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**How the Social Neurosciences Add to our Understanding of the Psyche**

(Der Beitrag der „Sozialen Neurowissenschaften“ zum Verständnis der Psyche)

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**From Darwin's „Social Instincts“ to the „Social Brain“ of modern Neuroscience**

Humans are, by their very nature, social creatures – and not lone warriors in the struggle for survival. This is an insight we already find in the writings of the brilliant Charles Darwin. In 1876 he wrote “that the highest satisfaction is derived from following certain impulses, namely the social instincts”. “[To] gain the love of those with whom he lives [...]”, Darwin continues, “undoubtedly is the highest pleasure on this earth.”<sup>1</sup>. Of course, these statements by Darwin in no way imply that man is by nature a morally “good“ being. I will explain later in my presentation why the naive assumption that man is “good“ by nature has to be rejected from a neuroscientific perspective as well.

The fact of the deeply social nature of man was clouded by a very narrow reading of Darwin, the so called social darwinism, in the first half of the 20th century.<sup>2</sup>. An additional obscuring factor was the „aggression instinct“ postulated by Sigmund Freud in 1920. Even though there is no neuroscientific evidence for such a drive or instinct, I do not want to question the genius of Sigmund Freud, to whom we owe many important insights. While Freud placed his aggressive instinct beside what he called the “Libido” – that is the instinct of love, Konrad Lorenz took it one crucial step further. In his 1963 bestseller “On

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<sup>1</sup> Darwin (1887). Darwin had already penned the text of his autobiography in 1876.

<sup>2</sup> I have already given a detailed account of the disastrously narrow reception of Darwin's work in the German-speaking world in my book „Prinzip Menschlichkeit – Warum wir von Natur aus kooperieren“ (Bauer, 2008)

aggression“ he defines the “aggressions instinct“ as *the* central human drive. According to Lorenz, the bond between two humans derives from the aggressive drive and solely rests on two humans directing their aggression towards a third<sup>3</sup>.

The next one to cast a shadow on the primarily social nature of man was Richard Dawkins with his bestseller “The selfish gene“. First, Dawkins, who himself never did research on genes, declared genes to be the actual agents in evolution – an assumption that is already untenable. Moreover, he characterized them as selfish. Organisms, according to Dawkins, are nothing but machines built by genes, and their job is to maximally disperse the genes contained in them into the biosphere. This is what, according to Dawkins, makes all life forms – including humans –by nature primarily selfish entities.<sup>4</sup> . Colleagues who – like myself – have done research in molecular biology for any length of time, find these claims rather unrealistic. In fact, we today know, and I have made this clear in several of my books<sup>5</sup>, that genes are communicators and cooperators. In the following, I would like to contrast the one-sided anthropological ideas of social darwinism and of sociobiology with a series of findings modern neuroscience has brought us And I wish to demonstrate the importance of these insights for psychotherapists..

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<sup>3</sup> “The aggression of a particular individual is diverted from a second, equally particular individual, while its discharge against all other, anonymous members of the species is not inhibited. Thus discrimination between friend and stranger arises, and for the first time in the world personal bonds between individuals come into being.” (Lorenz, 2005, p. 131). “Thus”, Lorenz continues, “intra-specific aggression can certainly exist without its counterpart, love, but conversely there is no love without aggression.“. (Lorenz, 2005, p. 210.)

<sup>4</sup> “A monkey is a machine that preserves genes up trees, a fish is a machine that preserves genes in the water“. (Dawkins, 1999, p. 21). “Genes in juvenile bodies will be selected for their ability to outsmart parental bodies; genes in parental bodies will be selected for their ability to outsmart the young.“ (Dawkins, 1999, p. 137). “A child“, writes Dawkins, „should lose no opportunity of cheating ... lying, deceiving, exploiting...! [...] I am simply saying that natural selection will tend to favour children who do act in this way, and that therefore when we look at wild populations we may expect to see cheating and selfishness within families.“ (Dawkins, 1999, p. 139).

<sup>5</sup> Bauer, 2008, 2010 and 2013.

