

Review Article

Affect Regulation and Treatment for Depression and Anxiety through Art: Theoretical Ground and Clinical Issues

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Abstract

Advances in neuroscience research have shown that depression and anxiety are closely related to affect regulation, the emotional processes that work within the brain system. This paper reviews two major areas of affect regulation. The first area accounts for the relationships between affect regulation and the functions of the left/right hemispheric brain, as well as the effect of these emotional processes on the autonomic nervous system. The interpersonal-neurobiological basis of affect regulation is also elaborated. The discussion implies that depressed and anxious individuals with seriously disturbed emotional or cognitive processes could probably benefit from the enhancement of right hemispheric brain processes via nonverbal form of communication. With capabilities of strengthening emotional and nonverbal processes that occur in the right hemispheric brain, nonverbal forms of psychotherapy, including art therapy, could have benefits in the treatment of depression and anxiety.

On the theoretical basis of affect regulation, the second area of discussion focuses on how the assessment and healing functions of various art media adopted in art therapy treatment correlate with left/right hemispheric brain processes. The discussion sheds light on the therapeutic use of art media to allow individuals with mood problems to experience, express, and communicate emotions effectively via nonverbal forms of treatment. The mind-body approach and the various processes of art therapy treatment can attune psycho-physiological processes and help to integrate brain processes holistically to improve affect regulation and enhance well-being.

Keywords: Affect regulation; Medical humanities; Emotional processes; Art therapy; Anxiety; Depression; Mirror neurons

Abbreviations

MRI: Magnetic Resonance Imaging; ANS: Autonomic Nervous System; MNS: Mirror Neuron System

Introduction

According to the World Health Organisation [1], depression is the most serious form of mental disorder in the world. It was ranked third among the 10 leading causes of disability in 2004 and is predicted to become the leading cause of disability in 2030, which will create an unprecedentedly serious economic and disability burden. Anxiety also is a serious health problem worldwide. In the United States alone, anxiety disorders affect 40 million adults in a given year, a figure that represents 18% of the over-18 population [2].

Mood problems, including depression and anxiety, are closely related to affect regulation, a term that refers to the emotional processes in the brain system. Affect deregulation causes serious mood problems. For example, a state of hyper arousal might directly or indirectly lead to different forms of anxiety disorders, while a state of hypo arousal might lead to depression. Understanding how affect is regulated may significantly aid in elucidating the mechanisms of depression and anxiety in the human brain and, more importantly,

indicate appropriate treatments and support for depression patients.

Individuals with serious mood problems typically find it difficult to express feelings and thoughts using verbal communication. Accordingly, it can be challenging for psychotherapists to effectively treat mood disorders, including depression or anxiety, using only verbal forms of therapy. Although cognitive approaches of disputing irrational thoughts have been documented in the literature in the last few decades, a growing body of literature documents the significance of nonverbal forms of psychotherapy for patients whose verbal communication is seriously blocked [3-6].

As one of the major nonverbal psychotherapeutic approaches, art therapy has received growing attention for its efficacy in treating depression and anxiety. It has been documented that art therapy could help to manage depression and improve functioning in various aspects of life among depressed patients [7], reduce the trauma symptoms of children experiencing post-traumatic stress disorder [8], enhance the emotional expression and psychological well-being of breast cancer patients with signs of depression, anxiety, and other forms of emotional problems [9], decrease depression and fatigue in cancer patients [10], treat depression in male and female inmates [11], and positively improve signs of depression in elderly people with dementia [12].

This paper is an attempt to understand depression and anxiety from the perspective of affect regulation. Recent advances in neuroscience have revealed new information on how affect functions in the human brain, and how the brain and the body are interrelated in their influences on illness and wellness. This knowledge has informed and improved the theoretical underpinnings and clinical techniques of art therapy for the benefit of depressed and anxious patients.

Fundamental Emotional Systems

Theories of emotion and basic emotional systems are varied. Ekman [13,14] suggests sadness, anger, disgust, fear, joy, and surprise as basic emotions. Frijda [15] proposes sorrow, desire, happiness, interest, surprise, and wonder, while Tomkins [16] lists distress, anger, interest, contempt, disgust, fear, joy, shame, and surprise. Parrott [17] classifies emotions into a tree structure in which primary emotions include sadness, love, joy, surprise, anger, and fear. Despite the differences in theories, two common basic emotions that theorists agree on are sadness and fear. Secondary or tertiary emotions based on sadness include distress, sorrow, depression, hopelessness, gloom, glumness, unhappiness, grief, misery, and melancholy.

