

The Science Behind Art Therapy: Neuro-Psychiatry and Case Studies of Healing Trauma in Children

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Abstract

Art therapy is an evidence-based intervention that uses creative expression to promote psychological healing. It is especially effective for children experiencing trauma. Rooted in neuropsychiatry, art therapy helps people process emotions, reduce stress, and build resilience. It works by tapping into the brain's natural ability to heal itself. Research shows that art therapy has a strong effect on the central nervous system. It offers a non-verbal way for individuals to express and process deep emotions. This article explains the science behind art therapy, its effects on the brain and body, and its role in trauma recovery. Case evidence is used to show its transformative impact.

Keywords: Psychological Healing, Experiencing Trauma, Art Therapy, Central Nervous System.

Introduction

Understanding Trauma and the Brain: The Science Behind Healing Art

When children experience trauma, their brains often enter a state of heightened alertness. This "fight, flight, or freeze" response is governed by the amygdala, the brain's emotional processing center. Overactivation of the amygdala can suppress the functioning of the prefrontal cortex, responsible for reasoning and regulation. Trauma can also "flip the lid" of the brain, a term coined by Dr. Daniel Siegel, describing how dysregulation impairs a child's ability to process emotions effectively.

Art therapy directly addresses this dysregulation by engaging the right hemisphere of the brain, which processes imagery, emotions, and sensory input. The act of creating art fosters relaxation, promotes mindfulness, and activates the parasympathetic nervous system, thereby reducing stress. Studies using neuroimaging have demonstrated increased activity in the brain's reward and regulation centers during art-making, reinforcing its role in fostering emotional resilience.

Central Nervous System Changes During Art-Making

Creating art triggers biochemical changes that promote healing. Engaging in artistic activities reduces cortisol levels, the body's primary stress hormone, thereby calming the autonomic nervous system. This state of relaxation enhances vagal tone, improving emotional and physiological regulation. Additionally, art-making releases dopamine, a neurotransmitter associated with pleasure and motivation, which helps counteract the depressive symptoms often linked with trauma.

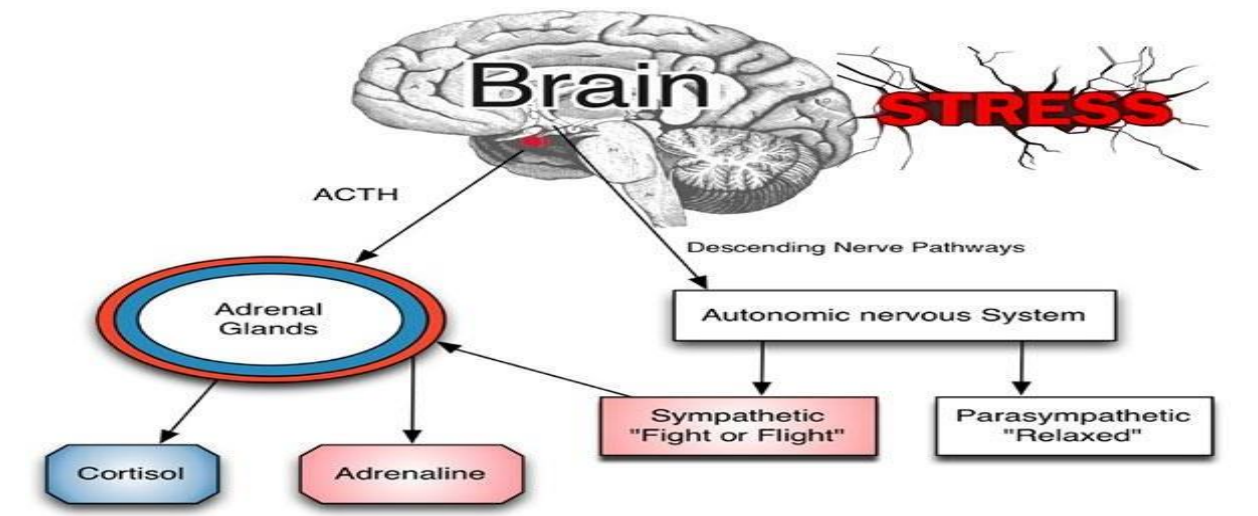
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Furthermore, the rhythmic and repetitive nature of art activities, such as drawing or painting, mimics the soothing effects of self-soothing behaviors. This process activates the brain's default mode network (DMN), a set of brain regions associated with introspection and emotional processing, enabling the child to process trauma at a subconscious level.