## How can humans understand one another?

The so called "social neurosciences" focus, on one hand, on the question which neurobiological radar system in our brain is responsible for our capacity to perceive and understand the feelings and thoughts of other humans.<sup>6</sup> On the other hand, there is the question what effect positive or negative social experiences, which other humans inflict on us, have on our brain. Primarily the first question, that is how we connect with other human beings, is far from trivial. Let's take a look at the cognitive situation at the start of a human life: how do infants who have no concept of a self nor know what is going on "out there", who therefore also do not have any idea what another human is – how do these infants establish contact with their first attachment figure at all? Towards the end of life, the same question pops up again, although slightly varied: How can humans who have suffered cognitive decline stay socially connected to their fellow human beings? The answer is that humans possess a neuronal resonance system (slide 2), that allows us to establish a social connection even when higher cognitive functions are not yet – or no longer – available. The neurobiological basis of this resonance system is the mirror neuron system. (MNS). This system is also of importance for the ability of psychotherapists to intuitively connect with their patients and to understand them.

Human infants are born – in comparison to the young of other mammals – especially immature. This has an evolutionary reason: approximately 600,000 years ago human head size experienced a burst<sup>7</sup>. The size increase of the human head resulted, as it were, in nature having to move the birth of human infants forward, because else no mother would since have survived the birth of

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<sup>6</sup> Gallese et al. (2004), Waytz and Mitchell (2011)

<sup>7</sup> Fischer and Mitteroecker (2015)

her child. Newborns in other mammals – just think of cats, dogs, or horses, develop physical, i.e. bodily competences that form the essence of what we could call a "self" within a few days after birth. But how does a human infant – in the face of his dramatic physical and cognitive immaturity – develop a first inkling, a first notion of what he –or she- is and what other humans are?

Dyadic, that is bilateral interactions between the infant and his main attachment figure, usually the mother, mark the beginning of social communication at the start of human life (slide 3). These interactions center around acts of imitation or mirroring: The infant's spontaneous, mostly involuntary movements or utterances are imitated by the attachment figure and are thus mirrored back to the infant. If this mirroring happens contingently, that is directly in a situation, the infant will gradually recognize that he or she is the cause of this mirroring, that he or she is "meant". The sum of these dyadic mirroring acts – that continue over months – results in the infant recognizing the outlines of what he himself -or herself- and what a significant "You" is.

Long before Giacomo Rizzolatti's research team at the University of Parma discovered the mirror neuron mechanisms, the American children's researcher Andrew Meltzoff ( slide 4) recognized that infants of only a few days show a tendency -which they are completely unaware of – to mimic a facial expression displayed to them. In a real-life setting this process usually starts the opposite way than in the experiment Meltzoff conducted: In everyday life it is most often not the adult but the infant who starts with a spontaneous, involuntary action, and we – the grown-ups – react by imitating the infant. This mirror feed-back adults give to infants is more than a message telling the infant that he -or she- exists, that he has been "noticed". The infant not only perceives *that* he has been noticed but also *how* he has been seen. Resonance feedback to the infant – and to other humans in general – always has an affective tinge

and informs the receiver about whether he or she is welcome or considered a nuisance.. An affective tinge thus is always woven into the self, which slowly develops in the infant as the sum of the mirroring events he –or she- experiences. This tinge becomes part of the self, and the content of this tinge may, for example, read as follows: "I am a likable human being and welcome to this world" or alternatively: "Wherever I show up and am noticed, others feel annoyed and irritated."

### **Neuronal Resonance: The System of Mirror Neurons**

Mirror neurons are neuronal resonance systems<sup>8</sup>(slide 5): Motor neuron networks that an acting human turns on to allow him to perform a certain action, also – quasi mirror-like -become active in another human, who merely observes the other's action. The mirror activation of motor neurons usually does not result in an action, but it can facilitate mirrored acts of imitation. This shows, for example, when we as adults open our own mouth while feeding a toddler, unconsciously knowing that this will increase the child's tendency to open his mouth in return and to let in the spoon. Somatosensory neurons can start resonating as well: Not only are they activated, when a human's limb is actually touched or massaged, but also when someone merely observes such a touch or a massage. Motor and somatosensory mirror neurons form the so called "parietofrontal mirror neuron system" which Giacomo Rizzolatti's group discovered. Mirror neurons – and this should be mentioned in the light of recent events - -- are a very well proven neuroscientific fact supported by numerous empirical studies published in top-notch journals. Not even a

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<sup>8</sup> A comprehensive overview of the mirror neuron system and its relevance for ever-day interpersonal interaction, for medicine, and for psychotherapy can be found in Bauer (2006). Also refer to Gallese et al. (2004), Waytz and Mitchell (2011).

recently published polemical book by Gregory Hickok, which tried to depict mirror neurons as a "myth" can change this. Christian Keysers, a neuroscientist working in Holland, gave Gregory Hickok's book a fitting rebuttal in a review in the scientific journal "Science"<sup>9</sup>.