Emotion is complicated, and is best explained as a dynamic process (or system) that involves the interplay of the nervous system, relationships, and mind. Some affective states or emotions, regarded as universal and basic expressions of internal states, are identifiable in cultures throughout the world. Each of the basic emotions reveals the way in which human beings create common pathways for neural firing. When these pathways are activated and linked together into a functional whole, they integrate as an emotional state of mind. Sadness and fear can be viewed as two of these states of mind [18].

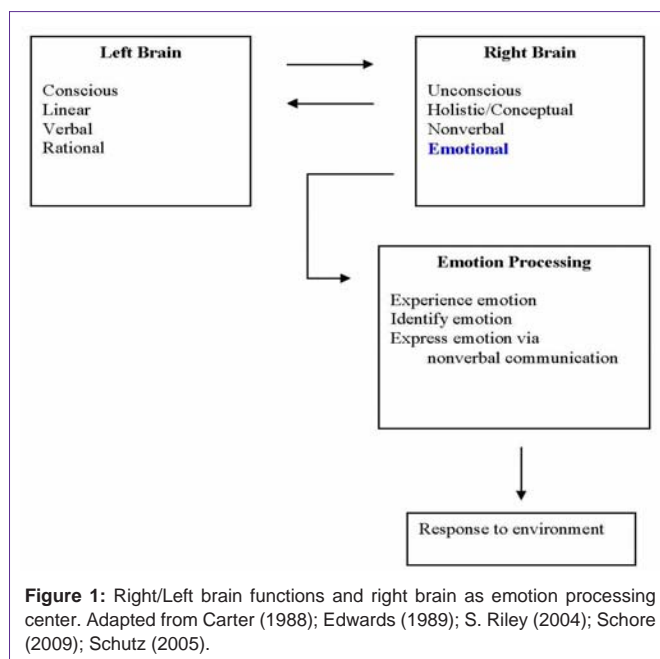
In each of the integrated emotional states of mind, certain regions of the brain work together to link widely separated areas; for instance, the prefrontal cortex links information from the cortex to the subcortical limbic, brainstem, and somatic regions [18]. Fundamental emotions are closely connected to a variety of bodily states and brain arousal systems (e.g. nor epinephrine and serotonin) that coherently generate actions and other secondary or tertiary feelings in response to the environment. However, when these emotions are deregulated, psycho physiological problems emerge [4]. Depression and anxiety are two conditions that can occur when emotion becomes deregulated.

Affect Regulation and Emotional Brain

Emotional process in left/right hemispheric brain

It is generally agreed that the left hemispheric brain is responsible in most people for processing verbal, conscious, linear and rational information. The left hemisphere is the region in which information is labeled, organized, categorized, and analyzed in logical ways [19,20]. The right hemisphere processes information that is nonverbal, unconscious, holistic, conceptual and emotional. It is also the region where information associated with spirituality is processed (Figure 1) [21,22].

The experience and identification of emotion, expression of naturally strong emotions and nonverbal communication of emotions are predominantly processed in the right hemisphere, allowing that hemisphere to function as a quick-response system to environmental threats and danger (Figure 1) [5,23]. A recent Magnetic Resonance



