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A NORTON PROFESSIONAL BOOK

ART THERAPY & THE NEUROSCIENCE OF RELATIONSHIPS, CREATIVITY & RESILIENCY

SKILLS AND PRACTICES

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W. W. NORTON & COMPANY
New York • London

CHAPTER 3

Creative Embodiment: In Motion

believed that motor information related to motor actions is stored he cerebellum and can be retrieved as needed. Perhaps emotions memories associated with particular movements are also easily led when that motor information is elicited from the cerebellum. then creation in action has therapeutic uses in fostering general herapy practices such as safety, calmness, and hope. When paint- I created a scene that reminded me of a pleasurable experience. act of creating required movement. When moving is done simul- usly with thinking or feeling, it might have a more profound ct than thinking or feeling alone. In addition, next time I look e artwork, my brain will remember the movement involved in its ion, and the positive memories will be elicited again. When I the space I created for art making, I will immediately be engaged ienting me to that space, and the freedom and well-being I felt ime I worked there will hopefully be felt again when I move or anticipate movement in my space. Tamara Cates

SSIVE THERAPIES SUCH AS ART, drama, and play therapy concrete fine motor movements and large actions; rhythmic or re also symbolized in scribbles, loops, and reiterative lines and nages. This chapter focuses on the first CREATE principle, Cre- odiment, and it describes how the art therapist's skills and space ual and symbolic therapeutic movements. The space in which art curs can range from a spacious area with dedicated tables and small office space that was quickly converted into an art studio. novement, no matter how large or small the art therapy space, ficant clinical benefits. The motor dimensions of art making ntribute developmental, emotional, and symbolic values to the al Neurobiology (IPNB) therapeutic context.

omentally directed movement, such as kneading clay, provides

opportunities to hone gross and fine motor skills, as well as visuospatial skills that affect social function (Kramer, 1986). Drawing bold gestures on large canvases assists in warming up and releasing emotions (Kwiatkowska, 1978). Motor-based activities can also increase cognitive function, such as understanding the differentiation between left and right (Kramer & Erickson, 2007). These activate, motivate, excite, and release emotions, and, when successful, can symbolize the potential for change. Rhythmic movements whether walking, dancing, playing percussion instruments such as drums or even moving speak directly to lower brain functions of the motor system that are responsible for survival responses. When repeated with the support of a caring therapist these kind of multimodal interventions have the capacity to soothe and lull and perhaps recalibrate the functions of the motor system and cranial nerves involved in instinctual fear based and defensive reactivity (Perry & Hambrick, 2006; Porges, 2011, 2013).

Emotions such as fear and happiness, when compassionately processed as metaphors, can additionally generate motion and propel people into action. A studio art therapy experience in which the group members create and infuse with color a body-sized drawing, My Space, first demonstrates this chapter's principle. Then the artists engage in an interpersonal space exploration, Group Space.

Day-to-day therapist-client actions and interactions are therapeutic. Such motions, which can be taken for granted, include covering the workspace with protective paper, putting the crayons and paints where they can be easily accessed, and reaching out for the crayons. Picking up the brush, dipping it in the paint, creating, and then cleaning brushes and putting away all the materials are other examples. We propose that such simple beginning and ending gestures provide emotional and cognitive motion-based outlets (Hass-Cohen, 2008a). Our hands and bodies perform hundreds of simple and complicated automatic movements daily, to which we usually do not pay much conscious attention. These automatic motions initiated by the art therapist allow for several noteworthy therapeutic gateways: Communicating interest, conveying respect, showing appreciation of the client's difficulties in beginning to create art, helping to abandon judgment, and providing attuned acceptance. Moving from nonverbal knowledge to explicit verbalized meaning making can be challenging yet it can effectively consolidate therapeutic gains. As examples, our artists' accompanying narratives, reflections, and processing of a group mural facilitate this explicit process (Manders & Chilton, 2013).

The study of mirror neurons (MN) and their functions provide additional important insights to the connections between movement, cognition and intersubjectivity. MNs, located near the motor strip play a critical role in

intersubjective functions of familiar motions and motor-based goals (Rizzolatti, Fadiga, Gallese, & Fogassi, 1996). This is an intersubjective function, as without the observer's internal knowledge of the observed action, he or she cannot understand their purpose (Gallese, 2010). Thus, embodied simulation theory shows that "people reuse their own mental states or processes represented in bodily format to functionally attribute them to themselves" (Ammaniti & Gallese, 2014, p.16).

The explicit conveyance of interest, attuned acceptance, and trust (Frank & Frank, 2004; Lambert, 1986) are significant ATR-N therapeutic skills. The effective therapist skillfully communicates these factors nonverbally. For example, even a simple act of moving the media so that it is within the client's reach (Hass-Cohen, 2008a) may begin the needed process of reducing defensive and avoidant states and initiating adaptive action systems (Ogden, Minton, & Pain, 2006). Approaching the media, scratching the page with a pencil, and loading a brush with paint are concrete actions that transform into symbolic meaning while breaking the barrier of entry to a new dimension of expression. In addition to carrying specific content, the created image may also allegorically convey the actions that contributed to its creation. The goal is to generalize these successful tangible and emblematic motions to daily function. As children and adults alike experience a sense of control in the studio, they also gain a positive cognitive belief in themselves and bolstered confidence to take control and ownership outside of the studio (Moon, 2001). Repeated moving occurs in space. As the studio environment and context are negotiated this movement becomes safe and relational. Sharing media, being careful not to bump into each other's creative space, watching others' creative endeavors is an embodied opportunity to engage in safe and supportive relationships.

