

The Human Body as a Resonance Organ

A Sketch of an Anthropology of the Senses

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*W*hat happens in us when we look at a face such as the one in the first illustration? How does it come about that we perceive in this face an expression of the soul? Several brain researchers inform us that when we observe a face with an expression suggestive of laughter or of anger, the very same brain cells are active in us which guide the actual mimicking gesture of the observed face. They are called “mirror neurons,” because the person doing the perceiving inwardly mirrors or simulates the observed face. This neuronal mirroring makes it possible for us to feel empathy with another human being. Therefore, it forms the basis of our empathic capacity.



Illustration #1

But is this really the entire explanation? The research teams of Vezio Ruggieri in Italy and Ulf Dimberg in Sweden discovered that in looking at a sad or happy facial expression, for example, exactly the same muscles are exercised which are necessary for reproducing or mimicking that facial expression. However, the actual mimicking consists of such extremely fine muscle activity that for an external observer the process remains invisible and may be confirmed only with the assistance of a special electromyographic-measuring device. Ruggieri and colleagues speak here of motoric “imitative micro behavior.” So far it has not been investigated if this kind of micro mirroring behavior in every case leads to physiognomic gestures. I suspect that during very cursory obser-

vation these gestures would not be provoked. But the available research findings give rise to the question if the so-called mirror neurons actually only signal whatever is going on in the body periphery of the observers themselves, i.e., in their facial musculature.

Every muscle activity is registered in the brain via receptors of the sense of one’s own movement. The mimetic fine motoric imitation is, in this view, simply the impression of that movement mirrored back. It must be mirrored, because the impulse to provide the micro imitation proceeds from the brain receptor for the perceptual organ. During the process of perception the observed outer impression then mingles with the impression of the movement. It seems plausible to assume that something like sharing or empathy with the “otherness” of the outer image first arises from the actual micro imitation, i.e., via the physical sharing. In this context the Dutch neurobiologist Christian Keysers speaks of transformed “motoric basic tension” in the respectively affected region of the periphery. The idea that such complex acts of perception may have significance beyond the relatively simple micro imitation may be supported by a further example.

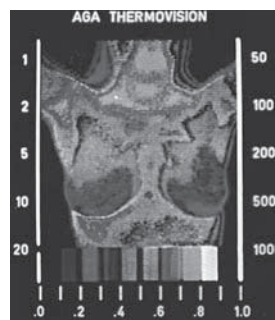


Illustration #2

Illustration 2 provides a thermographic image (warm field measurement using infrared photography) of a person’s upper torso. Red and yellow areas indicate the warmer skin regions, while blue and green indicate the cooler regions of skin. These warmer and cooler areas, which are in a constant process of dynamic change, also vary

according to the person's psychic condition, not simply according to environmental temperature changes or to physical exercise, and so forth. Research completed by Vezio Ruggieri and Maria Gracia Petruziello in Italy (as well as my own investigations in Germany) has shown that during the observation of colors which suggest "warm" or "cool," and also during the observation of "warm" or "cool" images of schoolroom interiors, the skin temperature of some experimental subjects changed in the direction of "warm" or "cool"—even when there was only a small variance of one tenth of a degree. Some other subjects reacted, instead, with pulse variations or changes in skin dampness. In the German study the temperatures were measured between the left collarbone and chest bone (the point of assessment is marked in the illustration with a small x).

Working with this scientific data, it should not be assumed that colors or architectural forms have any direct influence on skin temperature. Skin temperature rises or falls most often according to a stimulated or depressed activity of the blood vessels. Therefore, one must assume that the changes come about when a visual signal—the color or the impression of a building—reaches the brain. From that point on, an impulse must be sent through to the periphery of the chest area, where the blood vessel activity is either stimulated or depressed. The resulting rise or fall in body temperature is reported by the temperature receptors back to the brain. These messages combine with the visual outer impression, so that the judgment of a "cold" or "warm" color becomes an intermodal perception, i.e., the sensual interplay of the visual sense with the sense of temperature.

How can one explain that the "warm" or "cold" impressions of forms or colors are not directly registered by the central nervous system, but instead are continuously produced or reinforced in the body? If the perception of façade would be one single brain process, then, I assume, we would observe such phenomena with complete indifference—without sympathy or antipathy, without any accentuated judgment of our perception. Only when our body reacts—even if only

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minimally warmed up or cooled down—do we begin to form a judgment of the image we observe. ("This color affects me as too cool." "The reddish yellow room hardly gives me space to breathe; it suffocates me with its intense colors.") We take a position, formulate a judgment, thereby supporting the scientific observation of how closely the sensing activity of our body is associated with the cognitive achievements of daily life, in which our images are constituted first as objects of judgment. The body acts like the resonance base of a violin, whose string vibrations allow for the sound, and this relationship may be compared with the mind-soul engagement with and participation in the phenomena of our world.