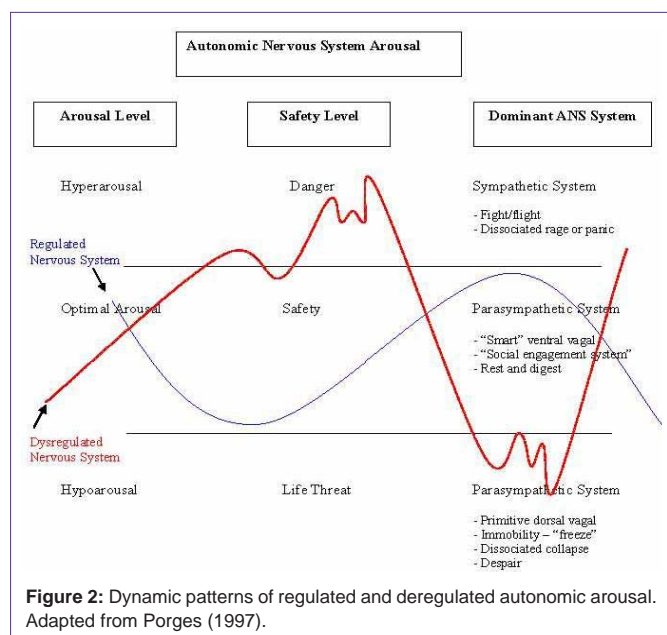
Imaging (MRI) study on mother-infant emotional communication showed that the right hemisphere is more involved than the left hemisphere in emotional processing and may be more emotionally caring and nurturing [5,24].

Affect regulation and autonomic nervous system arousal modes

As an important region for emotion processing, the right hemispheric brain has close connections with the involuntary Autonomic Nervous System (ANS), which monitors the visceral organs, effectors in the skin, and the cardiovascular system [5]. When the emotional arousal system is in its optimized functional state, it produces effects on the parasympathetic ventral vagal system of the brainstem that regulates the cardiac system to produce a sense of safety that fosters social engagement, and on the pain system to facilitate optimal emotional communication (Figure 2) [5]. However, there are two conditions (or modes) in which the emotional arousal system becomes dysfunctional.

In the hyper arousal mode, an individual perceives danger, which triggers the alarm system, and activates the sympathetic system of the ANS. This results in increases in the heart rate, blood pressure, and respiration (Figure 2). All of these psychobiological reactions express signs of fear or life threat [5]. Hyper aroused emotions may trigger panic reactions, hamper clear judgment, and result in withdrawal from social engagement. The fight/flight response could become a long-term endocrine stress response when stimulation or perception of the danger signal lasts for a long time. The long-term endocrine stress response includes activation of the pituitary gland, and of the hypothalamus, which plays an important role in regulating sleep, appetite, and other endocrine functions. An over-activated hypothalamus can cause sleeping and eating problems, or more serious mental problems including various forms of anxiety disorder [25].

The hypo arousal mode is activated when an individual perceives that he or she is helpless and hopeless in a situation. The dominant



parasympathetic dorsal vagal system is activated, producing a dissociative state, decreasing heart rate, blood pressure, and respiration. This immobilization or detachment state will make the individual become inhibited, conserve energy, and dampen pain (Figure 2). The prolonged state of despair, hopelessness, and emotional detachment is similar to triggering the separation-distress panic system, which could have negative effects on the limbic system or influence regulatory functions of the ANS, and could eventually culminate in various psychiatric disorders such as depression (Figure 3) [4,5, 26].

Interpersonal-neurobiological basis of affect regulation

Affect regulation and affective communication are interpersonal, and interpersonal relationships can arouse as well as alleviate distressing emotions. The discovery of the Mirror Neuron System (MNS) in the 1990s showed that human beings had the ability to imitate and perform acts that were learned only by observation. In the observing process, neuronal pathways are automatically activated in the observer's pre-motor cortex as though the individual had actually performed the specific sequence of actions, which would have required the coordination of cross-sensory modalities (visual, auditory, olfactory, gustatory, proprioceptive, kinesthetic, and temporal experiences) [27]. In addition, the mirror neuron system operates in response not only to the observation of goal-directed behaviors but also to the conveyance of emotions through nonverbal forms of communication – visual (facial expression), auditory (quality of voice – tempo, volume, pace, prosody, etc.) and bodily (movement and posture) [5,28-30].

Facilitated by mirror neurons, similar neuronal pathways and networks from similar brain areas of two individuals respond and fire, evoking empathic resonance, a state in which the two brains synchronize [27, 31]. Via the work of mirror neurons, human beings can learn through empathic imitation and observation of another's actions by nonverbal means, recognizing that someone else's action is something that they can also do. The empathic resonance in the interpersonal relationship in this integrated state will enable a more

adaptable, coherent, dynamic, and stable state of mind, which could also improve stability of mood [18].

