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Abstract: Social Neuroscience maintains that human survival depends on interpersonal relations, and that shared circuits evolved to enhance our ability to interact with and understand other people. Shared circuits operate by re-creating the Other’s experience in the same brain regions used for Self experience. The interpersonal understanding made possible by shared circuits is, for the most part, outside conscious awareness and plays a role in the transference-counter-transference interaction. The brain mechanisms of shared circuits are presented and clinical vignettes illustrate the use of the concept of shared circuits in the clinical setting.

1. A full discussion of Self and Other goes beyond the limits of this article. For the purpose of this article (a) SELF refers to all that is contained in the physical boundary of an individual, as well as what is contained in his or her subjective sense of who he or she is as a separate physical, agentive, and experiential being, (b) OTHER is someone with a separate physical body and a separate subjective agentive and experiential sense of self and body. For a good review of the psychoanalytic concept of the SELF, see Milrod, (2002).
evolved to enhance an individual’s ability to interact with and understand other people. Additionally, some neuroscientists go so far as to propose that a sense of self and self awareness evolved in order to better understand others (Hurley & Chater, 2005). Shared circuits are known to exist in lower animals, but in humans shared circuits are more complex and widespread. Studies using fMRI, PET, and TMS have thus far identified shared circuits for touch, pain, emotion, behavior, and even for mind. While the Mirror Neuron System (MNS) was the first shared circuit to be identified (Rizzolatti, Fadiga et al., 1996), scientists now maintain that shared circuitry goes beyond the MNS and is probably a universal property of human brains so that people can understand each other at all levels (Keysers & Gazzola, 2006). The interpersonal understanding made possible by shared circuits is for the most part automatic and pre-reflective, that is, outside conscious awareness (Iacoboni, 2005; Iacoboni, 2008; Keysers & Gazzola, 2006). This may help explain why children typically are unaware of the behaviors, affects, and other mental processes they internalize from their parents.

The main point of this article is to integrate the brain mechanism of shared circuits, with psychoanalysis and psychodynamic psychotherapy. I emphasize that shared circuits are a basic property of self-other interaction and that the MNS is just one example of this fundamental brain mechanism used for social interaction and social relationships. Using the perspective of shared circuitry I intend to illustrate how neuroscience supports the intersubjective nature of relationships, the centrality of empathy, the use of the self in understanding others as well as the role of the body in mental life and the unconscious impact that patient and analyst have on one another.

I also hope to show how shared circuits may explain some of the limits of attunement and empathy with regard to therapeutic effectiveness. This article addresses in great detail how shared circuits make it possible for humans to understand each other even without words. Lastly, shared circuits help to illustrate the often precarious balancing act in relationships between understanding other as like self and the understanding of others as different from self. In particular I hope to show that sometimes it is more adaptive to principally focus on how self is like

2. fMRI, which stands for functional magnetic resonance imaging, is a neuroimaging technique sensitive to changes such as blood flow, blood oxygenation. PET stands for positron emission tomography. PET is a neuroimaging technique sensitive to changes in glucose metabolism. Both of these techniques measure changes, which indirectly reflect underlying neuronal tissue activity. TMS, or trans-cranial magnetic stimulation, can either stimulate or transiently impair a cortical region.

3. Although this article addresses both psychoanalysis and psychodynamic psychotherapy, to save space I use the terms psychoanalysis, analyst, and patient.
other, but that at others times recognizing the difference between self and other is most adaptive. Lastly the brain operates both consciously and unconsciously, therefore the role played by shared circuits in therapeutic action also operates at both these levels (Fosshage, 2005; Pally, 2007). I argue that shared circuits contribute to the transference-countertransference interaction and must be reflected on by both patient and therapist in order to have the fullest possible therapeutic effectiveness for the patient.

I first present some historical background, then illustrative clinical vignettes and finally the scientific findings related to shared circuitry. The clinical vignettes are abbreviated. Although these cases can be understood from many other perspectives, this article only focuses on that aspect of the treatment that pertains to the topic of shared circuits. The clinical vignettes underscore the importance of self-understanding in order to understand others, while at the same time indicating that too much emphasis on self can impair understanding of the other.

HISTORICAL BACKGROUND AND THEORETICAL CONTROVERSY

The concept of shared circuits harkens back to the early days of psychoanalysis, which explicitly recognized the role of the body in mental life. Freud wrote, “The ego is first and foremost a bodily ego” (Freud, 1923, p. 26). He compared the body ego to the cortical homunculus, which is the brain’s representation of the body’s sensory and motor experience (Freud, 1923).

The concept of shared circuits has much in common with a number of psychoanalytic and psychodynamic concepts that involve how the analyst is able to make sense of the patient’s material and also all other aspects of the analyst-patient interaction. A list of a commonality or overlap between shared circuits and psychoanalytic ideas includes the complementary and concordant countertransference (Racker, 1988); the concept of role-responsiveness in the context of an expanded view of countertransference (Sandler, 1976); the recognition that aspects of the treatment that are therapeutic resemble the deep kind of empathy and a blurring of self-other boundary that exists in the mother-infant interaction (Loewald, 1970); an emphasis on a two-person constructive view of transference (Fosshage, 1994); the intersubjective nature of relationships (Beebe, Knoblauch, & Rustin, 2005); the importance of mentalization in the development of self regulation and adaptive social relatedness (Fonagy et al., 2003); the importance of nonverbal communication
in self-other understanding and the transference-countertransference relationship (Jacobs, 1994; Kernberg, 2003); the importance of the analyst’s ability to contain the patient’s affect (Bollas, 1993; Kernberg, 1998; Winnicott, 1971); and the use of the analyst’s self in understanding the patient-analyst interaction (Jacobs, 1993).

There are now quite a number of psychoanalytic writers who support the integration of neuroscience and psychoanalysis. They come from a broad array of psychoanalytic theoretical approaches, including classical Freud, Object Relations, Self Psychology, Relational Theory, Intersubjective Theory as well as the eclectic point of view. The most intensive effort at integration is found in the journal *Neuropsychoanalysis*. This journal is dedicated to reconciling psychoanalytic and neuroscientific perspectives, since both fields pursue the same task of understanding the mind (Nersessian & Solms, 1999). Solms (1996) who takes a classical Freudian perspective argues “the human mental apparatus, as we conceive of it in psychoanalysis, might be represented in the tissues of the brain” (p. 331). Kernberg (2002), in a presidential address states that

current developments in neurosciences, cognitive psychology, affect theory and the new biology of memory open the perspective of a new relationship between psychoanalysis and the neurosciences, with the potential for neurosciences and psychoanalysis to become the two major pillars of the knowledge of the human mind. (p. 198)

Basch (1985), a Self Psychologist, believes that the findings of neuroscience are needed for a complete understanding of what self is and how self experience, through the process of empathy, contributes to the therapeutic process. Fosshage (2005), from the perspective of Relational and Intersubjective Theory, maintains that neuroscience adds to a psychoanalytic understanding of the development of psychological organization, change processes, and a theory of therapeutic action. Westen and Gabbard (2002) contend that neuroscience indicates which aspects of experience are more likely to appear in the transference, that is, issues related to authority, intimacy, attachment, and sexuality and that it is no longer relevant to distinguish between a real and a transference relationship. Schore (1999) provides a monumental contribution to understanding how the mother-infant relationship leads to actual brain development, and how this organizes all subsequent interpersonal relationships, including the analytic one.

