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Mandala-based interventions for managing stress-anxiety-depression (SAD) syndrome in children with special needs

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Abstract
Mandala coloring has long been used as a calming activity, but its therapeutic potential extends far beyond simple artistic engagement. This short article examines how mandala-based practices can be systematically expanded to support children with special needs experiencing Stress-Anxiety-Depression (SAD) syndrome. Drawing on evidence from dialogic-diagnostic arts therapies, special needs educational therapy, sensory integration therapy, cognitive-behavioral therapy, trauma-informed practice, and mindfulness practice, this short article outlines how mandalas can serve as a multidimensional tool for emotional regulation, sensory stabilization, cognitive restructuring, and relational support. Adaptations such as containment mandalas, proprioceptive variations, breath-synchronized coloring, and affirmation-centered designs are reviewed in relation to their applicability within educational therapy. The paper argues that mandalas, when intentionally structured, can provide a powerful, child-centered medium for enhancing self-regulation and psychological resilience.

Keywords: Dialogic-Diagnostic arts therapies, educational therapy, mandala coloring, special needs, stress-anxiety-depression (SAD) syndrome

Introduction

Stress, anxiety, and depression (SAD) as a triadic syndrome presents significant barriers to learning and emotional well-being among children with special needs [1, 2]. Emotional dysregulation and emotional conflict are common across neurodevelopmental conditions [3], including autism spectrum disorder (ASD), attention-deficit/hyperactivity disorder (ADHD), intellectual disability (ID), and developmental trauma histories. Wellness practitioners, such as counselors, dialogic-diagnostic arts therapists, mindfulness practitioners and educational therapists, therefore require evidence-informed, developmentally sensitive, and adaptable interventions that support both regulation and learning readiness. Mandala coloring, traditionally considered a simple recreational activity, has been shown to reduce anxiety by promoting focused attention and inducing physiological calm [4]. Emerging research in expressive arts therapy, cognitive-behavioral approaches, sensory integration, and mindfulness suggests that mandalas can become a more expansive therapeutic tool when intentionally adapted [5, 6].

This short article presents a comprehensive framework for extending mandala-based work into a structured intervention for children experiencing SAD syndrome. It synthesizes multidisciplinary evidence to show how mandalas can support sensory processing, emotional containment, cognitive reframing, relational attunement, and mindful interoception: domains essential for children with special needs. The aim of this paper is to provide educational therapists, dialogic-diagnostic arts therapists and counselors with a theoretically grounded and practical set of mandala-based strategies that are safe, accessible, and adaptable across diverse learner profiles.

The Historical Origin of Mandala

Traditionally, a mandala, whose name derives from the Sanskrit term for “circle” or “discoid object,” is visually presented as a circular geometric design composed of concentric layers and intricate patterns. Across major Eastern religious and spiritual traditions (e.g., Hinduism, Buddhism, Jainism, Taoism, and Shintoism), mandalas have long served as sacred symbols representing the universe, cosmic order, and the interconnectedness of all things [2]. Beyond their spiritual role, mandalas have also been understood psychologically, particularly through the work of Carl Gustav Jung (b.1875-d.1961), a Swiss psychiatrist and psychoanalyst, who viewed them as symbolic representations of the wholeness of the self and expressions of inner unity and completeness [7]. Hence, a mandala is far more than decorative geometry. In fact, psycho-analytically speaking, the mandala carries profound symbolic meanings that are related to unity, harmony, the cosmos, and the self [7].

Historically, mandalas (see Figures 1, 2 and 3) originated in the ancient India around the 4th century BCE, emerging as part of spiritual practices within Hinduism and later Buddhism, but not as artistic coloring activities. Early references [8,9] appear in the *Rig Veda* or *Rigveda* (derived from the root *ṛc* “to praise”, cf. Dhātupātha 28.19, translated by Sir Monier-Williams, a British scholar of Sanskrit, as “a Veda of Praise or Hymn-Veda”), and over time mandalas evolved into essential tools for meditation and ritual practice in both Hindu and Buddhist traditions. In Tibetan Buddhism, in particular, the intricate sand mandalas became central to meditative and ceremonial practices [10]. As Buddhism spread across the Asian continent, the use of mandalas influenced the artistic and religious cultures of Tibet, China, and Japan, further solidifying their significance as sacred cosmological diagrams.