### **Why I feel what you feel: The Limbic Mirror System**

Mirror mechanisms not only exist in those parts of the brain that plan and control actions, but also in those that process feelings, that is the limbic system. The Canadian neurosurgeon William Hutchison discovered the limbic mirror neuron system<sup>10</sup> (slide 6). While performing brain surgery on an awake patient, he identified cells in the region of the anterior cingulate cortex (ACC) which not only fired when Hutchinson pricked the consenting patient's finger pad with a lancet. The same cells also fired when the patient only observed Hutchison piercing his own finger pad. "It's a mirror neuron!" Hutchison spontaneously exclaimed, when he first observed this phenomenon, as a video recording shows, that he sent to me. Tania Singer later confirmed Hutchison's discovery using functional magnetic resonance imaging. Why Tania Singer - in contrast to its discoverer William Hutchison-rejects the idea that the limbic mirror neuron system is part of the mirror neuron system is unclear.

Further research revealed that not only the anterior cingulate cortex ACC, but also other parts of the limbic system can show mirror resonance<sup>11</sup>: When a person witnesses how someone else shows clear signs of disgust, this not only stimulates the disgust centers in the insula of the disgusted person, but also those of the observer. Seeing a fellow human's horrified face activates one's

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<sup>9</sup> Keysers (2015).

<sup>10</sup> Hutchison, W.D. and colleagues (2001).

<sup>11</sup> For an overview again refer to Bauer (2006).

own fear centers, i.e. the amygdalae (Corpora amygdaloidea). Hearing the agonized cry of a fellow human being (slide 7) not only activates the pain centers in the ACC and insula but also one's own motor language area, known as Broca's area, which would have to spring into action if you yourself wanted to scream. Mirror neurons are probably also located in the vegetative nervous system. We all know the tiring effect speech or body language can have, especially if another human starts yawning. A recent investigation was able to show that even our body temperature drops if we see another human freeze.<sup>12</sup> Mirror neurons are the biological basis of many socially contagious phenomena. They are especially relevant for psychotherapy: Mirror neurons let us intuitively understand what others do; they let us feel what others feel; and they are one –however, not the only one- of the neuronal foundations of therapeutic countertransference.

I would like to return to the interaction between infant and attachment figure: let us reflect on the role of the mirror neuron system here and why it marks the start of all social communication at the beginning of life. The mirror neuron system does not require elaborate cognitive capabilities. It is a system that is deeply rooted in the body. The physical anchoring of social communication has been termed "embodiment". The word "embodiment", though, could be misconstrued to imply that a form of communication originally rooted in the cognitive realm, - e.g. one that utilizes the possibilities of symbolization which language offers - shifts to the somatic domain. Actually the exact opposite is the case: Interpersonal communication at the beginning of life starts off as a communication between bodies capable of resonance. The mirror neuron system is primarily activated by body language signals (slide 8), but can – as soon as the child is able to speak – become also activated by verbal language.

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<sup>12</sup> Cooper et al. (2015).

Spoken language contains body language elements, too, that manifest as tone, volume, and speech melody. „Body language“ emanating from the infant activates mirror neurons in the adult attachment figure. They then produce a spontaneous resonance in the grown-up, that shows in his –or her- facial expression, in their eye glance behavior, posture, actions and speech prosody. The resonances the infant elicits in the attachment figure feed back to the baby, who perceives them and thus learns about himself or herself.

