning outcomes, with attention to durability, developmental relevance, and transfer beyond the intervention setting over time.

4.2 Age, Context, and Individual Differences

Age, context, and individual differences are central to interpreting emotional-regulation interventions because regulatory capacities change across development. Early adolescents are negotiating rapid cognitive, social, and biological transitions while still depending heavily on external structure and co-regulation. A meta-analysis of self-regulation interventions for 10–15-year-olds found that effects differed according to intervention approach and outcome domain, indicating that developmental fit is a substantive determinant of whether programmes produce measurable benefit (Murray *et al.*, 2022).

Individual characteristics further shape how young people engage with intervention. A meta-analysis of cognitive and behavioural treatments for youth anxiety identified age-related variation in some preventive and treatment effects, while evidence for baseline anxiety and several other moderators remained inconsistent. Such findings caution against assuming uniform responsiveness and support evaluation of mindfulness, movement, and creative modalities according to developmental readiness, symptom profile, preference, and mode of engagement (Zhou *et al.*, 2025).

Contextual conditions may be especially influential in resource-constrained settings. A rapid review of youth mental-health interventions in Southern Africa emphasized involving young people in programme design, addressing social determinants, and using flexible, multimodal delivery mechanisms. These principles are relevant to regulation-focused interventions because accessibility, cultural meaning, family support, and service infrastructure can determine whether a theoretically effective technique is usable in everyday life (Coetzer *et al.*, 2022).

Nigerian evidence similarly demonstrates that individual functioning is embedded in socioeconomic and interpersonal environments. Among undergraduates in Oyo State, peer approval seeking, socioeconomic status, and locus of control were associated with academic self-handicapping, illustrating how personal agency and social pressures may shape coping and behavioural regulation in emerging adulthood (Sabbah & Ojo, 2023).

For younger adolescents, vulnerability may also reflect caregiving quality and surrounding psychosocial conditions. Research among junior secondary students in Kaduna found that parental socioeconomic status and parenting styles significantly predicted child abuse experiences, highlighting the importance of adversity and family context when interpreting regulatory needs (Sabbah & Yusuf, 2021). Comparative intervention design should therefore avoid treating age or modality as isolated predictors; responsiveness is more plausibly produced by interactions among developmental capacity, environment, cultural expectations, adversity, motivation, and opportunities to consistently practise regulatory skills across daily settings.

5. INTEGRATION, EVIDENCE GAPS, AND FUTURE DIRECTIONS

5.1 Practice Recommendations and Research Priorities

Practice recommendations for emotional-regulation interventions should move beyond selecting a preferred modality and instead emphasise developmentally calibrated and context-sensitive care. Mindfulness, movement, and creative approaches should be matched to the child or young adult's regulatory profile, developmental capacity, preferences, communication style, and service

environment. Evidence indicates that psychosocial interventions produce small-to-moderate improvements in emotion regulation across children and youth, but effects vary across intervention types and outcome measures. Practice should therefore prioritise clear treatment targets, monitoring, and flexible strategy combinations rather than assuming that any single modality is universally effective (Espenes *et al.*, 2025).

Clinical and educational programmes should also distinguish between transdiagnostic regulatory processes and disorder-specific needs. Emotion dysregulation cuts across multiple forms of psychological difficulty, yet the evidence base remains heterogeneous in intervention content, populations, mechanisms, and methodological quality. Practitioners should use mindfulness, movement, or creative techniques as components of coherent formulations in which the intended regulatory mechanism is specified, monitored, and revised when necessary, rather than as generic wellness activities. Comparative research should similarly test which mechanisms account for improvement and identify whether specific approaches are more beneficial for developmental or clinical profiles (Saccaro *et al.*, 2024).

Implementation quality requires equal attention. A systematic review of psychosocial interventions for children and adolescents in low- and middle-income countries found that feasibility and acceptability were commonly assessed, whereas sustainability, adoption, penetration, and implementation costs received considerably less attention. Future studies should extend beyond researcher-supported trials to evaluate routine delivery, workforce requirements, supervision, fidelity, scalability, and long-term maintenance. These priorities are particularly relevant to multimodal programmes, whose complexity may increase training demands while also offering greater responsiveness to heterogeneous regulatory needs (Ceccarelli *et al.*, 2024).