Affect regulation and art therapy practice

It can be challenging to treat depression or anxiety with verbal forms of psychotherapy, because depressed and anxious patients are sometimes overwhelmed with feelings or thoughts. It is common that depressed patients have alexithymia, the inability to find appropriate words to describe emotions, which occurs when depression hampers cognitive and verbal communication functioning [6,32]. In light of knowledge regarding affect regulation in relation to right/left brain functions and the central nervous system, facilitation of right-brain processes via nonverbal form of communication should be able to cross language barriers and help to achieve better expression and communication of emotions [20,33].

Brain processes and assessment/healing functions of art media

In recognizing the challenges posed by the verbal communication of feelings, art therapists usually encourage an individual to freely choose art materials at the first treatment session. Therapists can use a patient's free choice of materials as a means of assessment and healing. In the idiosyncratic nature of art making, individuals usually begin by choosing an art medium that they feel comfortable with. The freedom to choose art media is important, as it can create a sense of control in the unfamiliar environment and build trust with the art therapist. Through the interactive process of making art, the inner experiences of the artist, including feelings, can be more easily and effectively organized and expressed. At the same time, the art-making process represents how the artist processes information internally [34,35]. Therefore, the choice of medium can be used for assessment, and the patient's interaction with the medium corresponds to their inner methods for processing information, which reflect parallel brain processes.

Generally, the physical nature of art media can be ranked from highly resistive to highly fluid. Resistive media require clear, step-by-step procedures, and the artist needs to input rational and analytical steps in the art making processes, for instance, manipulating, problem-solving skills, organization skills, and making sound judgments. Woodwork, clay work and sculpting require artists to objectively observe, make clear judgments at every step, and are usually irreversible processes. On this level, the rational, logical, and analytical processes predominantly facilitate intense left hemispheric brain processes [34]. At the opposite pole, fluid media can allow more spontaneous art-making. Allowing watercolor to flow freely on water color paper, or mixing acrylic paints on a canvas permit freer and more unstructured expressions of inner processes. Paint colors are good at stimulating sensory processes and facilitating expression of different feelings by letting emotions appear visually and symbolically. These sensory and affective processes in art making predominantly facilitate right hemispheric brain processes [20,34,35].

Therapeutic Use of Art Media in Emotion Regulation

The relationship between nature of art media and left/right brain processes can guide the direction of therapeutic treatment. Individuals with depression or anxiety may predominantly process

information on the affective level, prefer fluid media to resistive media and participate in more spontaneous, unstructured art making processes [34,36]. To attune to the preferences and the inner state of such clients, the art therapist can adopt art materials with relatively fluid natures to facilitate emotional processes. However, individuals with mood problems might overly process their emotions as reflected in the overuse of fluid materials, thus trigger overwhelming emotions [33,37]. Therefore, it is necessary for the art therapist to balance the use of fluid and resistive materials in working with individuals with mood problems so that exploration and experiencing emotions could be potentially balanced with logical, rational, and organized inner processes.

To facilitate exploration and containment of emotion, the art therapist may start from instructing the client to use specific drawing medium such as a fluid material like oil pastel. After the drawing process, the art therapist can guide the individual to verbally share the drawing experience. The drawing and sharing processes can help the individual identity emotions, externalize emotions, and re-experience emotions in a controlled manner. Usually, the art therapist will also allow the client and him/herself to look at the final art product together for a while. Viewing the artwork mindfully can help integrate all the preceded processes and experiences as well as develop new or different perspectives. Lastly, the verbal sharing about the viewpoints on the artwork will deepen the thinking and feeling in the client. The art therapist may also adopt verbal counseling techniques at this stage to convey encouragement, assurance, empathy, reframing of the problems and other positive messages to the client.

In verbal psychotherapy, the therapist typically guides the client to verbally discuss emotion as a major way to treat emotion. The distinctive difference between verbal psychotherapy and art therapy is that the art therapist's responses to the client or intervention in treatment are not purely verbal. In art therapy, art exists as an additional and crucial therapeutic component apart from the therapist-client relationship [33]. At the same time, art consists of Process and Product, each part playing a significant role in art therapy treatment [33].