Despite my strong belief that neuroscience has relevance to psychoanalysis, I acknowledge there remains much controversy. One relates to the tendency for each psychoanalytic theoretical approach to try and
use neuroscience to support its theory. I maintain that a complete reading of the “integrative literature” does not support any one theoretical approach (Pally, 1996, 1997a, 1997b, 1998a, 1998b, 2001, 2007). This fits well with the idea that psychoanalysis is actually a pluralistic set of theories and practices (Gabbard, 2005; Gabbard & Westen, 2003). For example, since shared circuits focus directly on social interaction and how people understand each other, it might be argued that this concept is most compatible with so called 

**two-person** viewpoints which emphasize the intersubjective nature of relationships and the development of the self, as well as the centrality of the relationship, empathy, and the use of the analyst’s self in the therapeutic process. However shared circuits also can add to an understanding of clinical issues contained in so called **one-person** viewpoints, which focus more on intrapsychic conflict, the subjective nature of mental functioning and the role of aggression in superego development, and defenses such as projection and projective identification.

Another controversy derives from the fact that neuroscience is the study of concrete, tangible, physically measureable phenomena and psychoanalysis is the study of subjective, intangible experiences, which cannot be concretely measured. Additionally both the fields of psychoanalysis and neuroscience contain divergent points of view with controversy. Therefore neuroscience cannot serve to either fully explain or prove any particular psychoanalytic idea. In past articles I have discussed that neuroscience encourages analysts to focus in on certain issues with patients, such as the fact that each of us creates our reality and our memories subjectively, our emotions are embedded in our body, and that effortful conscious reflection is necessary for the ability to see situations from multiple perspectives and to change deeply engrained behaviors (Pally, 1996, 1997a, 1997b, 1998a, 1998b, 2001, 2007; Pally & Olds, 2000). What this article on shared circuits adds is a focus on how **self**-experience influences one’s experience of others and the ways that this can lead to either an accurate or an **inaccurate** understanding of others.

Lastly there remains the controversy that neuroscience is unnecessary to psychoanalysis, since there are already sufficient ways to understand and treat patients contained within current psychoanalytic theory. Putting necessity aside, the relevant question ought to be “can we benefit from neuroscience?” There are indeed many benefits. For one, neuroscience validates psychoanalytic work and protects it from becoming marginalized within the field of mental health. For another it can bring more unity and a sense of a common language to the field of psychoanalysis, which may lessen the difficulty that exists in our communicating with one another, as in the Tower of Babel story. However
this will take place only by psychoanalysts learning about neuroscience and recognizing that what is captured by psychoanalytic theory and clinical interpretation, is in large part the abstract symbolic description of the physical workings of the brain and brain-to-brain interaction. Additionally if analysts learn about neuroscience they will be able to engage in a two-way conversation with neuroscientists in order to see what each field can learn from the other. Probably the best argument is that insights gained in other fields may enhance one’s work and strengthens the field in general.

CLINICAL VIGNETTES

None of the cases below are in a formal 4-5 times a week analysis using the couch. However all are in an intense transference-based psychodynamic psychotherapy. In each of these highly challenging cases, the main source of therapeutic improvement occurs through the use and interpretation of the transference-countertransference relationship, which is why I feel these cases are relevant both to psychoanalytic treatment as well as to psychodynamic psychotherapy. (The patients described have approved the inclusion of this disguised material for publication in a professional journal.)

Ryan: The Body and the Shared Circuit of Emotion

Ryan, a businessman, comes for treatment because his professional success is lagging. It takes a while for him to open up that his problems also involve his family. He is married, with two children, and a wide circle of friends and interests. He is clearly a rather friendly affable man. However at the same time he has a characteristically flat demeanor while talking, which becomes the heart of the treatment. Ryan tells me the events of his life in an emotionless monotone, stringing them together event after event, in minute detail. When I point out that it seems as if he is reporting things to me, but without any emotion, he laughs at my comment and says he is “just a man of facts, not feelings.” He explains he focuses on what people say and do only in terms

4. Both Dr. Pulver (2003) and I were astonished to discover that I was asked to give the annual Sydney Pulver lecture in 2008. In a personal communication he told me that despite his initial skepticism he now fully embraces the importance of learning about neuroscience for psychoanalysts.
of whether they are right or wrong, the way someone would calculate a math problem. When I ask him if there is a particular reason he is telling me all the details of a specific event he might answer with a defensive tone of voice, saying, “There is no reason other than the event happened that way.” Something in his tone of voice leads me to often comment, “You seem to feel criticized by my question.” And a usual reply would be, “You may be right, but I can’t feel a thing.” When he tells me about interactions within his family, his detachment from feelings is particularly evident. I point out again and again that the family situations often sound upsetting but that he does not show any emotion. It is almost a year into treatment before he begins to share how his family is upset with him for being emotionally detached. In fact one of his sons is so upset with him, that the son threatened to stop interacting with him. He even reports this in monotone, and denies any feelings about it. One of the main themes he talks about is his need to please others and avoid confrontation—a frequent example being his interactions with his secretary. “I should tell my secretary when she does something wrong but I just never get to it.” I ask, “What do you feel like when she makes a mistake?” He says, “I immediately justify people’s mistakes, but I have no idea how I feel. I am not even sure that I have feelings.”

I can sense he is connected to me and he is diligent in trying to use the therapeutic process, but his detachment from his own feelings is so pervasive and his ability to reflect on his emotions so minimal, I give up on asking about feelings, or pointing out he does not express emotion. I turn instead to noticing the physical signs of his emotion. I do this over and over. Initially he says things such as, “You may be right, but I did not feel a thing.” Eventually however it begins to be effective. The first occasion occurs after a long stream of “reporting” to me, in which he says, “I am eating too much . . . I am not exercising much . . . My wife refuses sex lately . . . Maybe that’s normal.” I point out, “I noticed a little flush in your face while you were talking. I wonder if it’s connected to being upset with your wife about not having sex and maybe it’s even affecting your eating and exercise.” Ryan answers, “I am not aware of feelings about it. I’m just figuring out if I am right or she is right.” I respond, “I want to understand what is really important for you, but when you just report things it is hard for me to tell. So I look for when your face flushes because I sense that is an indication when something emotionally upsets you.” Ryan says, “now that you mention it I did have a little flutter in my stomach when you said the words ‘upset with my wife.’” Ryan himself begins to notice these physical signs of emotion and they lead to a bit of insight. Ryan says (still in “reporting” mode), “My mother was extremely critical. I never could do anything right. It did not bother me because I decided I just was not going to be
affected by her anymore. I probably stopped having feelings as a kid.”
This insight is clearly a move forward, however he exhibits no change either in reporting mode when talking with me or in his pattern of overeating.