Important to this work is a review of the neuroscience of the motor system and its relevance for IPNB approaches and Art Therapy Relational Neuroscience (ATR-N) interventions. Due to neuronal isomorphism between the motor system, specifically the cerebellum and the prefrontal cortex (Baizer, 2014), motor activity also most likely increases cognitive, emotive and social function. Sensory-motor based work, involving touch and music go hand in hand with motor activation and are considered critical for recovery and development of trauma resiliency (Perry, 2006). Such repetitive movement must include positive, nurturing interactions with trustworthy others. Therefore the nature of art making, which is rooted in a deep respect for the artist's need for space, safely supports a tentative negotiation of the pace, quality, and quantity of potential lifelong attuned relationships and friendships. What has been advocated for traumatized children (Malchiodi & Crenshaw, 2013; Perry & Hambrick, 2006) is most likely effective for a variety of clinical problems. This is partially because art making, listening to music, and dancing are activities that can be generalized and used in clinical milieus and in day to-day practices. Different from cognitive focused work, ATR-N interventions have the potential to modulate lower motor systems' overarousal and put motion to therapeutic use.

EXPERIENTIAL PRACTICES AND DIRECTIVES

Experience I: My Space

Creating the creative environment, an essential part of the experiential process, is the first step in transforming the creative work space into an interpersonal environment. This step sets the course for our work together. Because this is one of our first group art therapy experiences, our walls, although soon to be festooned with art expressions, are typically bare and uninspiring. Thus, inviting relational and personal creativity, each group member first covers his or her work table with colorful butcher paper. As red, blue, yellow, green, black, and white paper lay out on the body-sized tables, the ordinary studio transforms into a vibrant working space. We encourage the large body sized paper in order to physically, emotionally and symbolically stimulate embodied movement. Setting a protected, safe and socially respected base for creation, each tabletop is completely wrapped in paper, which is securely taped. There is also enough space between the tables to allow for easy interaction and maneuvering without getting in each other's way, enabling artists to approach the space from any angle or point of view; close yet far enough apart, the group space is set for action. With individual spaces now nested within the interpersonal setting, the group is invited to: "Explore your space, the tabletop, using your choice of either acrylic or tempera paint or soft pastels." It is suggested that everyone use the whole canvas, thus filling it up. They may either use their own paints or feel free to use the community table media.

Group members are also encouraged to share their art materials with one another, which fosters movement within the clinic or expressive arts studio and influences creative motivation. To maintain an environment conducive to intrapersonal and social reflection, we ask the artists to avoid verbal social exchanges (Badenoch, 2008). This inner attention enables the focus to be on the tactile and kinesthetic experiences as well as on any emotions or thoughts triggered by the process and by others. Such an inward focus provides the opportunity for individuals to center themselves, synchronizing inner states with outer states. Such measures create a space for the group members to reflect on their sense of being present in the ATR-N space, thus allowing each

person to become actively aware of the potential of here-and-now processes for change and social learning.

Coined as My Space by many of our cohorts, the work involves the creation of a self-space. In this open-ended realm, each individual paints something personal and meaningful, while the media's fluidity on an expansive canvas allows felt, unrestricted, kinesthetic movements to emerge. These movements concretize as art forms that outwardly reveal the individual internal space. As a result, the process transforms the space and canvas into symbolic self-spaces. Kazuko's painted rhythmic curves, which represent movement, along with her written reflection, offer a wonderful example of this experience (Figure 3.1).

> *I did not feel that my space was intended to mean my working space. Rather, I felt that my space, for this work, should represent my whole self: body, mind, and spirit. Therefore, I thought of the paper as my physical body and the art represented my mind and spirit. I felt that my spirit would be a feminine color and shape. Therefore, I chose a pink pastel and drew a curve. I enjoyed the physical sensation of drawing curved lines. I felt that I was conveying my energy with each stroke of the pastel, so the curved lines represented my flow of energy. I drew several curves with the pink because I had a huge amount of energy. Moreover, I added several oil pastels and acrylics over the pink*

Figure 3.1 *My Flowing Energy.* On a soft yellow foundation, a light pink form spreads from a bulb in the lower left corner up into a deeper pink heart and diffused pink tendrils. At the top, the base, and in two distinct spots, hot red-pink contrasts with the yellow. Kazuko Numata.

> *pastel curved lines. These different media represented my different characteristics: kind, curious, genuine, dependable, and easygoing. I then added a heart symbol to symbolize a generator of my spirit that is connected with the source, which could be called God. Therefore, my energy will never be exhausted. Next, I cut the paper into a curved shape. As I already mentioned, the paper represented my physical body, so it was curved as a female body.* Kazuko Numata

Integral to embodying supportive movement and espousing therapeutic universality is creating communality (Riley, 2001; Yalom & Leszcz, 2005). One way in which we do this is by viewing a critically acclaimed documentary, *The Living Museum*. The film's director, Jessica Yu (1999), showcases art produced by patients at the Creedmoor Psychiatric Center, the largest state psychiatric care institution in New York City. Inspired by artists such as Hans Prinzhorn, André Breton, and Jean Dubuffet, the Living Museum was founded and created by Bolek Greczynki and Janos Marton. Serving as a psychiatric refuge, the therapeutic focus is on raw process expression and art form, rather than on technical skill. The film culminates with the patients' external exhibit, validating the residents' artistic abilities and the group expressive arts approach. We project a 20-minute segment of the film onto a large wall while the artist-participants start working at their table spaces, thus bringing us directly inside the Living Museum, and embodying the patients' work. Another reason we choose to have the group watch and respond to this video is that it provides a glimpse of the interface of client art, therapeutic art, and fine art. Seeing the film can clarify the therapeutic value of art making for the novice as well as the seasoned art therapy participant. It is also hoped that through the process of participatory identification with the art made by the Creedmoor patients, the viewers can eventually become more accepting of their own art.

While the film is being shown, some participants watch to its end, while others start painting right away, occasionally looking up or listening to the film.