Fig 1 Fig 2 Fig 3

In the modern era, the therapeutic adaptation of mandalas, especially the practice of creating or coloring them, was largely shaped by the work of Jung [11]. Jung introduced mandalas to Western psychology, believing that the process of drawing them could promote psychological integration, inner harmony, and personal wholeness. Although mandala coloring was not part of the original spiritual traditions, Jung's clinical use of mandalas laid the foundation for contemporary therapeutic practices. The widespread popularization of pre-drawn mandala coloring books as stress-relief tools is a more recent development that draws both on Jung's psychological insights and on the spiritual heritage of the mandala [1, 2, 12].

What and Why of Mandala Coloring

Mandala coloring can be described as the practice of coloring pre-drawn mandala patterns: circular, often radially symmetrical designs that have historically been used in Hindu and Buddhist traditions [1,2] as symbols of balance, unity, and the self. In contemporary contexts, mandala coloring is widely considered a form of art therapy or therapeutic activity aimed at supporting mental and emotional well-being. Rather than emphasizing religious meaning, modern therapeutic use focuses on the mandala's structured, symmetrical, and repetitive design, which distinguishes it from free coloring or unstructured drawing. These features encourage focused attention, rhythmic hand-eye coordination, and a contained creative process with a meditative quality. As a result, mandala coloring promotes relaxation and mindfulness by helping quiet the mind, anchor awareness in the present moment, and reduce stress and anxiety (see Table 1). The activity also provides a gentle avenue for emotional release and self-expression, allowing individuals to externalize worries, fears, and emotional tension without the need for verbal communication. For some people, including those who experience attention or impulse-control difficulties, mandala coloring has been associated with enhanced concentration, reduced impulsiveness, and improved task engagement. Beyond these benefits, the practice can stimulate creativity and support self-discovery, with many individuals reporting increased emotional clarity, deeper self-understanding, or even spiritual insight through engagement with colors, patterns, and the mandala's symbolic structure.

Table 1: What Mandala Coloring can offer and its Benefits

What Mandala Coloring can offer	Benefits of Mandala Coloring
Relaxation & Mindfulness	Because a mandala has structured, symmetrical, repetitive designs, coloring it encourages focused attention and rhythmic hand-eye coordination. This helps quiet the mind, bring awareness to the present moment (similar to meditation), and reduce stress and anxiety.
Emotional Release & Self-Expression	The process offers a safe medium for expressing feelings without needing words. People may externalize worries, fears, emotional tension through the coloring process, leaving the mind lighter.
Improved Concentration & Emotional Regulation	For some (including individuals with attention or impulse-control issues), mandala coloring has been associated with increased attention span, reduced impulsiveness, and better task completion or decision-making.
Creativity & Self-Discovery	Engaging with colors, patterns, and the mandala's structure can awaken creativity. Some people, through mandala coloring or drawing, report gaining deeper self-understanding, emotional clarity, or even spiritual insight over time.

Mandala coloring has increasingly been recognized as a therapeutic activity, with studies showing that structured mandala coloring tends to reduce stress and anxiety more effectively than unstructured or free-form coloring, as well as coloring plain patterns [4,13]. In various settings, including hospitals and clinics, where it has been used to support mothers with infants or patients undergoing treatment, and among students experiencing academic pressure, mandala coloring has been shown to significantly lessen stress and enhance overall well-being. Part of its appeal lies in its accessibility and low cost. As mandala coloring requires no special artistic skills, it serves as a practical self-help tool and can be easily incorporated into therapeutic practices.

Researchers suggest several reasons why mandala coloring can be effective. The symmetry and structure of mandalas provide the mind with a predictable, orderly "safe frame," which can be particularly soothing for individuals experiencing emotional turmoil or anxiety. The repetitive motions involved in coloring help calm the nervous system and draw attention away from rumination, promoting a

meditative focus. Additionally, the activity blends creativity, control, and mindfulness, allowing individuals to make choices about color and pattern while remaining grounded in the present moment. Mandala coloring also offers a nonverbal avenue for symbolic and emotional expression, making it especially helpful for people who find it difficult to articulate their feelings through words.

Expanded Mandala-based Interventions for SAD Syndrome

According to Xie and Wang [2], although mandalas have ancient spiritual roots, their application in coloring as a psychological or mental-wellness tool is a relatively modern development, particularly in supporting individuals coping with Stress, Anxiety, and mild-to-moderate Depression (referred to as the SAD syndrome).