Ryan is the type of patient one easily becomes bored with and has difficulty feeling empathy toward. His lack of facial expressions or tone of voice expressions of emotion means that two routes of shared circuits of emotion are not engaged. Therefore the resulting empathy that would emerge from this shared circuitry is not available to the analyst (Pally, 2001). I instead look for other routes of shared circuitry that are available. I track his emotions by observing his bodily visceral indicators of emotion. When I see his face flush, via the operation of shared circuitry, it serves is an indicator to me of his emotion, which I share with him verbally. He in turn is able to use his stomach, which I can have no awareness of, as a sign to him, that he must be feeling something, and verbally shares that with me. More and more he is able to say, “I am aware of that flutter in my stomach. I have a hunch I am upset. It is probably about the sex thing, but I am afraid to talk about it with my wife for fear of rejection.” Another time he tells me about the son who is not talking to him, and says, “As I am telling you this, I feel that stomach flutter. So it must mean I am feeling badly about my relationship with my son.”

After a long period of time, of he and I sharing about the body signs of his emotion, he becomes increasingly aware of his needs, hurts, anger, and shame and how they affect his behavior. In using the interaction with me to better understand himself, he is also better able to understand the feelings of others and to see when they feel hurt or rejected. He develops a much better relationship with his wife, resolves the rift with his son, is able to negotiate interpersonal conflicts at the office and becomes more successful professionally.

Lucy: A Mother’s “Self” Experience Interferes with Empathy for Her Child

Lucy is a highly intelligent and sophisticated woman, who is the mother of an 8-month-old girl. Lucy comes to treatment because she has serious problems in relating to her infant daughter, Jenny. Lucy feels that Jenny hates her and is trying to show her what a bad mother she is.

Lucy is the youngest of three children. Her mother was overwhelmed, resented her children’s demands and withdrew when they needed her.
She competed with Lucy, always finding Lucy’s talent less than her own. Her father was hostile and shamed Lucy for having vulnerable feelings. All of this emerges in the transference-countertransference relationship. In the transference Lucy is very competitive with me, particularly in terms of office décor, clothing, and reading books and feels shamed if I focus on her vulnerable feelings. In the countertransference I feel inadequate and rejected.

Lucy’s problems with her baby are similar to her problem with people, in general. When someone says something that makes her feel inadequate she gets angry and attacks them as being an awful person. If I respond by saying, “perhaps you think they are so awful because they make you feel badly about yourself,” she feels attacked and says, “You don’t take me seriously. You think it is my fault. But these people are just awful, always thinking they are better than me.” Again and again, Lucy tells me how her baby cries all the time and how the baby is trying to make her feel bad. “When she cries it’s like she’s saying I can’t do anything right. I hate her. She is a selfish bottomless pit.” I say I think you hate her because she makes you feel bad. Lucy angrily shouts, “You think I am a terrible mother too, that I should be more patient. But just agree with me, no one could deal with her. I hate you when you won’t agree with me. You are not as good as my previous therapist who would agree about something like this.” Lucy scrutinizes my every comment, gesture and silence and experiences them as some type of criticism or rejection. As Lucy tells me about an incident in which Jenny was crying, she says, “I know you are judging me. How dare you judge me! This baby is impossible.” I try the approach of suggesting that perhaps she feels the baby hates her because she hates the baby. But this so intensifies her anger about being blamed by me, that it threatens our therapeutic bond and seems to worsen her bond with the baby.

Lucy’s pain as a mother is palpable, and despite how hateful and almost paranoid she sounds, I nevertheless find myself really caring about her. I can see she uses anger as a defense against the vulnerable, helpless, hopeless feelings of being an unloved and rejected child, and that this causes her to ward off awareness of these feelings in her baby. Although it is not easy, my goal becomes to lessen her angry defenses by empathizing with her needs and emotions that underlie her angry attacks. I hope she in turn will be better able to more accurately identify the meaning of Jenny’s crying and better empathize with her. I say things such as, “You feel I, your baby and everyone are rejecting you and making you feel inadequate. And all you really want and need is to feel loved and approved of.” When Lucy sees her baby’s distress in terms of how it means she is a bad mother, I say, “I can understand why it is so hard to have Jenny. You are so looking to feel loved and adequate
and a crying baby only leaves you with the bad feelings about yourself you already have. I recognize how brave it is of you and how much you love your baby that you want to work on this, and that despite your shame you tell me about it.” I link this up with her early experience as a child. “I think it must have been so painful as a child. You felt so put down by your parents which is why I think you assume I am criticizing you all the time, and may even experience Jenny as criticizing you.” This facilitates the therapeutic process. Lucy eventually is more able to experience me as caring about her. She responds to my comments by saying, “You have it exactly. Yes, I felt so unloved and my parents made me feel so awful about myself I just can’t handle these hurts from anyone. But I do really love my baby.” In another instance Lucy says, “I can’t stand her when she needs so much. And no one believes me that she’s insatiable. You are just another person who thinks it’s all my fault because I can’t take care of her.” I listen and empathize. “It’s understandable why you feel angry. You did not get enough from your parents. It was so hard for you as a little girl. You are practically empty and she depletes you further. No wonder you resent her.” She calms down. “I do resent her, but I don’t want to. I panic at the idea she may know I resent her. It makes me not want to think about it.” We go through this pattern over and over of Lucy’s distress in feeling rejected, inadequate and criticized, followed by her being angry and hostile, followed by my listening carefully and empathizing with her until she calms down.

However after a year of work and despite the fact that Lucy feels a lot better herself, to my dismay she still does not empathize with her baby. Her “read” on Jenny is as a selfish baby, who thinks she is a bad mother. I try the approach of explaining that this is what she internalized from her own parents, and it became her sense of herself. I think to myself that she cannot de-center from her sense of herself in order to recognize the baby’s emotional vulnerability and need for empathic responsiveness. She no longer feels I am criticizing her, but it does nothing to help her attune to the baby’s distress or empathize with it.