This process is shown schematically in Illustration 3. For example, the perception of a building is registered as a visual signal to the brain (1), which then sends an impulse into the periphery (2), which in turn stimulates the activity of the blood vessels of the chest. The skin temperature is raised, as the sense of temperature signals the rise of temperature to the brain (3), while outer as well as bodily impressions mingle, leading to the judgment "warm color" or "warm-looking building façade." Both of these senses (as, of course, others) work together.



Illustration #3

Human senses can be directed either more toward the perception of one's outer world or more towards one's own body. The resonance always consists of the connection between outer perception and one's own body perception. It is the multi-modal sense perception that originally leads to the experience of objects. To elucidate this point, one could keep in mind the following phenomenologically-gathered system of human senses:



The resonance model of perception would describe, for example, the observation of a physiognomic gesture, as shown in Illustration 1, as follows: The face of another person is apprehended through the visual sense. Then follows, for both observer and person seen, an unknowingly perceived mimetic imitation, which nevertheless is registered by the sense of one's own movement and then reported to the brain. This process enables the person to share the same (or a similar) happy or friendly mood of another person, and not simply to register that mood in a neutral way. Of course, the whole process is actually much more complex: If the encounter with this woman leads to a relaxed communication situation, it is most likely to involve the sense of physiological body functions, which registers muscular tension and relaxation, as well as physical constriction and relief. The body temperature may rise in certain bodily regions, so that an impression of warmth is combined with a visual impression. In brief, this multisensory perception, which is experienced at the same time as the original visual impression and the resonance of one's own body, leads to a judgment of the other person as "friendly, warm-hearted, relaxed," and so on. In this way every outer impression is really an inner sensory impression as well, or vice versa. Our sensory-guided inwardness is always actively present in the outer world of perception.

Regarding this process two aspects seem to me worthy of attention. First of all, we can see that people are intricately entwined with their entire mind-body existence in the world they perceive. Secondly, if the activation of specific realms of sensing during the act of perception leads to a rudimentary judgment, instead of a neutral registering of the perception, then the significance of a multifaceted development of the senses becomes clearer. We must learn to activate this bodily resonance in ways appropriate to the respective situation. If bodily processes are too strong (such as in

the case of an intense grief reaction), they may limit thought and consciousness. If they are too weak, then we may gaze at the world with a cold lack of concern. Both extremes belong to life, but if they thoroughly dominate individual actions, they may lead to inadequate or inappropriate social behavior.

The following example shows how this may occur when social functions are dominated by physical reactions and how such social problems could be clarified empirically in detail. Initial indices in the research literature help to explain that the untouched, indifferent observation of pain delivered to another person (aggressive conduct disorder, ACD) may be attributed to partially missing mirroring processes in the brain, and therefore possibly a deficient bodily resonance, resulting in a lack of physical shared feeling concerning the pain. The observer then appears to lack empathy. Probably a person with adequate sensitivity would know that the observation of a child being beaten could hardly take place without antipathy experienced in the form of physical sensations. If such sensations would not be present, probably the perception of the beaten child would register no further than a computer-like registration of the act, and therefore result in the indifferent act of observation seen in those diagnosed with ACD.

Meanwhile there are numerous research studies which empirically support the resonance theory of perception and development of the senses. It seems that under the concept of "embodiment," a basic transformation of paradigms may be taking place in cognitive psychology. The opinion that our thinking and judgments are purely mechanical brain processes is countered by Daniel Casasanto and Katinka Dijkstra, who call this view the "digital computer-inspired theory of the human spirit," led by mistaken notions in cognitive science toward the end of the twentieth century. The researchers were able to demonstrate that, for example, we remember more pleasant biographical events when the memory is accompanied by upward-pointing bodily movements, while negative memories are favored by downward-pointing movements. These motions, possibly only micro-motorically completed, appear to be well-practiced resonance patterns, bodily representations of cognitive faculties.

Several further examples may illustrate future

facets of research through which the above resonance model gradually may assume clearer contours. For example, very informative is the discovery that, when carrying out certain mimetic facial gestures, it is difficult or impossible to simulate states of feeling other than those purposely mimicked. A further interesting experiment from Takayuki Ito, Mark Tiede, and David Ostry shows that the somatic sensory system of mimicry can be highly determining also for the perception of words. Every change in the physiognomic expression generates, via the kinetic sense, a sensory impulse registered by the central nervous system. For example, it is known from earlier studies that senses of vibration in the hand can influence the perception of the volume heard from a person's voice. The authors suspect that the sort of multi-sensory influences spoken about here, i.e., bodily resonances, constantly influence our speech behavior and our hearing experience. Ito and others follow a theory discussed by speech researchers, that unknowingly we must articulate simultaneously the speech we are hearing in order to understand it. In this case a physical activity is the focus. Experimental subjects listened over headphones to the two similarly sounding words *head* and *had*, whose articulations involve a differing position of the corners of the mouth. With the aid of a special apparatus, the corners of the mouth of the subjects were changed while they were listening to the words, so that they would correspond to the one or to the other word (compare Illustration 4). It can be seen that the probability of hearing the presented word as *had* rather than *head* increased according to the change of the position of the corners of the mouth. Apparently there is not only an unconscious intellectual, shared articulation of heard speech, but also, at least as often, a mimetic articulation, probably involving micro imitation. The authors assume an interactive process between center and periphery during speech and hearing, not a one-directional process from brain to facial musculature.