Research indicates that the geometric structure and repetitive motor engagement inherent in mandala coloring help decrease anxiety by focusing attention and reducing cognitive rumination [4]. Expanding on this foundation, containment mandalas, which emphasize strong circular boundaries, support emotional safety and containment, aligning with trauma-informed expressive arts frameworks that prioritize predictable structures for children with dysregulated affect [6]. Safe-place mandalas integrate guided imagery, allowing children to visualize and internalize calming mental spaces, a technique known to reduce autonomic arousal and promote emotional stability [14].

For children with sensory-processing differences, mandala activities can incorporate proprioceptive and tactile components. Weighted tools, textured surfaces, and vertical coloring surfaces engage the proprioceptive and tactile systems, which can support physiological regulation and reduce stress, consistent with sensory integration principles [15]. Movement-based adaptations such as finger-traced labyrinths further integrate vestibular input, which has been shown to support anxiety reduction and resilience through embodied mindfulness techniques [16].

Mandala interventions can also incorporate cognitive-behavioral strategies by assigning symbolic meanings to colors or mapping worries around the mandala before gradually coloring inward. These techniques parallel CBT methods of externalizing intrusive thoughts and promoting cognitive restructuring [17]. Affirmation mandalas, which place positive self-statements in the center, support mood lifting and foster adaptive self-concepts, consistent with evidence showing that self-affirmation enhances well-being and reduces depressive symptoms [18].

Relational variations (e.g., co-coloring and/or collaborative family mandala coloring) enhance social connectedness and emotional attunement. Relationship-centered creative practices have been shown to increase perceived social support, a major protective factor against anxiety and depressive symptoms in childhood [19]. Mindful variations, including breath-synchronized coloring or heartbeat awareness mandalas, align with evidence that body-based mindfulness training enhances interoceptive accuracy and modulates physiological stress responses [20].

Symbolic mandalas tailored for depression, such as light-centered or hope-oriented designs, enable children to express internal states and envision positive change. Narrative-oriented expressive practices have been linked to improvements in mood, resilience, and meaning-making in children and adolescents [21]. Finally, mandalas can serve as a nonverbal assessment tool for educational therapists: color choices, pressure patterns, organization levels, and recurring symbols can provide insight into mood, arousal, and executive functioning [5]. As such, mandalas become not only an intervention but also a reflective tool for ongoing therapeutic assessment.

Five Recent Empirical Studies on Mandala Coloring (2020-2024)

The author of this paper has identified five recent empirical studies, published between 2020 and 2024, to provide evidence on the effects of mandala coloring and mandala-based interventions (see Table 2). Briefly, the first study, conducted by Khademi *et al*. [22] in 2021, found that hospitalized COVID-19 patients who engaged in 30 minutes of mandala coloring per day for six days experienced significantly reduced state anxiety compared with patients receiving standard care. The second study done in 2022 comes from Støre and Jakobsson [12], who conducted a systematic review and meta-analysis and reported mixed results, noting that mandala coloring did not consistently outperform free drawing for reducing anxiety across all studies, partly due to heterogeneous designs and brief interventions. In the third study conducted in 2024, using a randomized clinical trial with veterans diagnosed with PTSD, Nasiri *et al*. [23] found that although both mandala and free coloring increased happiness levels, mandala coloring produced significantly greater improvements. Another randomized controlled study carried out by Kırca *et al*. [24] in 2024 demonstrated that mandala coloring effectively reduced anxiety and enhanced several dimensions of quality of life among women in the climacteric period. Finally, there is a fifth study done in 2023, Özsavran and Ayyıldız [25] found that a multi-session mandala art therapy program improved comfort and psychological resilience in mothers of children with special needs. Together, these studies highlight the growing empirical support for mandala-based interventions across diverse populations and clinical contexts.

Table 2: A Summary of the Five Empirical Studies on Mandala Coloring Interventions (2020-2024)

Study (Year)	Population (Sample Size)	Research Design	Intervention Details	Outcome Measures	Main Findings	Limitations
Khademi *et al*. [22] (2021)	Hospitalized COVID-19 patients (≈70)	RCT	Mandala coloring 30 min/day for 6 days	State Anxiety (e.g., STAI)	Significant reduction in state anxiety vs. standard care.	Short duration; single hospital; cannot generalize to non-medical populations.
Støre & Jakobsson [12] (2022)	Pooled data from previous studies (systematic review & meta-analysis)	Meta-analysis	Varied mandala vs. free drawing interventions across studies	Mainly state anxiety	Overall no significant advantage of mandala coloring over free drawing; results mixed.	High heterogeneity; small sample sizes in included studies; non-uniform protocols.
Nasiri *et al*.	Veterans with PTSD	RCT	Mandala vs. free	Happiness scale	Both methods improved	Did not isolate