My understanding of shared circuits keeps me focusing on ways to connect Lucy empathically to her baby. Lucy is quite critical of other people’s taste and intellect. With her I feel my office looks awful, my clothes and hair look awful and that despite how much I read, that I missed all the really important books. But since I also have a tendency to be critical of myself, I fail to reflect on these feelings as being part of the interaction with her. A turning point in the treatment occurs one day when I notice Lucy’s behavior as I greet her in the waiting room and usher her into my office. First she looks down, walks across the room, and as she passes by me at the door she turns up her nose and
looks away. It dawns on me that I have been interpreting some of her behavior as disdain and rejection of me. In that instant I realize Lucy is not rejecting me or disdaining me. Lucy is shy and overly sensitive and has difficulty with direct face-to-face contact and the intensity of my smile. I realize I misinterpreted the intention behind Lucy’s behavior. She is avoiding my look because she is oversensitive. She is not trying to reject or snub me. I realize that my rejected feeling must be what Lucy feels with her baby. So when Lucy starts off the session complaining about her baby hating her and criticizing her, I say, “I don’t think your baby hates you or is trying to point out how inadequate you are. I think your baby is just like you. She is just shy, sensitive, and easily gets disappointed and hurt and so she cries and screams. It’s just like you are when I greet you in the waiting room. You turn away and I am aware of feeling a little bad.” Lucy scornfully says, “How can you say I am like her?” I say, “When you feel I disappoint you or misunderstand you, you get angry with me, even scream at me. And I let you scream and I try to understand. It takes a long period of my empathizing with your feelings. You really need a lot of this. But eventually it calms and soothes you. She is just like you. She is sensitive like that and screams when she feels disappointed and misunderstood and needs you to empathize with her.” Much to my surprise and relief these comments get to her and for the first time she is able to empathize with her daughter. Lucy coos, “Oh the poor thing. She is just needing me to love her.” By pointing out how I misinterpreted her traits of shyness, sensitivity, and quick anger as rejections of me, and by pointing out how she shares this trait with her daughter provides a link for Lucy to better understand her baby’s motivation and needs. Lucy is finally able to utilize her shared circuitry with her baby daughter, in a way that more accurately corresponds to the daughter’s emotions and intentions, enabling Lucy to better attune and empathize. Although clearly later than is desirable, Lucy and her 3-year-old daughter form a loving bond.

Sarah: Shared Circuit of Mind

Sarah is married with two children. She is the eldest of three sisters. Her father was emotionally hostile, denigrated and physically abused the children, while her depressed mother, who had been raised in an orphanage, stood helplessly by and did not protect them. Sarah first came for treatment because her daughter had made a serious suicide attempt. Sarah feels responsible and is punishing herself by no longer having any pleasure in life. She is socially withdrawn and isolated.
Sarah tells me that she feels she does not matter, that she is unworthy, a bad mother and deserving of punishment. She repeatedly says things such as, “If my daughter was so depressed it is my fault. You too must think I am a terrible mother and that I don’t deserve to be happy if I am the cause of her unhappiness. I will not allow myself to have any good feelings, because I feel I deserve to be punished,” or “I feel so insignificant I am sure you are tired of paying attention to my problems.” I encourage her to explore how she might have developed such a belief. I explain that for example children often internalize the feelings, behaviors, and attitudes of their parents without knowing it. Sarah cries, reliving a memory. “When we would misbehave at the table he would yell that we were disturbing his dinner and we would have to pay the price. He would slam my sister to the floor or hit me until it hurt. He made me feel so bad!” Using the concept of shared circuitry to shape how I respond I say, “I think you internalized his punishing intention toward you. It is now your own intention toward yourself, so you believe you must inflict hurt onto yourself. Because you have this attitude, you assume I think these same things as well.” Again crying Sarah says, “And my mother just sat helplessly by. We just did not matter to her enough.” I say, “Here too you internalized what seemed like her attitude that you are not important and don’t matter. You feel this toward yourself and assume I feel it toward you.”

It takes a lot of treatment before Sarah shows any signs of change. But finally Sarah ventures out to take a gardening class, and makes a small flower garden at home. A therapeutic move forward occurs when she reflects on a process in her mind while she is gardening that she then uses adaptively to better understand my mind toward her. Sarah says, “I am really focused on these tiny flowers and trying to get them to grow well. I care so much about these little flowers. It is really silly because the flowers do not matter that much. It’s just a little tiny garden for heaven’s sake.” I respond, “But it matters to you. It matters so much to you that you put a lot of effort into it.” Sarah answers, “Yes I do. In fact I was thinking about a parallel between how I feel toward the flowers and how you feel toward me. That little flowers are precious to me, so I enjoy the time I spend tending them. I started to think this is how you feel about me. I am just this little flower that you care about. Maybe you don’t think I should punish myself, maybe you think I should do well.” I tell her that is exactly how I think. I am glad she can see the connection between how she feels about the flowers and how I feel about her and hope she will see others find her important as well. This was a real turning point in the treatment and eventually little by little Sarah reconnects with the people and activities that give her pleasure in life.
Elliott: Shared Circuit of Mind, and the Impact on the Transference

Elliott is a warm, likeable man, who is married and has three sons. He is successful in his career, and has many friends yet he is unhappy. He sees himself as someone who is not allowed to have needs and whose purpose in life is to serve the needs of others. Two pivotal events color Elliott’s view of life. When he was 2 years old, his 4-year-old brother fell and permanently injured his leg while their mother was dressing Elliott. The father was angry with the mother for letting this happen. Elliott felt blamed and guilty, as if the accident were his fault, since his mother was taking care of him when his brother got hurt. A subsequent situation only intensified Elliott’s worries. At 5 years old he “threatened” to leave home when he did not get his way. His mother replied with hostility, “Fine! I will pack your bags.” She started to pack and he begged her to stop. What emerges in the transference is that he believes his dependency needs are bad and his anger is bad. He feels poisonous and that others will get hurt or have to abandon him if he expresses his emotions and needs.

He quickly forms an intense transference. About six months into the analysis after a particularly painful session he says he needs a hug from me. I explain how I cannot do that because of professional reasons but that we can talk about his feelings. What happens in those few minutes becomes a main theme of much of the treatment. Although I encourage him to express his disappointment and anger he says there is no point. He believes if he tells me how he feels I will become disgusted by his neediness and get rid of him. He says, “I just want love. Is that so much to ask? But I guess I just have to do therapy your way because my way is wrong. I am certainly not going to get my needs met here. You are not the type of person to put up with an angry patient.” I explain to him that even though I cannot hug him, it is fine that he asks. I say I really want to understand how he feels and that his needs are important to me. Nevertheless he shuts down, at times threatens to leave, and is generally hopeless. He says, “This is the story of my life. I have never been loved. I crave to be loved. I cannot have my needs met because your needs to live up to your professional standards are more important than my need for love.” What emerges as we come back to this event over and over, as other disappointments with me arise, is that he detected in me a “horror of disgust,” that I had “recoiled” with fear, when I said, “No. I cannot hug you.” He sensed this in me and sensed this in his mother. He says, “Women flee me, when I am needy or angry.” It is this bodily response on my part that he tunes into and serves as a signal to him to
hold in frustration at not getting what he wants and needs. He says, “Even though you say it is alright for me to ask for things, and to get angry at you, I know that is not true. I can tell by your voice and how you move how uncomfortable it makes you. You look afraid, as if you just want to get rid of me. I can handle that you won’t hug me, but at least I would like some type of intimacy but you are afraid of even that.” We analyze the painful transference longings and his resultant feelings of hopelessness from so many angles without any movement forward that I begin to fear stalemate. My understanding of how the shared circuit of mind and emotion play a role in the impact people have on each other, helps me consider that he has a point about my reaction. It is as if he has read my mind before I was aware of it myself. His request for a hug, his constant requests for love and intimacy and his anger at me do in fact stir up emotions in me that I do not want to be aware of. I want to be open and accepting of his transference and yet he is right, I am afraid of it, I do wish he would stop asking. I realize I feel guilty that perhaps I had overstepped some professional boundary and given the impression I would give him more. I also feel like a failure that I cannot help him resolve the “transference neurosis.” I want him to stop so I do not feel so badly. I take what feels like a bold step and share this with him. I say, “I think you are right. You did pick up on my fear and withdrawal which I was not aware of.” For the first time in the treatment he sighs with relief and says, “In the face of all that fear, that you were still willing to share something so vulnerable with me, makes me feel that perhaps I am not so toxic and dangerous after all. You may not have been aware of it, but when you told me you could not hug me, your face showed a sign of disgust and fear. I took that to mean my needs turned you off. I could also sense that fear in you and I was reacting to it, taking care of it in you by not pressing you. But what you just said now feels like I am not so awful and I don’t have to take care of you.” He links up with how he felt he had to protect his mother, because she was so vulnerable. She was so guilt ridden about Elliott’s brother and afraid of the father’s wrath that he did not feel he could add any extra burden to her life.