Figure 1: How stress impacts brain



Evidence-Based Benefits of Art Therapy for Trauma

A growing body of research supports the effectiveness of art therapy for children with trauma. A meta-analysis of studies published in *Trauma-Focused Therapy Research* reveals that art therapy significantly reduces symptoms of post-traumatic stress disorder (PTSD), anxiety, and depression in children. Additionally, art therapy fosters emotional expression, builds trust, and empowers children to regain a sense of control over their lives.

One particularly effective approach is the use of structured art-based interventions, which guide children through a series of creative exercises designed to externalize their feelings, build narrative coherence, and develop coping strategies. These interventions are often complemented by discussions that provide psychoeducation about trauma, grief, and healing.

Case Study 1: Amir's Journey of Healing Through Art

Background

*Amir, a 7-year-old boy, was referred to art therapy by his school after exhibiting sudden behavioral changes, including aggression, spitting, and a decline in academic performance. During initial interviews, Amir's parents disclosed that he had recently witnessed the drowning of his cousin, who was the same age. The incident occurred during a family swimming trip, where Amir saw lifeguards retrieve his cousin's lifeless body and accompanied him in the ambulance to the hospital. Amir expressed his emotions as "*something happening inside my tummy*," unable to articulate his grief or guilt.

Art Therapy Intervention

Amir was scheduled for 10 art therapy sessions at his school. The initial sessions focused on building rapport and trust. In the first session, Amir was asked to draw something that made him

happy, and he sketched a field with three sunflowers. Over the next few sessions, Amir was chatty but avoided mentioning his cousin or the incident.

In the eighth session, Amir's demeanor shifted. He entered the room, opened his art book, and silently drew a scene depicting the pool, an ambulance, and a small grave. After completing the drawing, he closed his book and left without saying a word. This pattern continued in subsequent sessions, with creating similar drawings but remaining quiet.

During the tenth session, Amir began to share details about his cousin's death spontaneously while drawing. He revealed feelings of guilt and shame, stating that he knew how to swim but couldn't save his cousin. The therapist guided Amir in exploring these emotions, discussing the concepts of grief and guilt. Amir came to understand that he was not responsible for the tragedy and that he had done everything he could at the time. As Amir processed his emotions, his demeanor transformed; he became calmer, more focused, and showed improvement in both behavior and academic performance.



Figure 2 (a, b): Depiction of feelings in drawing

The Neuropsychiatric Perspective: How Art Therapy Helped Ali

Amir's case illustrates the neuropsychiatric principles underpinning art therapy. His initial inability to verbalize his trauma reflected an overwhelmed prefrontal cortex and an overactive amygdala. Art-making allowed Amir to bypass verbal expression, tapping into the right hemisphere of his brain to process emotions visually and somatically. The repetitive act of drawing promoted regulation of his central nervous system, while the therapeutic relationship fostered safety and trust. By externalizing his grief and guilt through art, Amir was able to reframe his narrative and achieve emotional healing.

Case Study 2: Using Art to Heal Childhood Abuse**Maria's Journey to Trust and Self-Worth Background**

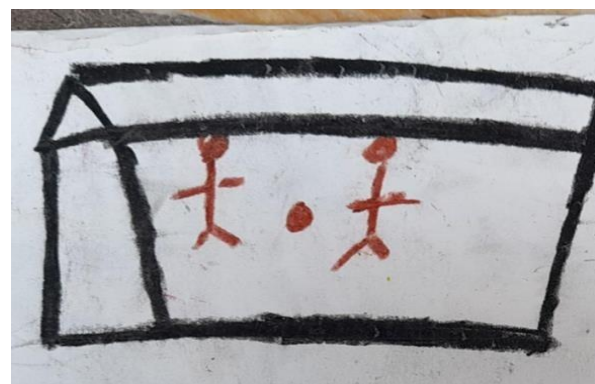
*Maria, a 13-year-old girl, participated in 12 art therapy sessions designed to help her process past trauma and address deep-seated emotional struggles. Initially hesitant to engage verbally, Maria found solace in artistic expression. The journey from abstract, chaotic art to structured, meaningful creations mirrored her emotional healing and the rebuilding of trust in herself and those around her.

The Beginning: Chaotic Expressions of Inner Turmoil

In the first few sessions, Maria used clay and paints to create abstract, messy shapes, reflecting her internal chaos. Her first drawing was a dark, chaotic blend of spiral scribbles and bold, aggressive strokes that seemed to clash across the card sheet. She requested thumbtacks and pressed them into various parts of her artwork, a poignant physical expression of her inner pain and anger.