[23] (2024)	during COVID-19		coloring; multiple sessions (duration varies)		happiness, but mandala coloring showed higher gains than free coloring.	anxiety/depression; cultural specificity; hospital-based.
Kırca *et al*. [24] (2024)	Women in climacteric (menopausal) period	RCT	Structured mandala coloring protocol; repeated weekly sessions	Anxiety scales; QoL subscales	Mandala coloring reduced climacteric-related anxiety and improved several QoL subdomains.	Focused only on menopausal population; self-report bias; no long-term follow-up.
Özsavran & Ayyıldız [25] (2023)	Mothers of children with special needs	RCT	Mandala art therapy program (multi-session; structured)	Comfort scale; Psychological resilience	Mandala-based art therapy significantly increased comfort and resilience vs. control.	Combined "mandala art therapy" (multi-modal), not pure coloring; limited external validity.

Note: RCT stands for Randomized Controlled Trial

Mandala coloring shows its strongest evidence for reducing stress and state anxiety, particularly in medical or high-stress populations, and for supporting emotional comfort, resilience, and overall subjective well-being. The five selected studies (see Table 3) also highlight benefits for enhancing happiness and positive affect, including among veterans with PTSD, as well as providing emotional support for caregivers, e.g., mothers of children with special needs. Evidence is less consistent regarding whether mandala coloring is superior to free coloring, with some meta-analyses suggesting the advantage is not always robust; outcomes may vary depending on structural features, level of guidance, session duration, and the population involved. Typical practice involves 20-30-minute sessions completed daily or several times per week, with program lengths ranging from a single session to about six to eight sessions. Proposed psychological mechanisms underlying these effects include mindfulness and attentional focusing, emotional regulation facilitated by repetitive patterned activity, reductions in physiological arousal, and safe symbolic expression supported by structured geometric forms.

Table 3: Synthesis Across the Five Studies

Key Points highlighted	Findings
1. Where mandala coloring has strongest evidence	▪ Stress and state anxiety reduction (especially in medical and high-stress populations) ▪ Emotional comfort, resilience, and subjective well-being ▪ Enhancing happiness and positive affect (PTSD veterans) ▪ Support for caregivers (mothers of children with special needs)
2. Less consistent evidence	▪ Advantage over free coloring is not always robust (e.g., meta-analysis) ▪ Effects may depend on structure, guidance, session length, and population
3. Typical dosage	▪ 20-30 minutes per session ▪ Daily or several times per week ▪ Programs range from 1 session to 6–8 sessions
4. Most common psychological mechanisms proposed	▪ Mindfulness and attentional focusing ▪ Emotional regulation through repetitive patterned activity ▪ Reduction of physiological arousal ▪ Safe symbolic expression through structured geometric forms

Guidelines for Clinical Practice: Mandala Coloring for SAD) Management

Mandala coloring can be integrated into clinical practice as a structured, low-risk complementary intervention to support management of stress, anxiety, and depressive symptoms, alongside standard evidence-based treatments. Research [22, 26, 27] suggests that regular mandala coloring sessions, when facilitated within therapeutic settings or self-management plans, are associated with measurable reductions in anxiety and stress across diverse clinical and non-clinical populations. For instance, in one study conducted by Khademi *et al*. [2], hospitalized adults with COVID-19 who engaged in daily 30-minute mandala coloring demonstrated significant anxiety reductions compared with control conditions. Similarly, in another study, children with cystic fibrosis showed pronounced decreases in state anxiety after six consecutive days of mandala coloring [26]. Evidence also indicates positive impacts on psychological well-being and coping strategies in populations with chronic health conditions; patients receiving hemodialysis who participated in weekly mandala coloring over eight weeks reported improvements in psychological well-being, fatigue severity, and adaptive coping responses versus controls [27]. While research specifically targeting major depressive disorders remains emerging, broader literature on structured art interventions identifies potential benefits for mood and affect regulation that support clinical symptom management when combined with psychotherapeutic care [28].