**SHARED CIRCUITS:**
**TOUCH AND THE SOMATOSENSORY CORTEX**

Shared circuits of touch explain why when we watch a tarantula crawl on James Bond’s chest in the movie *Dr. No*, we literally squirm, as if the spider were crawling on our own chest. Similarly a mother can feel the softness her baby feels when the baby is being gently stroked.
A number of researchers have studied the shared circuits of touch by using fMRI scanning to compare brain activity when someone is touched versus when that person watches another person being touched (Keysers, Wicker et al., 2004; Morrison, Lloyd et al., 2004; Ochsner, Zaki et al., 2008; Wicker, Keysers et al., 2003). Being touched activates primary and secondary somatosensory cortex, respectively S1 and S2. Results show that S1 is active only when the subject is touched, but not when observing touch. On the other hand, S2 functions as a shared circuit, because overlapping areas within S2 are active both when the subject is touched and when the subject views another individual being touched.

Neuroscientists emphasize that although within the brain self experience is used to understand others, there is no exact replication. Rather there is an overlap between the activity of self-experience and the activity of other-experience. In this way brain processes retain the ability to make distinctions between self-experience and the other’s experience. This balance between recognizing self as like other, versus self as different from other has ramifications within every aspect of social interaction.

**SHARED CIRCUITS:
PAIN AND THE INSULA AND ANTERIOR CINGULATE CORTEX**

As President Clinton once said, “I feel your pain.” As a result of shared circuits of pain we vicariously feel pain sensations when we see someone else receive a painful stimulus. Neuroimaging shows that receiving a painful pinprick (Morrison et al., 2004) or heat pain (Ochsner et al., 2008) as well as witnessing another person undergo similar stimulation are associated with overlapping activity in pain-processing areas in the anterior cingulate cortex (ACC) and anterior insula, (AI). In humans the AI facilitates conscious awareness of the painful stimulus (Craig, 2008) and the ACC encodes the painfulness of the pain (Peyron & García-Larrea, 2000).

As with touch, in processing the pain of others, although the observer’s brain simulates the other’s experience of pain by reactivating his or her own pain circuitry, the capacity to distinguish self from other is retained in two ways. First, pain experience of self and other are overlapping, but not identical, and second, some areas are activated more in self-pain than other-pain. In fact for all interpersonal functions studied thus far, the brain has both shared and unshared circuitry (Bastiaansen, Thioux et al., 2009). For this reason patients and analyst must flexibly and adaptively fluctuate in their capacity for processing the shared “self-like-other” and unshared “self-as distinct from-other” elements of interpersonal functioning, as illustrated in the vignettes.
SHARED CIRCUITS OF EMOTION: INSULA AND ANTERIOR CINGULATE CORTEX

Knowing how other people feel is at the heart of all social relationships. Nowhere is this more important than the early caretaking relationship. A mother must share her baby’s feeling to some extent in order to understand and subsequently regulate the baby’s emotions, a process which fosters the development of a secure attachment and optimizes socio-emotional development (Ainsworth, Blehar et al., 1978; Beebe et al., 2005; Lyons-Ruth & Spielman, 2004).

From the perspective of the brain, emotion is a complex constellation of processes, which include hedonic tone (pleasure-pain); changes to the body and the somatic sensations that arise from these changes; the activation of behaviors used to communicate the emotion to others; and behaviors used to cope with the event causing the emotion in the first place. For example if a little girl sees her father hit her mother, she feels a painful sense of fear. Her heart races and breathing increases to support running out of the room to get away from the danger. Her head and chest ache from tension. Her tears and trembling indicate her distress. And if someone is around, they will know she needs comforting.

Neuroscientists have identified a shared circuit of emotion. Each element of emotion can participate in shared circuitry. The shared circuitry underlying the hedonic tone, and conscious awareness aspect of emotion are discussed here. The shared circuits for the communicative and coping behaviors of emotion are discussed under the Mirror Neuron System.

When an emotionally salient event occurs a complex series of brain areas are activated (Damasio, 1999; Pally, 1998; Panksepp, 1998). First the limbic system (amygdala and orbito-frontal cortex, OFC) receives the sensory input of the event and triggers the necessary changes to the body physiology. Then the posterior insula integrates sensory perceptions of the event, limbic information, and physiologic feedback from the body organs, and sends this to the anterior insula, which specifically plays a role in the ability to be conscious of emotions (Craig, 2008). The anterior insula in turn sends signals to the anterior cingulate, which processes the pleasure-pain dimension and regulates the attention directed to the event (Cacioppo et al., 2005). This information is forwarded to frontal behavioral planning systems, which organize a behavioral response to communicate the emotion and take adaptive action, for example, to smile and hug a loved one, or scowl and run from an enemy.

The best-studied shared circuit of emotion involves disgust (Carr, Iacoboni et al., 2003). Brain activity is measured both when an experi-
mental subject smells a disgusting odor and when they watch someone else with the facial expression of disgust. Results show that experiencing disgust and seeing someone else express disgust exhibit increased activity in both the insula and anterior cingulate, as it does with pain. And as with pain and touch, some areas are activated more with self, some more with other and some overlapping areas are activated both with self and other. By re-activating the insula and ACC, the observer re-creates the other’s disgust, including the other’s physiology, hedonic tone, and behavioral tendency. There is a protective value to the shared circuit of disgust. When one person views another person grimace, gag, and spit out a piece of rotten meat, by re-creating that disgust in their own brain, the viewer now feels disgust and their brain automatically implements behaviors to avoid the meat, without the viewer having to actually taste the meat. This way of understanding other people’s emotions emphasizes the centrality of the body in the empathic process (Craig, 2008; Decety & Jackson, 2006). It is presumed by neuroscientists that similar mechanisms are used to understand, empathize, and respond to other emotional facial expressions, such as fear, sadness, and anger (Bastiaansen et al., 2009; Craig, 2008; Rizzolatti, Fadiga et al., 1996). Such learning through shared emotional circuits enables a child to see their parent frown or yell at another person, automatically sense the other person is not safe and avoid that person. For some however there can be a maladaptive confusion of self-emotion and other-emotion. For example during a session with Lucy she tells me of an upsetting event and she asks me, “Are you okay?” I reply, “Yes I am fine, but why do you ask?” She in turn responds, “Your face looks upset.” She is worried that I am upset with her. I, realizing that my face must be matching her facial expression of distress, say, “I think I am resonating with your feelings of distress, and so my face shows it. I think that it is so hard for you to feel empathized with that you assume I am upset at you rather than I am feeling what you are feeling.”

