

Mirror Neurons: The Empathic Embodiment of Intentionality

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Abstract

Phenomenology developed an intentional theory of mind, where mental acts are always directed outward to the world. These intentional acts are the source for meaning and understanding. Brentano introduced the idea that our mental acts relate intentionally to the world. Husserl uncovered a unity between the mental act and the world through meaning intention and meaning fulfillment. Heidegger evolved the unity as an indivisible being-in-the-world and Merleau-Ponty showed how it is constituted through the body. Recent scientific discoveries of the mirror neuron system in the brain provide empirical support for how human understanding relates intentionally to the world. When we observe another person doing something, mirror neurons fire in our own brain just as they would if we were performing the action ourselves. Thus, the sense of another person's actions resonates within as a primitive, felt sense of what neuroscience now calls embodied cognition. These findings offer evidence that the human brain is wired to be able to understand other people's actions by feeling them as if they were our own. Herein lies the neurological basis for conceptualizing meaning as a bottom-up, felt process. Embedded into this process we find empathy, naturally occurring when the brain resonates with the intentional actions of the other. Through the mirror neuron system, we experience empathy and thereby can infer the other's symbolic representation of the world. Both top-down and bottom-up processes confer meaning, embodying intentionality within the mind, body, and brain.

PHENOMENOLOGY OF INTENTIONALITY

Franz Brentano (1838-1917)



- As it appears, so it is.
- We know mental acts of thinking, feeling, perceiving.
- All mental acts are intentional: pointing to an object
- Problem is bridging between mental acts and the world.
- Mental acts are relational.

Edmund Husserl (1859-1938)



- World exists by sense-giving meaning bestowal
- Intentionality is meaningful.
- Two sides: meaning intention and meaning fulfillment.
- Intentionality bestows meaning on world.

Martin Heidegger (1889-1976)



- World has being.
- We are beings.
- Human being cannot be separated from the world; it is in the world.

Maurice Merleau-Ponty (1908-1961)



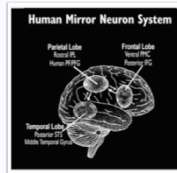
- Perception is necessary to meaningful experience.
- Perception is an ongoing constitutive process.
- The body is an active part of this perceptual process which constitutes inner experience.

Phenomenology previsionsed neuroscience findings

- The phenomenological perspective is compatible with recent neuroscience findings that we are a mind-brain-body system: embodied cognition and emotion, in our environment.
- The body is engaged in the experiential process.
- Meanings come through embodied perception.
- Through being embodied in the world, perceptual experience relates us directly to the world.

NEUROSCIENCE OF MIRROR NEURONS

What are Mirror Neurons?



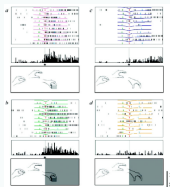
- The brain contains a system of neurons that responds directly to the intentional actions of others.
- Mirror Neuron Hypothesis: There is a link between particular neurons in our own brain and other people's actions.
- Mirror neurons are found in the frontal, parietal, and temporal lobes of humans

History of Mirror Neurons



- First discovered by accident during a study of premotor cortex of Rhesus monkey.
- Monkey's neurons fired when watching graduate student eat ice cream just as when monkey moved food to its own mouth.
- Led to discovery that neurons in ventral premotor cortex activate when making a movement or observing similar movements (Gallese, Fadiga, Fogassi, & Rizzolatti, 1996).
- Later studies found mirror neurons for vision, sound, touch as well as motor (Gallese, Keysers, & Rizzolatti, 2004).
- Emotional centers also have mirror-like qualities (Singer, et al., 2004).

Mirror Neurons Respond To Intention



- Mirror neurons fire more intensely to intentional movement. (Fogassi, et al, 2005; Iacoboni, et al., 2005)
- Action and understanding link when observing goal-directed action in another
- Complex cognitive functions grounded in mirror neurons (Wohlschlagler & Bekkering, 2002).
- Mirror neurons may even be capable of inferring intentions as when intention obscured (Umiltà et al., 2001).

Mirror Neurons and Language

- The motor theory of speech perception: Language is embodied, intentional action, movement of the mouth, with intention to communicate meanings (Lieberman & Mattingly, 1985).
- Mirror systems are located close to Broca's language area.
- They form a bridge between moving and communicating (Rizzolatti & Arbib, 1998).

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PSYCHOLOGY OF EMPATHY



Edward Tichener (1867-1927)

- Credited with coining the term *empathy*.
- Comes from the German *emfühlung*: feeling into.
- Need to put ourselves into the other person's shoes to personally feel the other's experiencing (Tichener, 1909).



Herbert Blumer (1900-1987)

- We understand what others do through response to another's gesture, as communication (Blumer, 1969)
- The other's intentional gesture toward an object is the source for meaning.



Albert Bandura (1925-)

- We observe, imitate, & model (Bandura, 1977).
- Lower level modeling and imitation lead to higher level processing as we form ideas about how the other's ideas are being produced.

MIRROR NEURONS & EMPATHY

- Mirror neurons make it possible to literally feel what others feel.
- So, mirror neurons are a window into the meaning world of others.
- They are fundamental for social understanding (Pineda et al., 2009).
- The mirror neuron system is the foundational building block for empathy.

THERAPEUTIC APPLICATIONS



- Ongoing pilot study currently with couples.
- Activate mirror neurons to enhance empathy.
- Used exercises found in (Simpkins & Simpkins, 2010).
- Improved ability to resolve differences by understanding feelings and perspectives of other.
- Led to rediscovering love: original basis of their relationship, & unity.

CONCLUSIONS

- Mirror neurons are the brain's way of mirroring meaningful feelings and behaviors of others to give shared experiences.
- Mirror neurons are responding to the meaning intention directed to the world, as the phenomenologists described.
- Mutual understanding is grasped from within, by direct resonance between self and other.
- Resonance with others' meaningful actions permits empathy.
- And as we resonate with each other, we become One.