### **Resonance experiences with consequences: The development of the „Self“ in early childhood**

The inner arch-image the infant develops of himself –or herself- is nothing but the sum of the resonances that impinge on the baby during the first 18 to 24 months. This arch-image develops in parallel with the arch-image of the „You“, i.e. of the significant other. Both “arch-images“ remain intimately connected for the rest of the life. These “arch-images“ develop during this early phase and are completely anchored in the somatic domain. Yet, to reach the personal – and thus also interpersonal – level from here requires an integration of innumerable pieces of physical experience (slide 9). The baby has received these in the shape of resonances from his attachment figure(s) throughout his/her first months of life. Such an integration is the indispensable prerequisite for a cognitively anchored self image, that can be reflected on and communicated, and which thus forms the starting point for a truly “interpersonal“ communication. The neuronal correlate of a cognitively anchored inner self-image capable of reflection can be found in the medial part of the ventral, that is lower, frontal lobe, in the so called ventromedial prefrontal



cortex (vmPFC)<sup>13</sup> (slide 10). Since the frontal lobe is the brain area that matures the latest, the networks located in it only establish themselves gradually in the second and third year of life. The ability of the toddler to start building an inner self capable of reflection accompanies the development of language, and thus the ability to symbolize.

One can place subjects inside a functional magnetic imaging scanner and ask them to judge whether certain qualities represented by adjectives (such as "humorous", "stingy", "outgoing", "ambitious", etc.), that are individually presented to them on a display, apply to them. This way one can make the test person recall their own inner self image. What one sees is neuronal activity in the ventral, lower frontal lobe. The same area also lights up, when subjects reflect on another person close to them. Different research groups were able to show that neuronal networks in the lower frontal lobe (vmPFC), which encode cognitively anchored inner representations of one's own self overlap with networks that represent the inner image of another human we consider similar<sup>14</sup> (slide 11). Humans from cultures – such as traditional China – where family ties play an important role, showed a complete overlap of networks in the ventromedial prefrontal cortex that encode inner images of the own person and of one's mother<sup>15</sup>. This means that the ventral, i.e. lower part of the frontal lobe, harbors networks that represent the self as well as the "You" of other persons close or similar to us. The inner representation of the self and of particularly close others are partially identical constructs. Only during the course of further maturation do toddlers acquire the ability to perceive their self-consciousness as something that is theirs, as something that is different from the attachment figure. The so-called "terrible twos" manifest at this

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<sup>13</sup> Mitchell et al. (2006), Jenkins et al. (2008), Jenkins and Mitchell (2011), Waytz and Mitchell (2011), De Brigard et al. (2015).

<sup>14</sup> Jenkins et al. (2008); Ma et al. (2014).

<sup>15</sup> Zhu et al. (2007);

stage. The neuronal substrate of our ability to tell self from non-self has been investigated extensively— among others, the so-called temporoparietal junction TPJ. The ability to discern between oneself and others, especially oneself and the most loved person – generally the mother, can disappear, though. The archaic overlap between both images can resurface, for example, in a life-threatening situation or in schizophrenia.

### **”Mirroring“ and ”Self-Projection“: Two systems to understand other humans**

Humans possess two systems that enable them to understand another human’s inner world, especially his –or her- emotions, motives, and intentions.<sup>16</sup> (slide 12): One is the system of mirror neurons that consists of a number of systems residing at different neurobiological addresses. The other system is based on a cognitively anchored inner image capable of self-reflection and is located in the lower, medial region of the frontal lobe. Using our self image as a reference point, we can recur to this system to consciously think about what the motives and intentions of another human are. Jason Mitchell calls this method ”self projection“.The first method, that is ”mirroring“ (according to Mitchell), is body-based. It works swiftly and prereflexively, ergo without extensive thinking. The second method is not only capable of entering conscious awareness but also capable of reflection. Psychotherapists utilize both approaches to understand their patients: We read their body language cues (for example, we hear them take a deep, strained breath or see them avert their eyes in certain situations). In parallel, we use ”self projection“: On the basis of what we know about the workings of our own psyche, we attempt to picture, i.e. to form a theory about, what is going on inside our patients.

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<sup>16</sup> Waytz and Mitchell (2011).

Both approaches, "mirroring" *and* "self projection" contribute their share to what is referred to as the "Theory of Mind".