**SHARED CIRCUIT OF BEHAVIOR, INTENTION, AND EMOTION: MIRROR NEURON SYSTEM**

**Understanding the Behavior of Others**

Mirror neurons are brain cells that are activated both when observing someone else perform an action and when performing that same action oneself (Rizzolatti et al., 1996). The process by which mirror neurons enable one individual to re-create, in his or her brain, the behavior of another individual is referred to as behavioral simulation (Gallese,
Simulation is internal. The frontal lobe typically inhibits overt action. By simulating another’s behavior, one knows what they are doing because one knows what one would be doing if one were behaving that same way . . . but one does not actually take any action!

As a result of their role in behavioral simulation mirror neurons participate in a wide range of human capacities (Iacoboni, Woods et al., 1999; Rizzolatti, 2001). Mirror neurons are found in three reciprocally interconnected areas referred to as the Mirror Neuron System (MNS), (1) ventral prefrontal cortex (vPFC), (2) superior temporal sulcus (STS) and (3) inferior parietal lobule (IPL; Carr et al., 2003; Iacoboni, 2006; Iacoboni, 2008; Rizzolatti et al., 1996). The vPFC processes the detailed motor specification of the behavior and the goal of the behavior; the STS the visual component of behavior; and the IPL the kinesthetic properties or how it feels to perform the behavior. The MNS is involved not only with visualized behavior, but also with the auditory aspect of behavior (Keysers & Gazzola, 2006). The MNS is activated when one hears an action such as tearing paper or cracking a peanut shell.

Although mirror neurons re-create the other’s behavior in the self, the MNS retains the ability to recognize who actually performed the action (Iacoboni, 2008). For example when a person performs an action the IPL is more active, since there is kinesthetic feedback from one’s own performance that does not occur during action observation. Additionally super mirror neurons exist which increase their firing rate for action of the self but decrease their firing rate for actions of other people.

Understanding the Intentions and Goals of Others

People react more to the intention of an action than to the action itself (Frith & Frith, 1999). Therefore one needs to know not only what action is performed, but the intention or purpose underlying the action, the why of the action. If a woman holds an apple in her hand, one reacts differently if it is assumed her intention is to offer to share the apple verses eat it herself. Two mechanisms have been indentified for how the MNS processes the intention underlying action (Iacoboni, Woods et al., 1999; Iacoboni, 2005). First, the vPFC maintains reciprocal connections with the frontal areas that process the goals of actions. Second, there is increased activity within the MNS when the observer is processing the intention of the observed behavior (e.g., sharing or eating), rather than recognizing what behavior is being performed, for example, holding an apple. As a result of simulation, the action observer knows the action
performer’s intention. This is because the observer knows what he or she would intend if he or she were performing that same action (Rizzolatti et al., 1996).

Since people use their own intentions to understand the intentions of others, there is often room for misunderstanding. In the example of Lucy, since she herself hates and attacks me when I don’t emotionally attune with her, she assumes others, including her baby, hate her and are intending to attack her with their behavior. In some instances, such as the baby’s shy temperament, she must see baby as similar to self, but when it comes to attacking or hating she must differentiate baby from self.

Imitation, Social Learning and Mirror Neurons

In comparison to animals, which have many innate behavioral repertoires, humans must learn most behavior. Additionally while many animals can mimic the behavior of others, only humans have true imitation. True imitation involves not just copying the behavior of another, but also automatically inferring the intention of the behavior (Tomasello, 1999). It is the innate and unique capacity of humans to imitate others, made possible by the MNS’s role in behavioral simulation and intentional understanding, that allows children to learn the vast repertoire of behaviors they need for functioning within their environment, family, and society (Cacioppo, Visser et al., 2005; Tomasello, 1999). Babies soon after birth imitate the facial expression of their caretakers (Meltzoff & Moore, 1998). Children learn more through imitation than from verbal instruction (Tomasello, 1999). One reason for this is that children need to learn how to behave well before they have language.

Imitation involves simulating the other’s behavior but without the frontal lobe inhibition, so that the observer overtly performs the action. Observing the behavior of another re-creates the behavior in the observer’s brain and enables the observer to understand what the behavior is and why it is being performed. During imitation there is increased activity in the MNS—more than either action performance or action observation alone (Iacoboni, 2005; Meltzoff & Decety, 2003). This makes sense because imitation involves both observing and performing the action. Infants and young children so readily imitate, because their frontal lobe inhibitory capacity is not yet fully developed. Imitation enables children to readily learn not only mechanical skills, such as how to fish, or how to tie their shoes, but also the social and ritual practices of the culture they belong to: for example, how to ask for food, how to hunt, how to
greet people, how to dance. Differential activity levels in the IPL help the individual distinguish between self and other. Therefore despite the very close matching of their parent’s behavior children can still develop a sense of autonomous agency (Meltzoff & Decety, 2003).

Imitation is often more beneficial than instruction. For one thing infants are preverbal. For another, even once language develops verbal instruction is slow and cumbersome in contrast to nonverbal behavior. Because human imitation involves also automatically recognizing the intention of the action, a child can choose to use a different behavior to gain the same goal. This serves as a major contributor to human intelligence and creativity. Since Broca’s area, a major language center, is part of the vPFC, it is proposed that the learning of language itself is a product of behavioral simulation and imitation (Gallese, 2003; Iacoboni, 2008; Rizzolatti & Arbib, 1998; Rizzolatti & Craighero, 2004).

Empathy and Understanding the Emotions of Others

The MNS also contributes to emotional empathy. Observing the facial expression and body posture of emotion in another person activates the MNS in the observer’s brain, in the same way as with nonemotionally based behavior. Neural pathways link the MNS to the anterior insula, which signals limbic system areas, (e.g., OFC and amygdala), that process the emotional meaning of stimuli and activate the body physiology underlying the emotional response to those stimuli (Gallese, 2001; Iacoboni, 2008). When observing someone’s emotional behavior, (e.g. smiling or crying), shared circuits enable one person to literally re-create the other person’s emotional state (Gallese et al., 2007). This process is called embodied simulation, because the same neural state is realized in two different bodies, and the other becomes, in a sense, another self (Gallese, 2006).

The neuroscience of shared circuits lends support to the importance of relational experience as a focal point for therapeutic action. As explained by Nahum (2005), one individual genuinely trying to understand another is at the core of a positive therapeutic impact and that by definition this understanding is inexact (Fosshage, 2005; Gallese, 2006). The importance of “inexact” emotional resonance is supported by research in which infants prefer a less than perfect contingency or matching in interactions with adults (Beebe et al., 2005; Gergely & Watson, 1996). Shared circuitry provides the neural basis for relational understanding, and also explains why too close an understanding, can be as harmful as too little understanding (Decety & Jackson, 2006). If the
shared circuitry of a parent with a distressed infant re-activates the parent’s distress, this reciprocally will lead the infant’s shared circuitry to re-activate distress and will add further distress to the infant. The parent who can simulate the infant’s distress, but also modify that distress in him or herself, provides a lower level of distress for the baby’s shared circuit to “pick up.” This, in turn, down-regulates the infant’s distress and is experienced as being understood and soothed.