> *I chose to create my space as a reflection of my new experience as an artist in the program. From the beginning, I wasn't sure what I wanted my space to look like or what meaning it should have in the end, so I just started to draw. I opened my brand-new NuPastels and chose one of my favorite colors, a pale blue, and began to draw a small circle in the center of the paper. As I became enthralled with the process of creating my space, I added more vibrant colors and created swirling patterns from the small center circle like curving pathways. I*

tore strips of purple and yellow paper, curled them around my fingers, and attached them around the circle. In the process of creating my space, the art came alive to me. The marks on the paper became symbols that were meaningful to me. I thought about the artists in the video we had just watched, and I realized that this drawing was symbolic of myself as an artist. Just as the small circle seemed to be bursting through the space, my identity as an artist is changing and emerging through my experience. I was inspired by one artist from the film, Helen, a woman with severe depression who drew straight lines with a ruler to create patterns of color. Using her technique, I created lines with black charcoal and white chalk pastel to create gradient lines representing the "bars of judgment" that can hold back my true self as an artist from emerging. I then smeared the lines away from the center, symbolizing the "bars of judgment" being erased (Figure 3.2). Rachel Tate

Here, Rachel reflects on what she experienced at the "bursting" interface of motor movements, emotions, and cognitions. Using motion-based language, she describes first looking at the empty space and the blank paper and how, at the same time that she is feeling uncertain about how to move, she begins action by drawing. The neuroscience information reviewed in the next

Figure 3.2 *Bursting Through: Emergence and Freedom.* The process of creating my own space helped me to rethink how I see myself as an artist. Softening from black through to light gray and white, vertical lines cross the paper. A wide mid blue line is flanked below by lavender and above by red, flowing from a pale green circle. A thick vibrant red line also lies to the lower right of this circle. Lavender and yellow paper ribbons also curve out from this central point. Rachel Tate.

Motion suggests that this kind of thoughtful pre-activity is of tremendous significance. The pre-activity activates the motor and cognitive areas of the brain, suggesting the connectivity of motion, emotion, and cognition. These amalgams are revealed in symbolized motions that are contained in the interpersonal creative space. Patty reported a similar experience, where moving her arm became physically and symbolically soothing:

After taking that deep breath, I started to draw. I drew circle after circle of different sizes. As I began to use more colors, I mixed and blended them with my fingers and the palm of my hand. Doing this, I realized, gives me a sense of control over what the colors will be and what the final image will look like. The simple circular motion my arm was moving in was soothing in itself, and at this point I knew what I wanted to draw. Patty Russell

The group members have also reported that standing up or moving around in order to make the art stimulates greater self-awareness and generates the safety to expand and experiment, which allows for the release of emotions, pain, or painful feelings. Robin Vance wrote about how making art while dancing invites the creation of new self-memories and supports positive memories along with the natural forgetting of difficult memories (Vance & Wahlin, 2008). Frequent movement around the tables while creating large-scale drawings permits glimpses of each other's space, giving rise to a natural borrowing or sharing of imagery.

To support the expression of the individual range of experiences, we sometimes suggest selecting one of the following directives: "Paint your own space (My Space), paint your name (My Name), or paint your reaction to the film (My Reaction)."

I chose to draw my name. I stood there in front of my table trying to decide what I was going to create. I had no idea where to start, what materials to use, or what the product would look like. I finally decided to choose a medium and begin. I figured that if I just stood there I would never decide what to do and that I would find direction after I began. I picked up pastels and started making random marks in the center of the paper. I used various colors to make random marks that overlapped one another. Eventually, I realized that what I created looked like a wall. It suddenly came to me what I wanted to create in regards to my name. I wrote my Chinese name on the left side and my English name on the right. I did this because I feel as though I do not fully fit into the American society that I was born into. Typically,

Caucasian Americans do not think of me as American due to my obvious Asian characteristics. On the other hand, Chinese people do not see me as fully Chinese. I am a "toe gee," an American-born Chinese who has lost much of what is considered Chinese. Hence, I am an American-born Chinese, an ABC. I found a picture of a naked woman covering her face with her arm. When I saw this image, I related to the woman in the fact that I, too, felt vulnerable and exposed. I cut out the image and placed it in the center, where I had drawn the wall. Once this directive was completed, the group was asked to title our pieces. Since I rarely title my pieces, I found it difficult to decide on a title. I thought over what I wanted to name my piece until it came to me: Somewhere in Between. *My title,* Somewhere in Between, *reflects these feelings of not fully belonging anywhere (Figure 3.3).* Maggie Fong

As participants discuss their experiences and art, some may mention how they have become inspired to envision their dedicated space for their art making at home. Thus, claiming and owning one's creative space becomes symbolic and can be generalized into taking action outside of the clinical studio.

Figure 3.3 My Name experiential: *Somewhere in Between.* A central panel is divided into three sections with lavender on the left behind Chinese letters, pale blue in the center under the collaged image, and pale gray blue surrounded by red brown on the right, under the artist's name. A bright golden yellow sun-like shape sits to the upper left of the image. On the lower left, a rectangle of marbled multicolored swirls lies next to the central panel. Maggie Fong.

Experience II: Group Space

Once finished working, group members share their work's narratives and create a group mural. To begin this process, we walk about in the creative milieu and hand each person a pair of scissors with large silver blades. With scissors in hand, the artists are asked to: "Release your art piece from its binding to the table and hang the cutouts in a large group mural." Some members choose to cut around the boundaries of My Space as it is, but others may cut out areas that they wish to discard around the edges, or divide the art into multiple images. This is a pivotal point in the process, as the meaning of the art can be changed by active release, elimination, and restructuring, contributing to a sense of control and mastery. As such, purposeful motions and actions empower self-agency.

We are inspired in this art directive by Henri Matisse's paper cutouts (http://www.henri-matisse.net/cut_outs.html). Following surgery and a cancer diagnosis, Matisse used a wheelchair for the last 14 years of his life. In the video *Painting with Scissors,* Matisse's studio assistants would paint sheets of white paper with gouache paint. They would hold the paper and Matisse would then cut out elements from the vivid handmade color stock and place them in often life-sized compositions that were tacked onto a white wall, which served as the background. As he does this, he playfully reflects on the cutouts and moves them around in his hands as if they were a three dimensional object. Watching a movie of him and his assistants working together is a transformative experience, as it becomes a shared "we" experience.