### **Social Acceptance as an Elixir of Life: No Vitality without Affection and Recognition**

The next section in my presentation is dedicated to the question whether interpersonal understanding and being understood has a function that goes beyond the purpose of interpersonal communication. Are "mirroring" and "self projection" more than a luxury imparted to our species by evolution, one we could do without, if push comes to shove? The answer to this question comes from studies that have shown that the motivation systems in our brain, without which there can be no lust for life, only kick in when humans experience social affection or appreciation (slide 13). Whether a human feels full of vigor and vitality, depends on the activity of the motivation system that reside in the midbrain. These systems are also known as reward systems. Simple acts, such as someone casting a friendly glance our way or showing us a smile, are capable of starting up the production (and release) of motivational messenger substances. If a person lacks his personal minimum dose of interpersonal affection, his motivation system will consequently shut down his activity. This may result in a significant reduction of vitality – up to depression. It is thus more than a – readily dispensable - evolutionary luxury that others mirror us empathically and think about us.

Social recognition, appreciation, and inclusion are premier basic human motivations. Social exclusion or isolation results in an inactivation of the motivation system and a precipitous drop in subjective well-being. The human

desire for social attachment possesses the force of an "addiction disorder" (slide 14) – as NIMH director Thomas Insel put it.

If no civilized outlets are available to fulfill this need, humans are willing to do bad or even commit criminal acts to socially belong somewhere. This is the reason why young, socially ill integrated men tend to join criminal or radical political or religious factions, which promise them identity, appreciation, maybe even the prospects of becoming a hero. Moreover, another neurobiological mechanism comes into play: Social exclusion and humiliation activate pain networks in the brain (slide 15). Afflicting pain is itself again an extremely reliable trigger for aggression.<sup>17</sup> Since the human brain perceives social exclusion like physical pain, it becomes clear why not just physical pain but also social isolation promote aggression. The addiction-like dependence on social recognition and the aggressive tendencies that result from the pain of social exclusion are the reasons that would make every neuroscientist object to the claim that man is morally "good".

### **Mirroring and Resonance as Psychotherapeutic Remedy**

The information presented so far defines the most important landmarks in the terrain on which we humans move in our every-day social life. At the same, this space is the landscape through which we as psychotherapists travel together with our patients. Some of the patients who seek our professional psychotherapeutic help have already experienced deprivation in the earliest phase of their lives, during the first two to three years. Some of them lacked sufficient mirroring per se. With others, it was the implicit negative messages

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<sup>17</sup> Overview in Bauer (2011).

hidden in the resonances they received from significant attachment figures as infants

Feed-back resonances that let the infant or toddler implicitly, that is tacitly, feel things like "You are a burden for us", "Your need for love overburdens us", "You need to show consideration for us", have in many persons created inner arch-images of their own persona that affect them their entire life. They form the basis for self-depreciation, anxiety, and depression. As soon such early experiences crystallize into a cognitively palpable resonance-ready self-image, beginning in the third year of life, the implicit messages from the first two years of life become explicit. What earlier was only a notion to him –or her-, will now be spelled out to the small child: "You are a burden for us", "Your need for love overburdens us", "You need to show consideration for us". Children who grow up this way, will inside always be on alert and in a state of permanent fearful tension. Instead of being concerned with themselves, they will always look for the needs of their attachment figures. This does not change when they have grown up: they are permanently concerned about the outside world, are unable to connect with their inner self, let alone take good and loving care

Against this backdrop we as psychotherapists should be worried about the quality of the day care institutions for children under 3 that pop up in large numbers now. This is not about stirring up controversy against these facilities, but their quality is an issue worthy of criticism, especially their abysmal manning. As I have already explained at the outset, children need dyadic – i.e. bilateral resonances - during their first 24 months of development to be able to develop a good sense of their own self and of the "You" that others represent. These feed-back resonances need to be contingent: Infants and toddlers under three can only feel "seen" and "addressed" if the attachment figure reacts to

the child in a I-You constellation that is individually and situationally customized

An expert commission installed by the Bertelsmann Foundation (Stiftung) correctly demanded a child care ratio of 1:3, that is one kindergarten teacher for every three children, in all day care facilities for children under three years of age. This ratio is hardly implemented anywhere. This way, we are fostering a new kind of "poisonous pedagogy" (as defined by Alice Miller). You can expect grave long-term psychological consequences in person who spent their first two years of life in understaffed facilities, that is under conditions of deprivation. Future generations of psychotherapists will certainly not be out of work.