Much of the time we are accurate enough in our understanding of the other, but the process can go awry. For example if I see a parent broadly smiling at his or her child, my own inner experience of warmth and pleasure most likely accurately enough corresponds to the parent’s experience. However the observer’s inner experience may not accurately correspond to the other. At one end of the continuum are autistic individuals, who have been shown to have impairments of MNS activity and therefore lack embodied simulation. This helps explain many of their social impairments (Iacoboni, 2006). A less extreme example of inaccurate simulation occurs in the case of Elliot’s mother. She failed to recognize his threat to leave home as a child’s developmentally appropriate expression of separation anxiety, and the need for reassurance that the mother loves and wants the child to stay. She simulated his behavior and interpreted it as a personal rejection, which made her act out her desire to reject him. Some parents, such as Sarah’s mother who was traumatized as a child, can find simulating their child’s distress too distressing for them. As a result, for defensive purposes they detach or dissociate. Therefore Sarah was emotionally alone with no source of distress soothing, which is what she re-experiences in the transference. This happens for Lucy. She becomes overly distressed by her daughter’s distress and must defend against awareness of the distress by labeling it as hostility. Another less pathologic example of shared circuitry gone awry is a woman patient who when her husband is angry with his boss, feels extremely agitated. She accurately simulates his feeling, and understands it. But she feels it so strongly it is too upsetting. She automatically says, “Oh, you should not be so angry,” just to relieve her own feeling of distress but inadvertently makes him feel uncared about.

**SHARED CIRCUITS: HOW MINDS UNDERSTAND OTHER MINDS**

**What is the Mind?**

The term mind refers to the process of reflection or being aware of one’s awareness, where as the term mental state refers to the contents
of the mind. For successful interaction with others one must recognize the other person as a mental agent, and intuit what is on his or her mind in order to fully understand his or her actions (Mitchell, Banaji et al., 2006). Recent neuroscience research has identified a set of structures that operate as a shared circuit of mind (Gusnard & Raichle, 2001; Gusnard, 2006; Raichle, MacLeod et al., 2001; Uddin, Iacoboni et al., 2007). All the shared circuits discussed previously are grounded in some way to an observable or tangible aspect of other people. Shared circuits of mind however relate to the purely mental nontangible aspects of others.

**Brain Circuitry of Self and Mind**

Only quite recently, as the result of a new way of interpreting neuroimaging data, has neuroscience identified the brain circuits, which underlie the sense of **self**. It turns out, these same circuits underlie awareness of one’s **mind**. This is why people feel a sense of ownership and agency regarding the contents of their mind. In addition, the brain regions which underlie the processing of one’s own mind overlap with the circuits which process the minds of others. It is for this reason that there is room for confusion when others’ minds differ from one’s own.

Neuroimaging data indicates that there are a group of brain areas characterized by high baseline metabolic activity when a person is in “idle” mode, that is, at rest, conscious but doing nothing in particular (Gusnard & Raichle, 2001; Raichle et al., 2001; Raichle & Snyder, 2007). This is considered to represent a person’s baseline state of functioning and therefore is called the default system. The default system displays the highest metabolic rate at rest and the largest decrease in activity during engagement in goal directed but nonself-related tasks, such as noticing the shape of an object or pressing a lever (Gusnard, 2006). The default system includes primarily midline structures, for example, dorsal and ventral medial prefrontal cortex (dmPFC, vmPFC), and precuneous (posterior medial parietal cortex) as well as posterior lateral cortex (Raichle, MacLeod et al., 2001; Uddin, Iacoboni et al., 2007).

These areas represent the various aspects of the physical self and the psychological self. The medial PFC represents the “emotional self” because it is heavily interconnected with limbic regions (amygdala, hypothalamus, and autonomic nervous system) that process sensory events

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5. It is similar to maintaining your computer in hibernation mode, rather than turning it off. It is ready much sooner when you need to use it.
and link them to changes in the body viscera. The precuneus is assumed to represent self-perspective taking and an experience of agency, because it is heavily connected to the spatial perspective parietal areas and to the PFC motor planning areas (Cavanna & Trimble, 2006; Gusnard & Raichle, 2001). In default mode the brain is highly active and continually monitoring the self in relation to the world. This enhances survival because the individual can react more quickly to a salient situation that requires directed attention and an emotional and behavioral response. The brain’s high baseline activity in the default system predisposes humans for social cognition and creates a bias to understand the outside world self-referentially (Iacoboni, Lieberman et al., 2004; Schilbach, Eickhoff et al., 2008). This helps explain how patients like Elliot assume other people’s behavior and emotions are directed toward them. Elliot misinterprets my behavior, which reflects my internal concern about my participation in an enactment, as an expression of his “toxicity.” An individual is more detached from self when attention is focused on objects or tasks, because activity in the default structures goes down. Such focused attention on cognitive tasks can be used defensively to keep the self detached from the internal state of the self. This occurs in the case of Ryan who explains events in minute detail and is not aware of what he feels during those events. In more extreme states patients can use overfocus on sensory events to dissociate from the emotional distress that occurs in trauma.

Brain Circuitry for Reflecting on the Mind of the Other

It turns out that the self system also operates as a mind of self system and shared circuit of mind between individuals (Gusnard & Raichle, 2001; Iacoboni, 2006). Default network activity goes down when attending to nonself-related tasks, but these same structures show increased activity during tasks that attend to the mental states of self, such as paying attention to one’s emotions or judgments. This same default system shows increased activity in attending to the mind of others. There is an overlap of activity in the vmPFC both in self-reflection and reflecting on the minds of others. This is why it is considered to operate as a shared circuit of mind, since it is activated both when the individual references some aspect of his or her own mind, as well as when referencing some aspect of the mind of another person. For example, the vmPFC has been found to be involved with tasks of mental attribution—for instance, “What do you think Susie is thinking in this situation?” In addition the default network of the mind of self is re-activated during social interac-
tion and when observing social interactions between others, or when ascribing social traits to others. Presumably this is because these tasks require the subject to reference the mental state of the other person. One study (Mitchell et al., 2006) found this overlap to be most significant when the observer perceives the other as similar to self. What this implies is that self-reflection, as a means for understanding others, may not operate when an individual does not realize that they are similar to the other. Clinically this is what occurs in the case of Lucy and her daughter. My helping Lucy connect up with the similarity between herself and her daughter enables her to more accurately understand the mind of her baby.

Of particular relevance to psychoanalysis is that reflecting on the minds of others is grounded in understanding the mind of the self. This is illustrated by the case of Sarah. First Sarah must understand an aspect of her own mind with regard to finding little flowers important, in order to better understand how I can find her important.