Some of our artists take eagerly to this task, allowing themselves to reinvent their art by boldly cutting out and then pasting their table cover or mural. Some will change the orientation of their art from horizontal to vertical or vice versa as they place their images on the wall, adding to the collective mural. Studio participants often seem to revel in the interplay between their consciously painted imagery and the chance effects created by the scissor cuttings. This kind of playfulness has been associated with therapeutic relational benefits (Jernberg & Booth, 1999). Symbolically this is a way of processing multiple possibilities for representations of the intersubjective self. If we are successful in attuning to ourselves and to our clients, it is as if each time we decide to make a change, we experience an internal shifting. In essence, creating and reflecting on the multiple possibilities for the construction of selfhood.

Even if I did not verbally share what I was feeling, that art piece was a witness to what I felt and to what my chaotic and overwhelming thoughts were all about. Having been able to leave behind [some of

the original artwork] and alter my art piece gave me the freedom to transform its meaning. I left behind all unwanted thoughts and feelings on the table while I allowed my wishful thoughts [to] hang on the wall. I felt safe enough to allow others to see my art piece. Ilene Lopez

Others experience an expansion of self-sense and emotional relief as they release their art from its binding and hang it on the wall, seeing it as a whole from a new vantage point.

I followed the directive to cut our pieces off the table in any manner that we saw appropriate. I liked my piece just the way it was. Therefore, I left it intact as a whole. Our last directive was to hang our pieces up on the wall so that they were next to other peoples' pieces. Maggie Fong

I moved forward and toward finding a connection within the group. I did not feel as alone or feel that I was going to be judged by (my) art piece. I felt better and more energized with each movement, but I suppose I placed into action the reward circuitry. One of the simplest transformations was when (after I released it from the table) I placed my art piece vertically instead of horizontally (on the wall) as I had originally intended to do. It gave a sense of feelings coming in and exploding under the pressure of containment and then the release of what was left. Ilene Lopez

The group unconsciously negotiates the space, develops relationships, and supports ownership and confidence. Periodically, within this action-filled context, the group stands back and reflects on the richness of the diverse images and emotional responses. Studio participants may find echoing themes and shared symbols such as hearts, stars, and sky in each other's work. Once tacked up, they may discuss adding to the wall and spatial changes. Some want their art to touch other pieces, while others layer one space over the other to reflect their overlapping interests and strong relationships. Movement prevails throughout, stimulating social and individual synergy. This kind of work is again reminiscent of Matisse's work, specifically the *Swimming Pool*, which he constructed in 1952. Positioned just above the level of his head, his assistants taped a broad band of what looks like butcher paper all around the room on which he taped ultramarine blue forms of swimmers, and sea creatures. The room, which was paved in tiles, became a pool where

anticipated movement, pleasure, joy, and interactions could be sensorially embodied. This kind of environment is a wonderful coming together of movement and expression at the most elementary level of human existence.

RELATIONAL NEUROSCIENCE: THE MOTOR SYSTEM

Over the eons, the human body has become engineered for immediate, adaptive, accurate, and relevant motion-based responses to stimuli. Managing motion has played an important role in building evolutionary linkages between surviving and enhancing life. Living beings that don't move also don't have a brain; thus brain circuitry is specifically designed to generate motion and behaviors in response to the environment (Ratey & Hagermaan, 2010). The motor system is involved in maintaining body balance as well as initiating, producing, controlling, and coordinating both simple and complex movements (Kalat, 2012). The ATR-N principle of Creative Embodiment is based on research suggesting that motor system pathways facilitate and strengthen beneficial links between movement, emotion, cognition, and social interaction (Baizer, 2014; Ratey, 2008). For example, an unexpected movement, such as tripping, can initiate a startle response that triggers self-protection movements (Kalat, 2012). Such a response also activates the brain's reward circuitry, stimulating adrenaline and dopamine as it brings forth both a realization of fear and a sense of reward or pleasure (Sapolsky, 2004). So, the initial fright and moving away from others can turn into an agile dance, accompanied by relief and laughter at the realization that the danger has passed and that social life can continue. We contend that utilizing expressive art motions can provide similar relief and support.

The motor system is intricately interwoven with the central nervous system (CNS). The CNS consists of the brain and spinal cord, and is intricately linked to the peripheral nervous system (PNS; Carlson, 2013). Through the CNS, messages travel to and from the body's muscles, organs, and brain. The PNS consists of two branches, the somatic and autonomic nervous systems. The somatic nervous system informs voluntary movements by using efferent (outgoing) neurons to carry instructions from the brain to the body. The somatic nervous system also includes afferent (incoming) neurons that conduct visual, tactile, auditory, kinesthetic, proprioceptive, and other sensory information from the body to the brain. Afferent neurons compose the sensory portion of the somatic and autonomic systems that give feedback to the brain, allowing motor system actions to be refined both consciously and unconsciously. That is, the incoming somatic sensory information allows the brain to compare planned or habitual actions with actual feedback about