### **Opportunities to Express Oneself and Being Understood Activate Self-Healing Powers**

Which neuroscientific keys do we press, when we as psychotherapists start working with our patients? Neuroscience has good news for the majority of our patients who fortunately are able to verbally communicate their inner distress to us and to speak about themselves. Recent studies that the previously mentioned Jason Mitchell from Harvard University conducted show interesting results (slide 16): If humans are given the opportunity to express their thoughts and feelings, this not only leads to activation of the networks in the frontal lobe, which code the inner image of one's own persona. The opportunity to speak about one's own thoughts and feelings while someone else is listening with interest, predominantly results in a massive activation of the motivation systems.<sup>18</sup> The motivation system which we already talked about consists of

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<sup>18</sup> Tamir and Mitchell (2012).

networks that reside in the midbrain and which produce messengers that boost vitality. An – albeit weaker - activation of the motivation system can even be observed when humans are allowed to talk about the thoughts and feelings of other humans.

But what about patients who cannot talk about certain aspects of their woes, be it out of shame or because certain contents have been split off into the unconscious? We know that patients – especially those with traumatic experiences - may have a hard time speaking about things that weigh upon them. Often, important events have even become dissociated. After all, a therapist has to first recognize such a situation in a patient. How can therapists sense when a patient is encumbered but unable to talk about it?

Therapists feel this due to preverbal resonances that arise within the therapist and are elicited through discrete signs coming from the patient (slide 17). These resonances are part of what we call counter-transference. Only if we sense that the patient has something on his mind but cannot put it into words, only then the therapist can carefully build a verbal bridge. The sensitive narrative inquiry into traumatic experiences is one of the core tasks of psychotherapy.

The central element of any psychotherapeutic healing process are the resonances that flow back from the therapist to the insecure, self-disparaging patient, who is inhibited and burdened by diverse symptoms. These resonances are partly preverbal, partly verbal in nature. Both have a big effect on patients, which is why both channels need to be attended to. They should work in synergy. In practical terms this primarily means that it is not only important *what* the therapist says but also *how* he says it. The resonance that is returned

to the patient should make the patient feel primarily one thing: "I –the therapist- am able to sympathetically accept you, your difficult inner situation, but also the pathologies that resulted from it. " This message can only be authentic and therefore can only be perceived by the patient if the therapist lives in peace with all aspects of his –or her- her own psyche. Only therapists who have conquered their own self-worth issues and are sure of their loveworthiness, can convincingly provide good resonance to a patient who is struggling with his self-worth problems. Only someone who is at peace with all aspects of his –or her- her own sexuality, can help a hetero- or homosexual patient who is battling his sexuality. Only someone who does not need to quell his aggressive impulses but can express them adequately, can help a patient with inhibited aggression. Therapists create the personal prerequisites for a healing therapeutic resonance, which we then impart to our patients, first and foremost through sufficient psychotherapeutic self experience.

### **The Power of Words: the Neurobiological Effects of Social Experiences**

As I have shown, neuroscience has proven that affording a patient the opportunity to express his thoughts and feelings without fear can have a - neurobiologically detectable - healing effect. The question that follows from this is which actual effects the words of the therapist precipitate. Since the days of Sigmund Freud, the inventor of the "talking cure", psychotherapy has faced the skepticism that it is all just hollow words. The power of words has recently been demonstrated in a very elegant neuroscientific study.<sup>19</sup> Test persons lying in an fMRI scanner received feed-back about how popular they were with persons close to them (slide 18). The investigators claimed they had made such inquiries among the test person's friends and acquaintances. The

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<sup>19</sup> Somerville et al. (2010).



researchers recorded how the neurobiological activity patterns in the brain of the patients lying in the scanner changed when they received the corresponding feed-back. This feed-back caused massive changes in a region that we have encountered repeatedly today, the ventral, lower part of the frontal lobe. Recall that this is where humans store their inner self image. Words from significant others went, so to say, straight to the heart of these networks that host the neuronal equivalent of our cognitive self.