As in the issue of treating serious emotional problems, the art therapist primarily intervenes to help the client contain emotion. The containment of emotion is imbedded in the process of the art therapist's progressive guidance to the client to make art. There are various methods for containing emotions via art processes. For instance, the art therapist may give structure to the art task by assigning form, giving boundaries for coloring work or providing step-by-step procedures for the work processes. Appropriate use of fluid media can facilitate expression of emotion and at the same time achieve containment of difficult or disturbing affect expressions of the client. Art therapists are trained to familiarize with various art media in the ways that they know when and how to produce different therapeutic techniques and effects to different client groups. With careful manipulation of different art media, the art therapist will be able to gradually help the depressed patient progressively re-experience, organize, and express strong emotions, so that affect can be regulated and properly controlled.

Giving structure to affect expressions will help the client develop good gestalts [38] in viewing art forms. Good gestalts imply more

sophisticated perceptual skills that help enhance logical and rational thinking skills [34]. When affect is more effectively regulated, the art therapist may progressively shift to the use of resistive art media or mixed use of both resistive and fluid media. This transition helps to enhance left hemispheric brain functions by processing logical and rational information as well as integrating left and right hemispheric brain processes.

Since the art product is an important media for communication and expression, and can provide information on different areas, such as, change of frustration tolerance level, problem-solving skills, or energy input during art making, formal training of art therapists covers learning of various standardized art-based assessment methods to conduct accurate assessment. Also, in order to facilitate clients viewing artworks created over different treatment phases and monitor the progress of treatment, art therapists need to conduct ongoing assessment. It is noteworthy that art-based assessment does not focus so much on "what" the client draws but "how" the client draws. It can avoid the flaws of making subjective interpretation on art images. In addition, verbal comments from clients on their artworks, discussions and sharing, and feedback from other collaborative professionals can also help confirm the accuracy of art-based assessment and avoid misunderstanding and misinterpretation.

Art therapy, emotion regulation and mind/body connectivity

Art therapy is a combined mind/body approach in psychotherapy [25]. When compared to verbal psychotherapy, art therapy allows clients to express inner experiences on sensory and kinesthetic levels, separately from the verbal, affective and cognitive levels [34,35]. Many individuals with mood problems may share common emotional signs and symptoms that include intense feelings of helplessness, hopelessness, anger, frustration, or loss of self-control. The art therapist can invite the client to take part in the art making processes by actively involving their body. In some processes, especially working with resistive media (e.g. clay or wood work), the artist needs to invest lots of physical strength and energy. These physical activities can relieve physical strain and build up a sense of inner rhythm that helps to reduce stress, anxiety, and the sense of helplessness [35]. When working clay, the kinesthetic movements of pounding and kneading the clay help depressed or anxious individuals relieve strain on their shoulders, neck, and back, regulate heartbeat and respiration, and can function as a way of expressing emotions in a physical manner, which can assist in changing their perception of themselves and in producing insight [35]. The kinesthetic-sensory movements embedded in art making attune psycho physiological processes that can potentially have positive effects on affect regulation [25].

Art therapy and interpersonal-neurobiological affect regulation

The function of the mirror neuron system has important implications for the practice of psychotherapy and art therapy. On the basis of a trusting therapeutic alliance, art-making and mutual sharing allows the flow of affect, both internal and interpersonal, to move naturally towards emotional connection. As the client responds to and is influenced by the therapist, the emotional resonance between the two parties allow the emotions of the client be appropriately recognized, contained, expressed, and invigorated [18]. Art is a

medium that can pass on empathic communication between the art therapist and the client. In place of language, the art therapist also can utilize artwork as a powerful tool to attune or convey empathic response to the client's affective experience [27,39]. The process of art making in connecting the minds of the therapist and the patient, and the strengthening of empathic resonance sets up the fundamental basis for connecting two separate systems of affect regulation in the brain [40]. On this basis, the anxious or depressed individual will be able to understand, re-experience, and communicate emotions in a coherent way.

Art therapy as standard care in clinical setting?