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Apparently physical resonance is involved also in imaginative activities, usually when we imagine, with our eyes closed, that objects are closer or further away. We accompany this fantasy with eye movements that



Illustration #4

accommodate the vision, as we would in the case of actual observations. Recent magnetic resonance imaging (MRI) observations of children reading show that while reading passages involving tense action scenes (for example, fending off an attack with a hand) exactly that brain region is active which would be active in the actual attack situation.

Analogous to the mimetic micro imitation described in the introduction, it could be tested if this sort of bodily resonance could be discovered during the reading of suspense stories. The authors explain the high degree of reality of such stories for child readers with the thesis of neuronal mirroring of the (in this case) imagined motoric activities. Reading, according to the investigators, is therefore not the passive reception of information, but instead an active “playing through” of at least the lively passages. Are the brain processes perhaps in

themselves the mirrors of the interplay of the visual reading procedure with certain inner senses? Perhaps through these it becomes possible to read not in an indifferent manner, but rather with inner sharing. Possibly the process deals with various micro motoric activities, as have been observed often as crude motoric movements: Not infrequently, discussion partners imitate (at least unknowingly) the gestures they notice, whereby it may be presumed that, via these gestures, a kind of sharing of the inner states of the other person is made possible.

In a research article concerning the effects of dancing on the human brain, Scott Grafton and

Emily Cross report about the so-called “action observation network” (AON). By this is meant that certain brain regions are active in an identical way during one’s observation and during one’s own carrying out of certain actions. During the observation of a dancer, apparently there is already a neuronal imitation and, as in the studies of mimicry, it may be assumed that the periphery is involved. After all, dancing may be most quickly and thoroughly learned when observation and simultaneous reproduction of the visual dance motions are combined.

A similar direction of thought stems from studies of the transfer effects of school theater plays. For example, if one should play a cashier threatened by a bank robber, the play will be convincing only if the actor can simulate the cashier’s fear with the entire range of bodily gestures that indicate a threat of that proportion. In youth theater it is often necessary to have long rehearsal phases in order for the actor to portray accurately the role of a truly fearful person, but not so in attempting to portray, for example, persons in more humorous emotional states (Illustration 5). The actor must incorporate the fear to some extent, so that, via his gestural and mimetic expressions, the emotion may be experienced by



Illustration #5

the audience via mirrored micro imitation. According to research results, bodily role-playing, in the form of school theater using mimicry, is helpful to learning about differing psychic states and their expressive forms. Some of the pupils demonstrated particular learning progress in the area of “emotional and social intelligence.” It is the training of certain bodily resonance as empathic dispositions that makes possible emotional intelligence. This is a confirmation of a saying attributed to Confucius: “Say it to me and I’ll forget it; show it to me and I’ll remember it; let me do it and I’ll understand it.” Both the teaching of the ethic or of its shared feeling, as well as its sensorimotoric practice are equally didactically meaningful. This view speaks

in favor of a school culture that would include such activities as theater rather than a straight informational approach. The controlled coping with negative feelings or the empathic capacity to experience the emotions of others may originate from a synesthetic resonance ability facilitated by theatrical training. This is a new field of research just at its beginnings. There are also interesting studies which clarify the association between sense of touch and empathy.

The fact that some people respond with a light feeling of being touched when observing another person being touched is attributed by the authors to the activity of the mirror neurons already mentioned and as synesthesia in the classical sense of the word, meaning the apparent combination of bodily sense experience.

The studies from Ulf Dimberg and Vezio Ruggieri seem to closely parallel the idea of synesthesia, but rather in the meaning of a synesthesia of actual senses, i.e., a very fine muscular activation and sensory “mirroring” of the bodily region that is observed being touched. The authors of the above-mentioned empathy study presume that there is a close connection between certain experiences of the tactile system and the experience of empathy. This hypothesis is strengthened all the more by the theory of resonance. There could be an actual “being touched” feeling or “ringing” in one’s own body brought on by observation of the touch, allowing for a lasting experience of the touch.

These few references may be sufficient to recognize the resonance theory of the body as a very important field of research for education and therapy. From the perspective of resonance theory, it becomes evident that the human body is also an intellectual-spiritual organ which always provides meaning. The peripheral body is, in this view, not only an “instrument of mind,” but also its constituting organ. “Understanding and sense perception,” said the philosopher Hans-Georg Gadamer, “form no real opposites. The hand is an organ of the mind, and our senses, as long as they are inspired by the touching, grasping or pointing hand, for example, develop their own intelligence. There is an intelligence of the senses ... a culture of senses. Lastly this means the development of the human ability to form judgments.”

Endnotes

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