Patients who seek help from a psychotherapist primarily have deficits in self experiencing and in their inner self image. How wonderful that, of all things, a therapist's words unfold a particular effect on the neuronal correlates of self-experience! We can strengthen the patient's self-(healing) powers if we as therapists support our patient's overburdened self. The patient's self which had to get used to a lack of affection from an early age on and that is thus convinced that it is not worthy of love, this self can start undoing its self-devaluation step by step, if it now experiences therapeutic empathy. A longing for love that the patient was not allowed to express so far or had buried completely, can then be revived again. In parallel, the patient can be encouraged to admit and talk about pent-up and current anger resulting from acts of humiliation and exclusion. Relationships where the patient let others devalue or emotionally take advantage of him -or her-, can now be scrutinized. These processes which are at the center of any psychotherapeutic intervention take time.

**The "Self": Link between social experience and physical condition**

The effects of psychotherapeutic intervention are not just limited to the soul and the brain. The effects extend into the patient's entire body (slide 19). The lower, ventral part of the human frontal lobe which is home to the neuronal equivalent of the inner self image, is neuronally connected to higher- as well as lower-level brain areas.<sup>20</sup> Let me start with the downstream, that is lower-level regions: The ventral prefrontal cortex connects to the fear centers, the motivation system, the hypothalamus, and the hindbrain. The neuronal correlates of our "self" therefore access various brain regions that critically influence what happens in our body. They have an effect on the motivation system, the stress system, our immune system, on various hormone systems, as well as on the heart, circulation, and on blood pressure. The lower, ventral frontal lobe where our self is located functions, on one side, as target for what other persons say to us, but on the other side itself addresses the body downstream of it. It follows that the neuronal correlates of our self that reside in the lower frontal lobe are the crucial relay between social experiences on one side and the psychosomatic consequences on the other<sup>21</sup>. Therapeutic dialogues thus not only address the patient as person per se, but always his –or her- body, too.

### **The Psychotherapist's Primary Contact: The patient's „inner self-observer“**

The area of the ventral, that is lower forebrain is – as already stated – not just neuronally connected to lower-level, but also to higher-level brain regions. These higher-level centers reside in the upper frontal lobe, in the so called dorsal prefrontal cortex. It hosts networks that allow us a vista on our own

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<sup>20</sup> Overview in Bauer (2015).

<sup>21</sup> For an overview once again refer to Bauer (2015).

person, that is they enable us to quasi look upon ourselves from the outside<sup>22</sup>. This region also is part of the neurobiological clay that can be molded when psychotherapist and patient get down to work. From here on, I would like to designate the networks in the upper frontal lobe as the “inner self-observer”.

During most psychotherapeutic treatments the therapist notes that at the beginning of therapy the patient’s “inner self-observer” is too hard on the own person and shows little loving care for it. In many patients, the “inner self observer” presents a strange mix of excessive rigor on one side, accompanied by an odd laissez-faire attitude on the other side. While patients, for example, may on one side feel a permanently pressuring inner booster breathing down their neck, the “inner self observer” at the same time doesn’t mind that the patient has already significantly been increasing calorie and alcohol intake for quite some time. At the outset of therapy the therapist’s initial task definitely is to put the brakes on and to moderate the “inner self observer”.

In the course of psychotherapy the patient should learn to assume a caring role towards himself or herself. The psychotherapist’s caring attitude should be the model for this. At the conclusion of psychotherapy, the “inner self observer” located in the upper, dorsal part of the frontal lobe should have learned to show an attitude towards his own person, which a good mother or good father would adopt towards a loved child. This primarily means paying attention to and defending the needs of the own person for love and bonding. An important prerequisite for this is a defense against overstraining performance expectations. The patient not only encounters them in the outside world, but that also come from within –usually having been internalized long ago. Another responsibility the patient’s “inner self observer” should have assumed at the end of therapy is to avoid behaviors that damage himself or herself

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<sup>22</sup> For an overview once again refer to Bauer (2015).