To maximize therapeutic benefit, clinicians are advised to incorporate mandala coloring within comprehensive treatment plans, ensuring clear session parameters (e.g., 20-30 minutes per session, three to seven times weekly) and integration with other psychosocial supports such as cognitive–behavioral strategies or mindfulness exercises. Facilitators should emphasize intentional engagement, encouraging patients to focus attention on coloring as a present-moment activity, which may help interrupt ruminative thinking and promote relaxation akin to mindfulness processes. Continuous monitoring of symptom trajectory should accompany mandala interventions, with adjustments made based on individual response and clinical progress. Clinicians should also be mindful that while mandala coloring appears to enhance emotional regulation and stress reduction, it should not replace primary evidence-based treatments for clinical anxiety or depressive disorders, but rather serve as an adjunctive modality that can increase

patient engagement, foster self-expression, and support overall therapeutic goals.

Mandala Coloring as a Complementary Rather Than Alternative Treatment

Mandala coloring has been increasingly conceptualized in clinical and wellness literature as a complementary psychosocial intervention rather than an alternative to evidence-based conventional medical or psychological treatments. In this context, mandala coloring is understood as a structured, art-based activity designed to support emotional regulation, stress reduction, and coping processes *alongside* primary clinical care.

The rationale for framing mandala coloring as a complementary intervention is supported by a growing body of randomized controlled studies demonstrating its beneficial effects on psychological outcomes. For example, in hospitalized adults with COVID-19, daily mandala coloring for six consecutive days resulted in significantly lower state anxiety scores compared with standard care alone, indicating meaningful anxiolytic effects [22]. Similarly, mothers of infants in neonatal intensive care units exhibited significantly reduced stress and state anxiety following mandala coloring activities compared with control conditions [29]. Among older adults, community-based randomized trials have shown that brief mandala coloring sessions significantly reduced self-reported anxiety relative to control activities such as reading or unstructured drawing [30]. Furthermore, school-based quasi-experimental research demonstrated that mandala coloring significantly reduced academic stress among adolescents when compared with non-intervention conditions [31].

Beyond anxiety reduction, mandala coloring has been associated with improvements in broader psychological well-being and coping processes. In patients receiving hemodialysis, repeated mandala coloring sessions over eight weeks were linked with enhanced psychological well-being, improved coping strategies, and reduced fatigue severity relative to control conditions [32]. Additionally, randomized controlled studies in pediatric oncology settings have reported significant reductions in nausea, pain, and anxiety following mandala art interventions as compared with standard care, suggesting beneficial effects on symptom management and emotional distress [33].

The mechanism by which mandala coloring exerts these effects may be similar to elements of mindfulness and structured art therapy. The repetitive, focused task of coloring within symmetrical patterns appears to facilitate attentional engagement, disrupt ruminative thought patterns, and promote a present-centered focus reminiscent of meditative states [34]. This attentional anchoring likely contributes to decreases in stress and supports emotional regulation processes, making mandala coloring a plausible non-pharmacological supportive strategy to enhance engagement with primary clinical treatments.

Despite these promising findings, mandala coloring is not considered an alternative to established clinical interventions for diagnosed psychological conditions for several reasons. First, the current evidence base lacks sufficiently standardized treatment protocols and large-scale, high-quality clinical trials demonstrating efficacy as a standalone treatment. Second, recent systematic reviews of art therapy and related modalities suggest that although art-based interventions, including coloring, show promise for improving psychological symptoms, the evidence is not yet robust enough to justify replacing evidence-based clinical care with mandala coloring alone [35]. Third, by definition, complementary therapies are intended to augment and support evidence-based treatments rather than substitute for them, and mandala coloring's role in the literature aligns with this adjunctive framework.

In summary, when integrated with conventional medical or psychological care, mandala coloring can be a useful, low-risk supportive tool to reduce stress and anxiety, promote present-moment awareness, and enhance psychological well-being. However, it should not be viewed as an alternative to standard evidence-based treatments due to the current limitations of the evidence regarding its efficacy as a standalone intervention.

Conclusion

When approached strategically, mandala coloring becomes a versatile, evidence-informed intervention for managing Stress-Anxiety-Depression (SAD) syndrome in children with special needs. The structured, sensory-rich, symbolic, and mindfulness-compatible nature of mandalas makes them uniquely suited for supporting regulation and expressive communication among learners who may struggle with verbal articulation. Integrating trauma-informed containment, sensory adaptations, cognitive-behavioral reframing, relational engagement, and mindful interoception extends mandalas far beyond recreational coloring, transforming them into an effective tool within educational therapy. As a result, mandalas offer a developmentally accessible, culturally adaptable, and neurologically supportive medium through which children can build resilience, emotional awareness, and self-regulation. This paper suggests that mandala-based interventions, when intentionally designed, hold significant promise in enhancing the holistic well-being and learning readiness of children with special needs experiencing SAD syndrome.

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