It is proposed that the Mirror Neuron System, particularly in the right hemisphere, participates in processing the physical tangible aspects of self and other, such as self-face or self-voice recognition, while the Default System processes the intangible, abstract, mental aspects of self and other (Uddin et al., 2007). Both are important for human social functioning. The two systems are highly interconnected. For this reason when a person attends to the physical aspects of a person’s facial expression they also automatically can infer the mental state or subjective emotional experience of that person, as I do with Ryan. Even when an individual only imagines aspects of self and other, the relevant components of the MNS and default network are activated suggesting that imagination is a common representational domain between the default system and MNS (Uddin et al., 2007).

Pathologic impairment in the default system exists in Schizophrenia. It is hyperactive during rest, and fails to decrease in activity during task performance (Whitfield-Gabrielia, Thermenos et al., 2009). Researchers suggest that this alteration of default activity may help explain the self referential symptoms of schizophrenia (Garrity, Pearlson et al., 2007; Whitfield-Gabrielia et al., 2009).

The neuroscience of Shared Circuits emphasizes that some aspects of transference occur because we tend to process other minds in terms of our own mind, for example, “I hate myself. You hate me too.” Clearly for adaptive function, one must be able to differentiate between when the other person’s mind is operating the same verses differently than our own. While it is not fully understood how the brain makes the distinction between “my mind and yours,” it is hypothesized that a subtle balance exists between activity in the default system and mirror sys-
tem, which facilitates the ability to distinguish self from other at the more abstract level (Uddin, Kaplan et al., 2005; Uddin et al., 2007).

Shared circuits of mind do not guarantee adaptive functioning. While the schizophrenic brain is assumed to have physical brain impairment, it is also possible that for overly self-preoccupied but nonschizophrenic individuals, there might be some type of imbalance in the activity of the default system. Additionally, patients may also “impair” the operation of the default system for defensive reasons as well. A person may deny that he is like others, in order to support narcissistic defenses. A person may defensively assert that others should “read her mind” so as not to have to experience painful affect states of separateness. Additionally early child experiences may impact the operation of shared circuitry, albeit at a nonconscious level. Children learn how their parents feel about them, in a number of ways. Through shared circuitry children literally feel the parent’s feelings inside themselves, and also take the parent’s mental attitude inside as well. For example, hostile or otherwise invalidating parental emotions and attitudes toward the child will be internalized and taken as feelings and attitudes toward the child’s self, and as a result of the shared circuitry it will be assumed others feel this way toward the child as well.

CONCLUSION

This paper has illustrated how understanding the neurobiology of shared circuitry can enhance therapeutic effectiveness. For one thing, its focus on the nonverbal elements of the interaction that can enhance the analyst’s sensitivity to noticing, commenting on, and empathizing with the patient’s difficulty in feeling empathized with, such as occurs with Lucy and Sarah. For another, it offers a new vantage point for understanding projection and projective identification. They are not necessarily something done by the patient. Instead they may be a reflection of the normal operation of shared circuitry of mental processes. The analyst automatically and unconsciously internalizes the patient’s state including the unwanted affect states defensively warded off by the patient. The sensitive analyst can reflect on his or her own state and recognize this internalization as being the result of shared circuitry which reflects the patient’s state, and use it in the service of containing the patient’s painful, destructive, or otherwise overwhelming affects.

Additionally, the neurobiology of shared circuits offers a way of understanding how the mother contains and modifies the baby’s distressing affect states, as well as the similar role of the analyst with a patient. The baby/patient’s affect is internalized and felt by the mother/analyst,
yet is recognized as the other’s affect. When it is experienced as the other’s affect, it is expressed in a toned-down way, which is re-internalized by the baby/patient. This begins the process of down-regulating the distressing affect. This process can be impaired. If the other’s distress is experienced as one’s “own affect” it will be expressed with the equivalent degree of distress and will exacerbate the distress of the baby/patient. If a parent feels the distress of their child too strongly, so that they are equally distressed, they cannot help the child down-regulate or adaptively cope with the distress. On the other hand a parent who wards off the conscious awareness of their child’s distress so as to avoid their own distress, will also be impaired in their affect regulatory role within the parent-child relationship.

Shared circuits explain how individuals mutually impact one another at multiple levels, for example, body physiology, behavior, emotion, and thoughts. With Ryan I use the idea that shared circuits of emotion are grounded in the physical aspect of the emotion. As a result I focus on his inability to viscerally identify and feel his emotions, leaving him with social handicaps that are interfering with professional success and the intimate relationships of family. In the case of Ryan, the impact of his emotion on my visceral response is how I know that he is feeling distress. Sharing this impact with him engages him in identifying his own visceral responses, even though in the beginning he cannot label them as connected to emotion. In the case of Elliot, he keeps telling me that I feel afraid of him and I keep denying it. Finally I consider he must be picking up something I am unaware of myself. Only when I identify in myself that I am scared by our interaction regarding the idea of hugging, am I able to understand that my scared facial expression is re-activating the feelings he had with his mother.

The cases of Lucy and Sarah illustrate that the activity of shared circuits can cause a blurring of the boundaries between self and other. With Lucy I realize that my shared circuit processing leads me to misidentify Lucy’s trait of shy temperament as disdain for me. I am then able to help her see how she misidentifies her baby’s fussiness as hate, rather than as a manifestation of her similar trait of shy temperament. With Sarah, I continually point out how she feels so unimportant and so judgmental of herself and therefore assumes I feel that way about her. Even though I tell her she is important to me, because of the action of shared circuits it is not until she has the experience with the flowers that she is able to believe in my concern for her. Through her awareness of how she feels caring toward the flowers, despite how little and unimportant they are, she can sense my caring for her.

The conscious mind serves a “top down” regulatory function over perception, memory, emotion, body viscera, and behavior. In the thera-
A shared circuit of mind suggests that the patient’s ability to apprehend that the analyst’s mind is focused on understanding the patient, and has a variety of new ways of thinking of the patient’s experience, are all taken into the mind of the patient and become part of the patient’s mind. In this way the patient is able to better self-regulate. I agree with the Boston Process of Change Study Group that there is much psychological well-being gained in a purely nonconscious, nonreflective way simply by talking to another person who is trying to understand and empathize. One’s well-being can be stronger, more long lasting, and more resilient to stress, however, when a person’s mind processes the interaction consciously. This is because under stress, individuals nonconsciously tend to revert to old negative patterns of interpersonal interaction and understanding. A person whose mind is able to consciously be aware of the analyst’s efforts to impart understanding and empathy is more likely, even under stress, to be able to voluntarily choose to take this more positive attitude toward his or her self (Pally, 2007; Pally & Olds, 1998).

In conclusion shared brain circuits underlie all interpersonal functioning. The neurobiology of shared circuitry indicates that self and other exist along a continuum of similarity and difference. For the most part the self is used to understand the other. But adaptive functioning also requires the individual to be able to flexibly shift between recognizing the self as the same as the other and recognizing the self as different from the other.

REFERENCES


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