Cultural adaptation should be treated as a core design process rather than a final modification. Reviews of school-based mental-health programmes in low- and middle-income countries show that interventions are implemented within linguistic, educational, familial, and sociocultural systems that influence relevance and uptake. Future mindfulness, movement, and creative programmes should document what is adapted, why adaptations are made, who participates, and whether modifications preserve hypothesised mechanisms. Co-design with young people, caregivers, teachers, and community stakeholders can strengthen ecological validity while preventing the uncritical transfer of intervention assumptions across settings (Harte & Barry, 2024).

Evidence from South Africa further supports participatory and feasible school-based implementation. The Four Steps To My Future programme demonstrated that universal mental-health promotion can be delivered to young adolescents within schools while assessing acceptability, feasibility, and exploratory outcomes. For practice, this supports embedding regulatory skills within settings and using delivery structures that minimise barriers to participation. Research should test whether integrating contemplative, embodied, and expressive components within such platforms improves engagement or outcomes beyond single-modality programmes and whether gains persist across developmental transitions (Coetzee *et al.*, 2024).

Measurement requires comparable attention. Adolescent emotion regulation is multidimensional, and conventional measures may omit culturally meaningful, spiritual, positive-emotion, or context-specific strategies. Development of the Emotion Regulation Skills Questionnaire for adolescents illustrates the value of involving young people and experts in refining measurement content. Future comparative trials should combine validated self-report instruments with caregiver or teacher reports, behavioural indicators, ecological assessments, and functional outcomes, while

testing measurement invariance across age, gender, culture, and intervention modality (McCullen *et al.*, 2024).

This priority is especially salient in Nigeria, where locally validated instruments remain essential for interpreting emotional functioning without relying exclusively on measures developed elsewhere. Item-response-theory validation of the Emotional Vacillation Scale among Nigerian undergraduates provides a methodological basis for examining how well individual items capture emotional fluctuation within a specific population. Future research should extend culturally grounded psychometric work to children and adolescents, distinguish emotional vacillation from broader dysregulation, and establish sensitivity to intervention-related change. Across the field, longitudinal designs, adequately powered head-to-head trials, transparent reporting, common outcome frameworks, and sustained follow-up are needed to determine for whom mindfulness, movement, creative modalities, or their combinations work best, under what conditions, and with what enduring functional benefits (Sabbah, 2025).

6. CONCLUSION

This review examined how mindfulness, movement-based practices, and creative or expressive modalities contribute to emotional regulation across childhood, adolescence, and young adulthood. The analysis met its objectives by integrating developmental, neurobiological, contextual, and intervention-focused evidence to clarify how regulatory capacity evolves and how different therapeutic approaches engage distinct but overlapping mechanisms. Across the literature, emotional regulation emerged as a multidimensional process shaped by cognitive maturation, autonomic functioning, family relationships, school climate, peer influence, culture, socioeconomic conditions, and individual differences.

The comparative findings indicate that mindfulness primarily strengthens attentional awareness, non-reactivity, and metacognitive control; movement-based approaches support physiological regulation, embodied awareness, behavioral activation, and social engagement; while creative modalities facilitate symbolic expression, emotional externalization, narrative processing, and relational connection. Although all three approaches demonstrate meaningful potential, the evidence does not support a single universally superior modality. Effectiveness depends on developmental readiness, intervention dose, delivery setting, cultural relevance, practitioner competence, participant preference, and the severity and nature of regulatory difficulties. Multimodal designs therefore appear particularly promising when components are integrated around clearly defined mechanisms rather than simply combined.

The review also identified important limitations in the current evidence base, including methodological heterogeneity, inconsistent outcome measures, limited long-term follow-up, insufficient cross-cultural validation, and a shortage of direct head-to-head comparisons. Future research should prioritize adequately powered comparative trials, culturally responsive measurement, longitudinal designs, implementation studies, and assessment of functional outcomes beyond symptom reduction. Practice should emphasize developmentally tailored, context-sensitive, and accessible interventions that can be embedded within schools, families, community programs, and clinical services. Greater attention should also be given to intervention sustainability, workforce training, family participation, digital accessibility, and the translation of short-term regulatory gains into durable everyday functioning across settings. Ultimately, emotional regulation is best supported through flexible intervention systems that recognize young people's diverse developmental pathways and provide multiple routes for strengthening awareness, expression, recovery, resilience, and adaptive functioning.

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