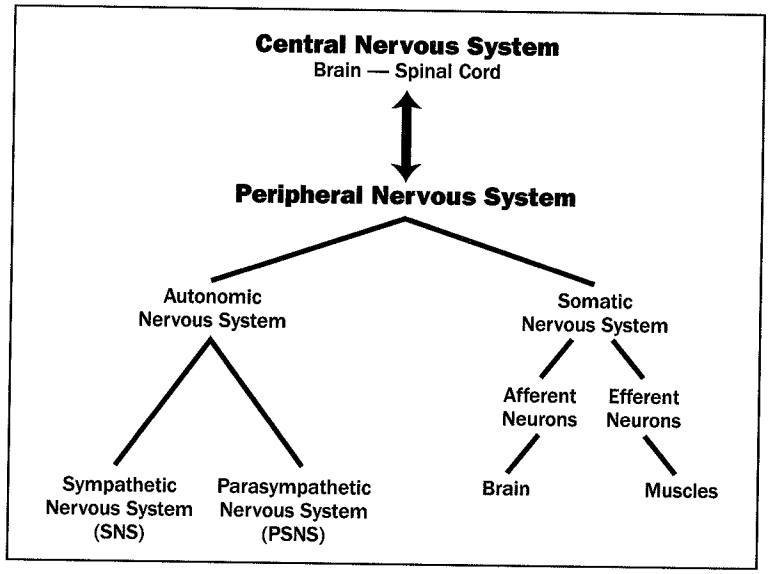

Figure 3.4 *The Central Nervous System and the Peripheral Nervous System.* The CNS includes the brain and spinal cord. The spinal cord connects the PNS with its somatic and autonomic nervous system branches in the body. The spinal cord and PNS simultaneously transmit motor information down to the body and sensory information up to the brain. The somatic/sensory nervous system conveys incoming or afferent sensory messages to the brain and carries outgoing or efferent messages to the major voluntary muscle groups. The autonomic nervous system (ANS) contains the sympathetic (SNS) and parasympathetic (PSNS) nervous systems. The SNS is excitatory, quickly initiating action, while the PSNS ("para" meaning "over") helps restore normal function by counterbalancing or inhibiting the SNS.

actions as they happen. Furthermore, parts of the motor system continuously correct movements to increase performance accuracy (for an extended discussion, see Carr, 2008b; Christian, 2008; Kravits, 2008b; Figure 3.4).

The motor system consists of primarily efferent neurons whose role is to transmit information from the CNS to the PNS (Kalat, 2012). The motor system also includes the automatic nervous system (ANS), which very rapidly initiates responses to fear, stress, and exciting stimuli. The efferent and afferent neurons of the motor system communicate through the spinal cord to the brain and body with various body responses over which we have little to no conscious control. This allows further feedback of feelings, emotions, and gut instincts.

The motor system can be imagined as a tree, with branches that extend to the tree's crown, adorning cognition with affect and motion, which emerge from its trunk and roots. Thus the impacts of motion on emotion and cognition are reflected in the motor system organization. For ease of comprehension, we describe the motor system as three distinct structural levels, but in

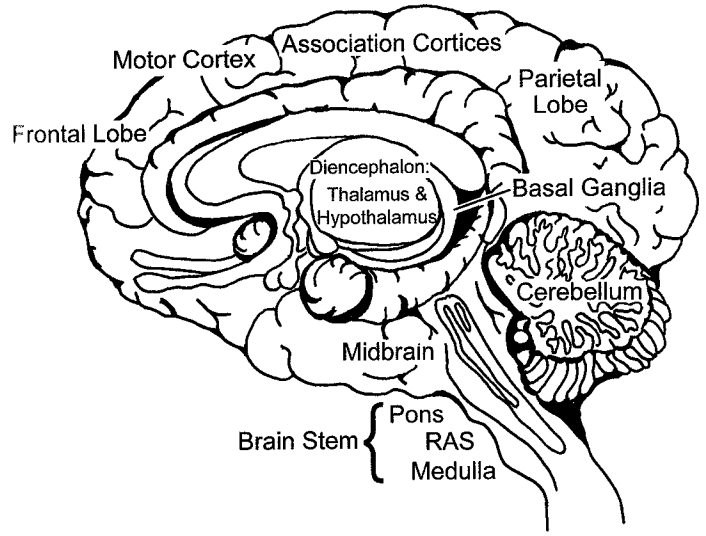

Figure 3.5 *Brain Areas that are Associated with Motor System Functions.*

reality these subsystems and their functions are interdependent and integrated with one another. So schematically, the motor system has three levels. They are: (1) the higher level, which includes the cortical association areas (the parietal lobe, temporal lobe, and dedicated areas of the frontal lobe); (2) the middle level, which includes the motor cortex and subcortical structures (the thalamus, hypothalamus, and cerebellum); and (3) the lower-level spinal cord and brain stem (Kalat, 2012; Figure 3.5).

Normal motor development relies upon establishing specific connections between the muscles and pyramidal neurons. The structural hierarchy also includes the pyramidal motor neuronal system, which connects lower- and higher-level systems and controls voluntary movement. The pyramidal motor neuronal system connects the executive center in the frontal lobe with the spinal cord and the muscles. The neocortex and the spinal cord are also connected by pyramidal neurons. When successful, these connections allow pyramidal cells to act as part of the circuitry responsible for vision-guided motor function (Salimi, Friel, & Martin, 2008). The prefrontal cortex (PFC) receives input from all brain areas involved in processing sensory modalities. Within the PFC, pyramidal cells have been implicated in cognition processes involving sensory and visual inputs (Elston, 2003). Horizontal pathways also connect the system's different levels, protecting us from consequences resulting from immediate damage to one of the three vertical links. This complex organization enables the different levels of the hierarchy to influence each other (Table 3.1).

Table 3.1 Motor System Structures and Functions

UPPER HIGHER LEVEL

Association cortices include the parietal, temporal, and frontal lobes along with most of the cerebral surface of the human brain. They are largely responsible for the complex processing that occurs between the arrival of input in the primary sensory cortices and the generation of behavior. The parietal association cortex is especially important for attending to complex stimuli in the external and internal environment. The temporal association cortex is especially important for identifying the nature of such stimuli. The frontal association cortex is especially important for orchestrating and planning appropriate behavioral responses to the stimuli.

Basal ganglia: Extrapyramidal subcortical nuclei are probably involved in the selection of actions. The basal ganglia include other structures that assist in its activities: the caudate nucleus, putamen, and globus pallidus, along with the substantia nigra, the red nucleus, and the sub-thalamic nucleus. All are synaptically connected to one another as well as to the thalamus, brainstem, cerebellum, and the pyramidal system.