Regarding the potential effectiveness and importance of art therapy in treating individuals with serious mood problems, it is highly recommended or even critical for this client group to have chance to use nonverbal form of psychotherapy, such as art therapy as standard care in clinical setting. Notably, art therapy is only one of the nonverbal approaches in psychotherapy. Music therapy, dance/movement therapy, drama therapy, and play therapy which pay equally important attention to nonverbal communication and the creative process can also produce multi-levels or multi-dimensional effects on individuals with emotional problems. They can produce some common effects on affect regulation and brain process as art therapy but each modality may have distinct pathway and advantage due to the different sensory systems each approach addresses. Overall, art therapy or arts related therapy is still new in mainstream medical and other related mental health services but the trend of including it in related service units has been increasing in Hong Kong and United States. Some community mental healthcare services providers have already included art therapy in the standard care. Certainly, some other approaches can also be effective in treatment individuals with serious mood problems but using art can have additional benefits as discussed earlier. Therefore, it is worth investing more on training of professionals, promotion, development, and implementation of art therapy or arts related therapy in mental health services.

Conclusion

In working with patients with depression or anxiety, art-making activities can be as simple as drawing lines, filling in colors or creating simple patterns. Patients whose emotions are deregulated benefit from using a visual form of expression rather than using language to communicate their emotions. Through the process of image making, broken thoughts and emotions can be gradually retrieved, organized, and restored into one unified whole. The ease of verbal expression of inner experience eventually increases. As with other forms of nonverbal psychotherapies, art therapy utilizes media that require the participation of different sensory modalities, stirring up responses from the sensory, kinesthetic, affective, perceptual, symbolic, and cognitive levels [34]. Each level represents complicated neural pathways, which are reflected in the process of making art. Careful selection of art media, art-making sequence and themes can help increase understanding of emotion and ability to express emotion. Art-making processes also integrate experiences from multi-sensory modalities, which have the potential to help patients to regulate their emotions, alleviate the signs and symptoms of mood disorders, and to facilitate optimal functioning of various brain processes [25].

References

1. World Health Organisation. The global burden of disease: 2004 update 2008.
2. National Institute of Mental Health of the United States. What is anxiety disorder? accessed July 20. 2014.
3. Panksepp J. Affective neuroscience: The foundations of human and animal emotion. New York: Oxford University Press. 1998.
4. Panksepp J. Brain emotion systems and qualities of mental life - From animal models of affect to implications for psychotherapeutics. Fosha D, Siegal DJ, Solomon MF, editors. In: The healing power of emotion: Affective neuroscience, development, and clinical practice. New York/London: WW Norton & Company. 2009.
5. Schore AN. Right-brain affect regulation - An essential mechanism of development, trauma, dissociation, and psychotherapy. Fosha D, Siegal DJ, Solomon MF, editors. In: The healing power of emotion: Affective neuroscience, development & clinical practice. New York/London: WW Norton & Company. 2009.
6. Kronholm E, Partonen T, Salminen JK, Mattila AK, Joukamaa M. Alexithymia, depression and sleep disturbance symptoms. *Psychother Psychosom*. 2008; 77: 63-65.
7. Reynolds F. Managing depression through needlecraft creative activities: A qualitative study. *The Psychoanalytic Review*. 2000; 27: 107-114.
8. Chapman L, Morabito D, Ladakakos C, Schreier H, Knudson MM. The effectiveness of art therapy interventions in reducing post traumatic stress disorder (PTSD) symptoms in pediatric trauma patients. *Art Therapy*. 2001; 18: 100-104.
9. Puig A, Lee SM, Goodwin L, Sherrard P. The efficacy of creative arts therapies to enhance emotional expression, spirituality, and psychological well-being of newly diagnosed Stage I and Stage II breast cancer patients: A preliminary study. *The Arts in Psychotherapy*. 2006; 33: 218-228.
10. Bar-Sela G, Atid L, Danos S, Gabay N, Epelbaum R. Art therapy improved depression and influenced fatigue levels in cancer patients on chemotherapy. *Psychooncology*. 2007; 16: 980-984.
11. Gussak D. Comparing the effectiveness of art therapy on depression and locus of control of male and female inmates. *The Arts in Psychotherapy*. 2009; 36: 202-227.
12. Choi YH, Park PK. The effects of group art therapy on cognition, depression and quality of life in elderly. *International Journal of Nursing Practice*. 2012; 18: 61.
13. Ekman P. Emotions revealed. New York: NY Times Books. 2003.
14. Ekman P. An argument for basic emotions. *Cognition and Emotion*. 1992; 6: 169-200.
15. Frijda NH. The emotions. New York: Cambridge University Press. 1986.
16. Tomkins SS. Affect theory. Scherer KR, Ekman P, editors. In: Approaches to emotion. Hillsdale, NJ: Erlbaum. 1984; 163-95.
17. Parrott W. Emotions in social psychology. Philadelphia: Psychology Press. 2001.
18. Siegel DJ. Emotion as integration: A possible answer to the question, what is emotion? Fosha D, Siegal DJ, Solomon M, editors. In: The healing power of emotion: Affective neuroscience, development, and clinical practice. New York & London: WW Norton & Company. 2009.
19. Carter R. Mapping the mind. Berkeley: University of California Press; 1998.
20. Edwards B. Drawing on the right side of the brain. Los Angeles: Jeremy P. Tarcher; 1989.
21. Larsen JK, Brand N, Bermond B, Hijman R. Cognitive and emotional characteristics of alexithymia: a review of neurobiological studies. *J Psychosom Res*. 2003; 54: 533-541.
22. Riley S. The creative mind. *Art Therapy*. 2004; 21: 184-90.
23. Schutz LE. Broad-perspective perceptual disorder of the right hemisphere. *Neuropsychology Review*. 2005; 15: 11-27.