A particular danger that we nowadays face in our relatively affluent societies are insidious, undetected addictive behaviors. Permanent eating, the habitual consumption of alcoholic drinks, but also the permanent occupation with monitors and displays, with smart phones, and with the signals our modern communication media throw at us, has taken on the proportions of an addiction epidemic. Moreover, permanently buying stuff or seeking refuge in work can become an addiction. What makes the aforementioned addiction behaviors and drugs so attractive to humans, is that they target the motivation system in our brain. As I have already detailed, the healthy way of activating this system actually consists in our receiving the appreciation, friendship, or love of other humans. We are traveling down the road to a society of addicts, because we are replacing the real, analog experiences of affection and love, which we need, with the aforementioned addictive substances or habits. Our patient's "inner self observer" should know this danger when therapy is drawing to an end.

### **Learning to bear the painful side of reality**

I would like to close with one last aspect, namely the questions whether it is the goal of psychotherapy to free humans from all worries and make them completely happy. We live in a world of limited resources. Not only goods or financial means, but also interpersonal affection and social support, which we all are in need of, are scarce. The consequence of this is that humans certainly help each others, but just as frequently compete against one another. Discrimination, insult, humiliation, and exclusion are experiences no one is exempt from in the real world that we just happen to live in. Sure, every single one of us can do something against it, you can and have to fight back individually, and you can furthermore forge alliances with others. But all of this

will not spare a human the experience of suffering injustice time and again. Even if we can do a lot for a good life, painful experiences will always be part of our existence. Personal separation, farewells and losses are among them. Psychotherapy cannot deliver patients from the real world. Sigmund Freud was the first to clearly realize this and pointed out that it is not the job of psychotherapy to make people happy. Even if we would probably not put it in such stark terms today, there is a certain truth to Freud's words. One of the challenges life poses to every human consists in bearing the inevitable painful sides of reality without suffering a depressive break-down or aggressively blowing up and acting crazy. Patients who we bid farewell at the end of psychotherapy should have also learned this.

Let me come to an end by expanding on the thought that we have to bear the painful aspects of reality. The world we live in today shows us what can happen when individuals, groups of people, and sometimes an entire people cannot accept that we share one planet and that we have to make compromises with one another. The streams of refugees that are currently coming to us are a practical test. We who live in the countries of the Western world will have to learn the hard way that we must give up a piece of the pie and share. But those who wish to come to us won't be spared painful experiences, since we cannot provide everything for everyone. If both parties refuse to go through this painful learning process, only violence and mutual destruction will come of it. Today we feel that we are steering towards a development that can potentially grow into a global crisis, should psychopaths and political arsonists prevail.

**Containing human aggression as a global challenge**

In the early 1930s Albert Einstein, on behalf of the League of Nations, turned to several fellow scientists, among them Sigmund Freud, to explore what could be done to curb the danger of a looming new war that was palpable. "Slaughter of a foe", Freud wrote in his reply to Einstein, gratified "an instinctive craving". Humans, according to Freud, are subject to an "instinct for hatred and destruction". A "lust for aggression and destruction" existed, and war was "due to the destructive instinct". Freud's advice to Einstein culminated in the sentence: "Why do we [...] protest so vehemently against war...? For it seems a natural thing enough, biologically sound and practically unavoidable"<sup>23</sup>. Thus spoke the man who only a few years before had postulated his "aggression instinct".

So we have come full circle and I return to the start of my deliberations. We owe many insights to the ingenious Sigmund Freud, but he was wrong about the "aggression instinct" (slide 20). Modern neuroscience sides with Charles Darwin, who viewed aggression as a reactive behavioral program. Only those experiences and behaviors that are capable of activating the motivation system and of triggering the release of happy messengers can become a drive – from a neuroscientific perspective. The central goal that drives humans is social connectedness. For humans of average mental health – but not those with a psychopathological disorder – this much holds true: Hurting or physically abusing another human being, without any provocation from him, is not gratifying "from the perspective of the motivation system". The danger we really face from human aggression is not the aggression instinct, which does not exist. The real breeding grounds for aggression are exclusion, humiliation and the unequal distribution of goods in this world that associates with experiences of exclusion. It is not the theory of the aggression instinct we

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<sup>23</sup> Quoted from Bauer (2011).

should listen to in the current crisis-ridden world. Instead, we should let Plato's cardinal virtues guide us: courage, knowledge, moderation and justice.

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