MIDDLE LEVEL

Motor cortex: initiates movement. This area includes the primary motor cortex, pre-motor cortex, and the supplementary motor area in the frontal lobe.

Diencephalon: area includes the thalamus and the hypothalamus. The thalamus acts as a gateway to the sensory system, receiving sensory information and forwarding it to areas of the motor system. The hypothalamus controls body temperature, hunger, thirst, fatigue, sleep, circadian cycles, survival or stress responses, and links the nervous and endocrine systems.

Cerebellum: facilitates the coordination of voluntary muscle movements, equilibrium, and tone, accompanied by an analysis of the timing of visual signals that correspond to one's own/others' movements. The cerebellum informs the brainstem, which is involved in involuntary bodily functions and movements as well as sustaining memory processes that enable fine motor skills.

LOWER LEVEL

Brainstem: The brainstem includes the pons, the reticular activating system (RAS), and the medulla oblongata. It is generally responsible for autonomic involuntary functions such as respiration, heart rate, blood pressure, etc.

Spinal cord: The spinal cord, a long, thin, tubular bundle of nervous tissue and support cells, extends from the medulla oblongata in the brainstem to the pelvis. Two of the spinal cord's three main functions are the conduction of motor information to the muscles, and transmission of sensory information up the brainstem to the thalamus for distribution to cortical and subcortical brain areas for further processing.

PYRAMIDAL MOTOR NEURONAL SYSTEM

Motor neurons descend from the motor strip in the frontal cortex to the lower brainstem areas (the midbrain, the pons, and the medulla oblongata) and on to the spinal cord. These long neuronal fibers terminate at different points along the spinal cord, where efferent nerves of the peripheral nervous system carry motor impulses to voluntary muscles. In conjunction, afferent sensory feedback into the cerebellum details fine motor aspects of these particular movements. Each discrete movement (for instance, picking up an object) triggers afferent nerves to send the cerebellum very specific information about each position during the movement sequence so that the cerebellum can send messages that fine-tune the muscle movements, adjust balance and redirect actions to accomplish the task.

Adapted from Carlson (2013)

The upper level contains association cortices, where auditory, spatial, visual, proprioceptive, kinesthetic, touch, and sensory inputs are processed. The association areas are responsible for the highest level of information processing in the brain, deciphering incoming information and connecting afferent sensory inputs with efferent outputs in order to construct and sequence motor responses in a timely manner. These processes occur simultaneously while the individual considers a myriad of possible behavioral responses and making decisions about which behaviors to execute, and when (Chakravarthy, Joseph, & Bapi, 2010; Stocco, Lebiere, & Anderson, 2010). The upper level is where the sensory information generated by art making is assembled, and where concrete movements become meaningful and symbolic: "The commonly held view that sensory and motor computations in the cortex are separate and hierarchical in organization needs to be reconsidered and interpreted in relation to the fact that all sensory pathways also carry copies of motor instructions so that sensorimotor processing is unified throughout all levels of thalamocortical functions" (Sherman & Guillery, 2011, p. 1075).

The association pathways receive information from the middle level, which is composed of the motor cortex, thalamus, basal ganglia, and cerebellum. These structures transmit incoming sensory information to the association pathways. This higher-level circuitry translates the information, resulting in more accurate movements. Their efforts are concerned with tactics aimed at avoiding collisions with objects and people. Comparisons of the desired versus actual results allow for corrections in movements as they occur.

It is partially due to the cerebellum's function that the motor system is associated with both emotional and cognitive function (Strick, Dum, & Fiez, 2009). The cerebellum, appropriately named the little brain, is involved in the coordination of voluntary and involuntary movements (Kalat, 2012), hand movement and language (Baizer, 2014), and the direction of emotions (Turner et al., 2007). Furthermore, it analyzes the timing of visual signals that correspond to one's own movements and those of others by balancing the excitation and inhibition of impulses. The cerebellum helps control complex motor movements, procedural learning, and muscle contraction sequences to create appropriate actions. Utilizing sensory input from the thalamus, the cerebellum works by balancing its own excitatory output with the inhibitory output from the basal ganglia to refine movement and increase coordination.

Historically, it was thought that both the cerebellum and the basal ganglia chiefly functioned as contributors to motor control. However, it is now known that these bodies have additional roles (Bostan, Dum, & Strick, 2010). The basal ganglia assist in emotion regulation (Ochsner & Gross, 2007), while the cerebellum is involved in language and memories of fine motor sequences, among its diverse neurobiological duties. "The range of

tasks associated with cerebellar activation is remarkable and includes tasks designed to assess attention, executive control, language, working memory, learning, pain, emotion, and addiction. . . . [Data], along with the revelations about cerebro-cerebellar circuitry, provide a new framework for exploring the contribution of the cerebellum to diverse aspects of behavior" (Strick et al., 2009, p. 413). This newer conceptualization of cerebrum function suggests that expressive art making movements may facilitate linkages to these functions.

The lower level of the motor system is responsible for transmitting information to the middle level and receiving commands from the higher level. For example, when one picks up a paintbrush, the motor cortex receives this information and, in turn, sends the appropriate messages to the hand. The hand's muscles adjust and balance fine motor actions, allowing one to fulfill the action and load the brush with paint, thus allowing art making to become an executed reality.