24. Lenzi D, Trentini C, Pantano P, Macaluso E, Iacoboni M, Lenzi G, et al. Neural basis of maternal communication and emotional expression processing during infant preverbal stage: Cerebral cortex. In press. 2009; 19: 1124-1133.
25. Hass-Cohen N, Carr R. Partnering of art therapy and clinical neuroscience. Art therapy and clinical neuroscience. London & Philadelphia: Jessica Kingsley Publishers. 2008.
26. Johnson S. Extravagant emotion: Understanding and transforming love relationships in emotionally focused therapy. In: Fosha D, Siegal DJ, Solomon M, editors. The healing power of emotion: Affective neuroscience, development, and clinical practice. New York & London: W W Norton & Company. 2009.
27. Gallese V, Eagle MN, Migone P. Intentional attunement: Mirror neurons and the neural underpinnings of interpersonal relations. Journal of the American Psychoanalytic Association. 2007; 55: 131-176.
28. Carr L, Iacoboni M, Dubeau MC, Mazziotta JC, Lenzi GL. Neural mechanisms of empathy in humans: a relay from neural systems for imitation to limbic areas. Proc Natl Acad Sci USA. 2003; 100: 5497-5502.
29. Iacoboni M, Dapretto M. The mirror neuron system and the consequences of its dysfunction. Nat Rev Neurosci. 2006; 7: 942-951.
30. Dael N, Mortillaro M, Scherer KR. Emotion expression in body action and posture. Emotion. 2012; 12: 1085-1101.
31. Gallese V. The roots of empathy: the shared manifold hypothesis and the neural basis of intersubjectivity. Psychopathology. 2003; 36: 171-180.
32. Miljkovitch de Heredia RM, Miljkovitch I. Drawings of depressed inpatients: intentional and unintentional expression of emotional states. J Clin Psychol. 1998; 54: 1029-1042.
33. Rubin JA. Art therapy: An Introduction. New York: Brunner/Mazel. 1999.
34. Lusebrink VB. Imagery and visual expression in therapy. New York: Plenum Press. 1990.
35. Hinz LD. Expressive Therapies Continuum: A framework for using art in therapy. New York: Taylor & Francis Group. 2009.
36. Lusebrink V. Art therapy and the brain: An attempt to understand the underlying processes of art expression in therapy Art Therapy: Journal of the American Art Therapy Association. 2004; 21: 125-135.
37. Rubin JA. Child art therapy: Understanding and helping children grow through art. second ed. New York: Van Nostrand Reinhold. 1984.
38. Rhyne J, editor. Gestalt art therapy. New York: Brunner/Mazel. 1987.
39. Gallese V. Embodied simulation: from mirror neuron systems to interpersonal relations. Novartis Found Symp. 2007; 278: 3-12.
40. Franklin M. Affect Regulation, mirror neurons, and the third hand: Formulating mindful empathic art interventions. American Journal of Art Therapy. 2010; 27: 160-167.