As Maria progressed, her art reflected a raw confrontation with her emotions. She frequently used messy, aggressive strokes, cutting, and punching her paper creations. These actions became symbolic gestures of her anger—not only at her abuser but also at the adults in her life who delayed believing her disclosures.

Figure 3 (a, b): Depiction of anger in drawing



Maria eventually opened up about her experiences, revealing that while she understood her uncle's actions were wrong and not her fault, she was deeply hurt by the lack of immediate support from her family and care home supervisors. This breach of trust made her question the reliability of the people who were supposed to protect her. The therapist used Maria's art as a bridge to navigate these challenging discussions, validating her feelings of betrayal and acknowledging the complexity of rebuilding trust. These sessions underscored the importance of giving Maria the space to feel heard and understood, laying the foundation for emotional healing.

Building Hope and Self-Worth

Gradually, Maria's art began to shift. She created a series of drawings depicting figures escaping a cage. These images symbolized her desire for freedom, safety, and hope for the future. The structured nature of these pieces marked a transition in Maria's emotional state—from chaos and despair to resilience and empowerment. The therapist used these drawings to initiate conversations about self-worth, resilience, and safety. Maria began to internalize these discussions, recognizing her own strength and potential. Through art, she processed her anger, sadness, and betrayal, transforming her pain into a narrative of survival and empowerment.

Figure 4: Recognizing potential and building hope



Trust Issues and Emotional Resilience

One of the most profound challenges Maria faced was rebuilding trust. Her experiences had left her skeptical of adults and wary of forming new relationships. The therapist worked with Maria to explore this distrust, using art as a medium to visualize and discuss her fears.

In addition to rebuilding trust, Maria learned valuable coping skills during her sessions. The therapist introduced her to journaling and mindfulness techniques, which helped her manage anxiety and intrusive thoughts. Maria's nightmares, which were once frequent and vivid, began to decrease as she developed a sense of control over her emotions.

By the end of her therapy, Maria had not only processed her trauma but also rebuilt trust in herself and her ability to navigate relationships. Her artwork evolved into vibrant, hopeful pieces that reflected her growing resilience and self-worth.

Transformative Role of Maria Art Therapy

A Neuropsychiatric Perspective

Maria's story illustrates the profound impact of art therapy on children who have experienced trauma. By providing a non-verbal outlet for expression, art therapy helps children process complex emotions, confront painful memories, and rebuild trust in themselves and others.

From a neuropsychiatric perspective, the act of creating art activates regions of the brain associated with emotion regulation, such as the prefrontal cortex, while calming the amygdala, the brain's fear center. This helps reduce hyperarousal commonly seen in trauma survivors. Engaging in art-making also stimulates the release of dopamine, a neurotransmitter linked to feelings of pleasure and reward, fostering a sense of safety and emotional grounding.

Figure 5: Drawing of pleasure and reward



Through creative exploration, Maria transformed her pain into strength, emerging as a more confident, self-aware individual. Her journey underscores the importance of empathy, patience, and the power of art in fostering healing and resilience.

The Broader Implications of Art Therapy

Art therapy offers a unique avenue for addressing the complexities of childhood trauma. It provides a safe, non-verbal space for children to process emotions that may be too difficult to articulate. The neuropsychiatric mechanisms underlying art therapy, including its impact on brain plasticity, stress regulation, and emotional processing, make it a powerful tool for healing. As the cases of Amir and Maria demonstrate, art therapy not only facilitates emotional expression but also fosters resilience and growth. By integrating the science of neuropsychiatry with the creative process, art therapy can help children overcome trauma, build emotional literacy, and reclaim their sense of agency.

Conclusion

Art therapy is a transformative intervention for children with trauma, backed by robust evidence and grounded in neuropsychiatric science. By engaging the brain's creative and emotional centers, art-making fosters relaxation, emotional regulation, and healing. Case studies such as Amir's and Maria's highlight the profound impact of art therapy in helping children navigate their trauma and

achieve emotional recovery.

However, it is crucial to emphasize the ethical use of art therapy. It is not merely about drawing or creating art but involves a structured, intentional approach guided by trained and skilled professionals. Practicing art therapy in a safe, supportive environment is essential to ensure that it remains a therapeutic and healing process rather than a source of distress or harm. As research continues to uncover the neurological and psychological benefits of art therapy, it stands as a cornerstone of holistic trauma-informed care, offering hope and healing to children in need.

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