> *Creating art provides us with new information about ourselves as well as a means of communicating thoughts and feelings that otherwise might have not been available to us through verbal communication. It is the movement of creating, the action of it, that begins this therapeutic process.* Lisa Cerrina

Movement seems to be critical to the process of ATR-N change and learning. Taking a variety of forms, movement occurs in standing and using an easel, practicing painting, and scribbling motions before creating art, or dancing, or moving toward the finished product (Cane, 1983; Kwiatkowska, 1978). Other embodied work includes play therapy and drama therapy. These therapeutic and playful therapies can stir the imaginative self in such a way as to not only experience pleasure but also anticipate successful outcomes (Jernberg & Booth, 1999; Lahad, 1993). Understanding the neurobiology of motion affirms ATR-N principles and has the added advantage of relieving art therapists from any polarized discussion on art versus therapy (Hass-Cohen, 2007; Kramer, 1971; Riley, 1999).

Younger clients may benefit developmentally from the inclusion of therapeutic motion, since it also supports the development of coordination skills. More specifically, children with neurodevelopmental deficits such as autism, nonverbal learning disorders, and attention-deficit/hyperactivity disorder (Allen & Courchesne, 2003; Schmahmann, Weilburg, & Sherman, 2007) may benefit, as motion can help to organize, coordinate, and navigate space. Such advantages have been linked to improved communication, enhanced social skills, and higher cognitive functions such as the ability to shift attention (Akshomooff & Courchesne, 1992). Children with a history of developmental abuse benefit from repeated therapeutic movement as it can help calm their flight or fight defensive responses to attempted relational interventions (Crenshaw & Mordock, 2005). Furthermore, movement is associated with catecholamine release by the reward system, that can balance the release of stress neurotransmitters and hormones, again increasing both pleasure and cognitive and regulated parasympathetic functions (Hass-Cohen et al., 2014).

From an IPNB perspective, perceived danger can inspire action and evoke movement. Survival needs have primed the nervous and visual systems to quickly detect motion, respond with action, and seek safety (Siegel, 2012). Two main visual processing streams forward environmental visual cues from the occipital lobe to the frontal lobe (Kalat, 2012). The dorsal or "where-how" stream is hypervigilant about motion in space and can stimulate a fear response.

The neurocircuitry of the "where-how" dorsal stream involves areas in the brain that are sensitive to actual, perceived, and implied movements, whether in the environment or in imagery. The cerebellum has direct linkages to the dorsal lateral PFC, the executive center of the brain (Herculano-Houzel, 2010, Figure 3.6). Therefore, art therapists should exercise caution and specificity when presenting clients with imagery that contains movement (Hass-Cohen & Loya, 2008). People also tend to resolve fears by moving away from or toward the stressors that cause them (Sapolsky, 2004). Motion is then triggered by limbic-based emotions, such as actual and

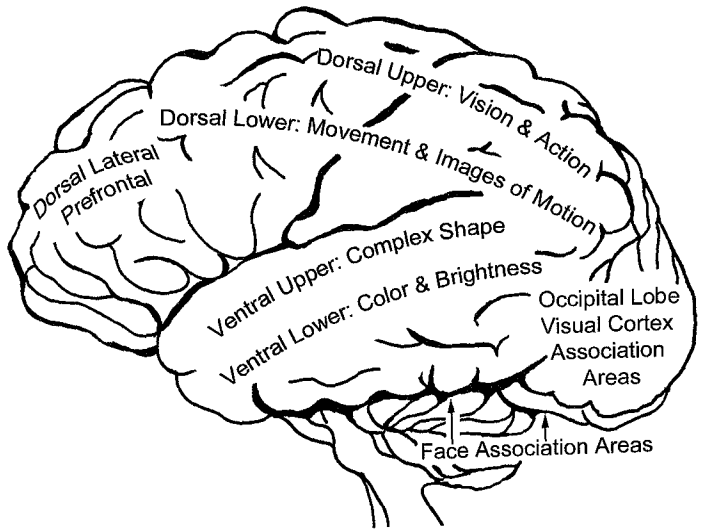

Figure 3.6 *Visual Processing Streams.* The dorsal upper and lower pathways are the "where-how" stream. The ventral pathways are the "what" streams responsible for the recognition of objects by their physical attributes which also include auditory inputs.

remembered fear. This knowledge guides the art therapist in initiating enactments of approach or avoidance that stimulate motion. Creating a sense of physical and emotional safety involves providing a supportive and adequately sized environment:

> *A sense of safety was set up early on and it was important to have a defined, ample space in which to create. We had the freedom to use the space to release and explore in a supportive environment in a manner of our choice.* Jessica Plotin

Understanding the Creative Embodiment principle is important when working with clients who have post-traumatic stress disorder (PTSD). Individuals diagnosed with PTSD often use avoidant strategies such as dissociation, thus inhibiting the recovery process (Cozolino, 2010; Porges, 2011). Vance and Wahlin (2008) suggested that dancing while making art increases memory functions and decreases pain, and Talwar (2007) explicated that dance and movement can support conscious processing of traumatic memories. It is likely that these actions stimulate the pleasure associated with catecholamine release by the reward system, which is discussed in later chapters. Furthermore, Talwar structures the art space in such a way that clients walk back and forth between the media table and the paper, which is taped on a wall. She holds that this assists in establishing proprioception. In other words, clients can gain a felt sense of the relative position of neighboring parts of the body and of the intensity of effort. In summary, engaging in nonverbal action provides a safe outlet for self-expression, as well as a sense of physical control (Hass-Cohen, 2006a). In addition, the neurotransmitters released during movement can calm the body while increasing energy, supporting clients' willingness to process traumas and relieving emotional and physical pain. As researchers continue to investigate the specific roles of each component of the motor system (Coffman, Dum, & Strick, 2011; Stocco et al., 2010), support for the importance of Creative Embodiment as a therapeutic factor in art therapy grows.

CREATE PRINCIPLES AND CLINICAL APPLICATIONS

In this chapter, the principle of Creative Embodiment is illustrated through experiential practices and directives. In particular, the larger art format and the creation of a group mural promote movement and enhance the ATR-N therapeutic advantages of motion. As an example, the motor system can become coordinated with the planning and with cognitive, emotive and social systems. This enables the integration of actions, emotions, and thoughts, promoting increased motivation and reduced inactivity. Motion, especially when repeated, can help clients solidify implicit learning and the consolidation of new memories. Motion can be embodied concretely, as in movement, or symbolically accessed. It is also an opportunity to joyfully interact.

In the same manner, relational interactions are encouraged between group members through experiential movement, sharing, and reflection. Associated with Relational Resonating, these ATR-N microskills allow for clients' growing awareness of others as well as their own relation to using interpersonal space. Group members attune to each other through rhythmic lines and shapes, motion-based imagery, words, and motions. In addition to the advantages of personal sharing, the sequencing of individual and group directives supports the creating participants' active awareness of others' art processes. Moreover, conveyance of interest in others' art through these discussions is motivating and rewarding, which enhances clinical change. Consequently, active co-creation and co-ownership of the wall mural increases interpersonal bonding and reduces isolation.

Experiencing the movement associated with painting a large surface with color and forms provides access to primary emotions such as joy or fear, feelings of self-doubt, and/or anxiety or self and interpersonal judgments. Expressive Communicating of emotions is released via the My Space experience. Once aroused states are reflected upon, the creators may be able to access subjective meaning making. For example, releasing the art from the table is an emotionally transformative moment in which what was created and expressed can be further communicated and changed. Realization of such impact through mutual discussion can provide the client group members with shared emotional moments of bonding, ownership, and pride.

Adaptive Responding takes place as the group members respond to moving around the art space and shifting toward mural making. In other words, movement assists in adapting to the demands of art making and the emotive reactions that arise. Moving both away and toward the art facilitates solutions that can balance emotional arousal and stress responses to novel situations. Supporting the capacity to tolerate emotional frustration and defensiveness, overall adaptation to concurrent stressors can be achieved in various ways. Navigating available space results in increased sensory motor experiences, possible emotional frustration, cognitive defensiveness, and the ambiguity of art expression, which are all means toward such adaptation. Experienced in exploration of fear-based impulses, these results are generated by the request to change the art, and turning to creative action for resolution of the fear response. The therapeutic request to change the image can be experienced as demanding by the creator. Such skillful ATR-N interventions provide clients with the opportunity to experience coping and adaptation. When feeling safe, clients identify and explore fear-based impulses, such as avoidance and

Transformative Integrating is demonstrated by the sequencing of the experientials. ATR-N microskills include the creative sequence of painting, expressing, cutting out the My Space art, reconsidering, and displaying the art. When therapeutically applied, creative sequencing of art directives assists clients in new meaning making. Such changes contribute to saliency, which transforms experiences and assists with achieving personal goals. Moreover, adding motion to the art making contributes to the integration of cognition, emotions, and sensory processes. This process mirrors the integrative process of creating, reframing, and witnessing oneself therapeutically. Viewing the *Living Museum* art in our relational space, moving about both during and after the art making, and shifting from personal art making to collective mural work in the Group Space experience supports many aspects of integration. Releasing the art from the personal context activates its interpersonal function. Furthermore, the creative transformation of the art in shape and orientation contributes to a sense of pleasure and well-being. Similarly, the integration of feelings, thoughts, and actions through the display and discussion of the art can promote flexibility. Flexible responses support balanced affective and cognitive function.

The progression from working individually to collectively, creating a mural, also enables an integration of personal- and group-meaning making. This unified sense of belonging aligns the group members' affective states, increases group bonding, and integrated cohesiveness. A feeling of membership in such a setting can increase relational security associated with integrated neurobiological functioning. Such integration is represented by the synchronization of the PFC, limbic system, sensory system, and motor system, which contributes to a sense of well-being and facilitates cognitive function. Viewing *The Living Museum* video showcases the CREATE principle of Empathizing and Compassion. Working as a group, watching the film, and seeing others' art collectively gives rise to empathic resonance with both the film participants (the psychiatric patients) and with present group members. Prosocial responses, such as helping each other and seeing oneself as part of the helping profession, are ignited by recognizing each individual's professional identity formation. Discussing and viewing art made in the presence of the film and each other supports a deepening connectedness and compassion as one witnesses and participates in the unfolding experiential. Looking at each person's My Space image supports the recognition that social loaning of imagery through the mimicking and mirroring of each other's actions, gesturing intentions, and symbols is a relational exchange. Within the arts psychotherapy clinic or art studio, in therapy groups or individual work, such repeated sharing experiences support the building of connected and empathic responses across a diverse group of people.

CHAPTER 4

Relational Resonating: Attachment and Neuroplasticity

I can see my growth as an artist, who is learning to become more in tune with her feelings towards making art, and more understanding of the feelings that can appear because of the art. From my mind's perspective, I believe that this semester, more than any other semester, has expanded my mind the most, in many ways. . . . Learning about neuroscience and how the brain works has also opened my eyes and my mind to new perspectives on life. Everything I have learned and participated in from this creative milieu has helped me understand what it might feel like to be the client, and has given me perspective on how I can foster that relationship and help it to grow. Autumn Cade

ATTUNED THERAPEUTIC RELATIONSHIPS AND COMMUnication promotes stable internal and flexible psychobiological states and interpersonal interactions. Such social exchanges and their ensuing mental representations have the potential to activate and mend attachment ruptures, stabilize affect regulation, update autobiographical memories, and contribute to earned attachment. Specifically collaborative and coherent art therapy relationships can increase experiences of positive affect and help disengage from negative feelings. Clients' abilities to access and share autobiographical memories will be influenced by their attachment style and history. Those with secure relational histories can use past positive memories for comfort, while those with less secure models or chronic trauma histories may experience difficulty evoking coherent past narratives.

This chapter is dedicated to the CREATE principle of Relational Resonating. It describes the multiple interpersonal dimensions of offering and sharing media, touching others' art, functioning together, and representing attachment-based imagery. As in Chapter 3, we contend that sharing art with others as well as making art in the presence of others most contributes to