Introduction to Brain and Cognition
Emotion

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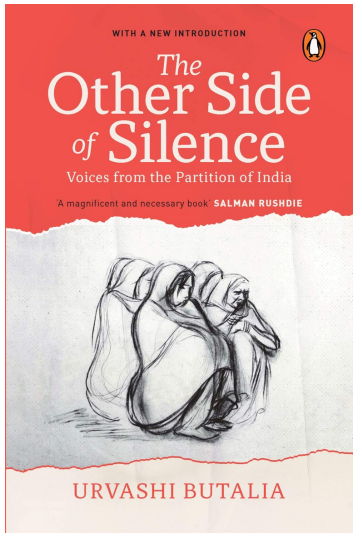
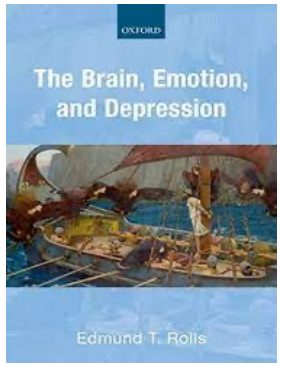
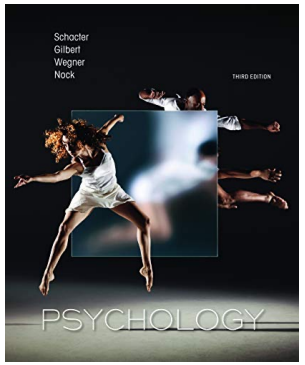
- “For years afterwards - indeed well into the present day – people involved in Partition violence would ask themselves what it was that turned the interconnectedness of entire lifetimes, often generations, of shared interdependent, albeit different lives, into feeling of enmity, ‘I cannot explain it’, said Harjit, a Sikh who lives close to the border town of Attari, ‘but one day our entire village took off to a near by Muslim village on a killing spree. We simply went mad. And it has cost me fifty years of remorse, of sleepless night – I cannot forget the faces of those we killed.’
- His feeling find an almost exact echo on the ‘other side’ – In those of Nasir Hussain, a farmer and ex army man: ‘I still cannot understand what happened to me and other youngsters of my age at that time. It was a matter of two days and we were swept away by this wild wave of hatred … I cannot even remember how many men I actually killed. It was a phase, state of mind over which we had no control. We did not even know what we were doing.’
- Like Harjit, he too is haunted by remorse of that moment of madness in his life.”

(Urvashi Butalia, The Other Side of Silence, 1998)



- What are emotions?
- Why do we have emotions?
- What is their adaptive values?
- How we measure emotion?
- Why does it feel like something to have an emotion?
- Why do emotions sometimes feel so intense?

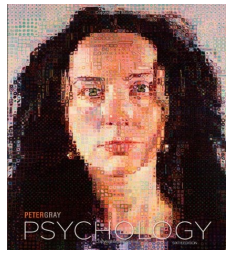


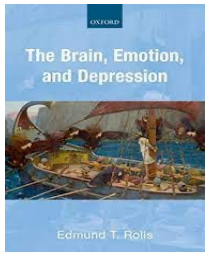


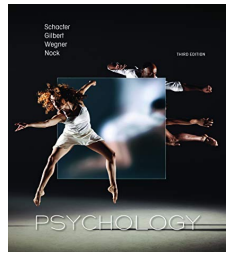
Let's Define Emotion

- Emotion is a subjective feeling that is mentally directed toward objects
- A positive or negative experience that is associated with a particular pattern of physiological activity
- Emotions are states elicited by rewards and punishers, that is, by instrumental reinforcers

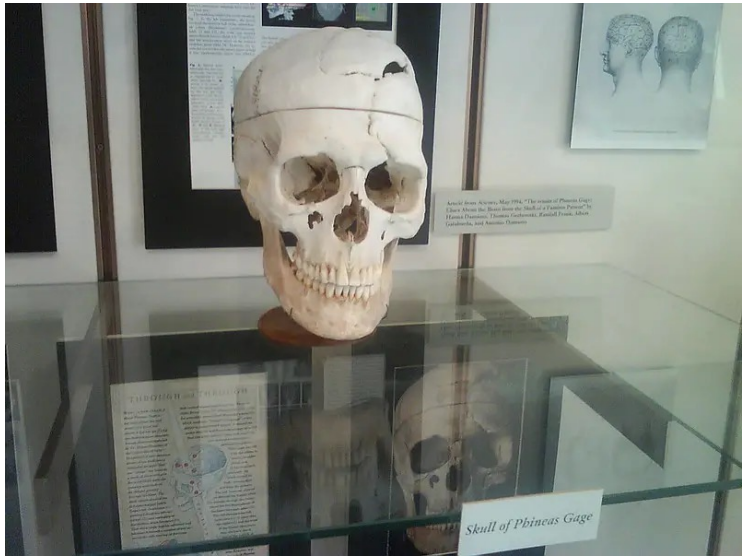
Emotion and Mood

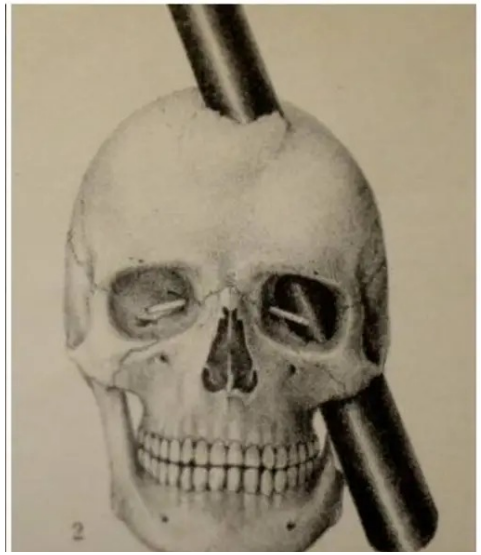






Why do we need Emotion?





Warren Anatomical Museum, Boston, Mass

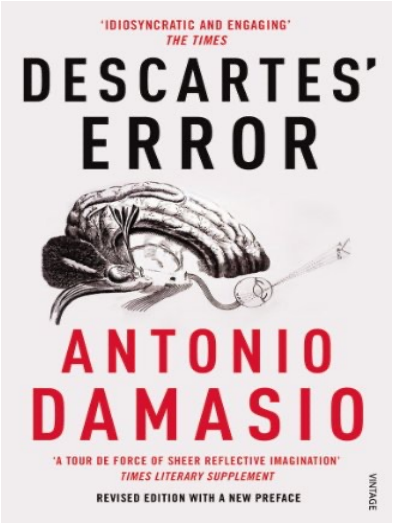
Phineas Gage, a railroad construction worker. He was using an iron rod to pack explosive powder into a hole to clear the path for railroad track. Mistakenly, the explosion triggered in reverse direction and hit his head, through his cheek to bottom of his skull and came out of his front brain

"Gage was Not Gage Anymore"

Though well-performed in intelligence test, he was different.

Started taking inappropriate decisions, using abusive language, disregarding advices, and behaving impulsive – failing to regard emotion, regret, anxiety about future etc.

Failure to adapt!



Leonardo, a 5 years old kid's story

- Leonardo is 5 years old and cute as a button. He can do many of things that other 5-year-olds can do. He can solve puzzle, build towers of blocks, and can play guessing game with grown-ups.
- But Unlike other kids, Leonardo has never been proud of his abilities, angry at his mother, or bored with his lessons.
- Because Leonardo has a conditions that makes him unable to experience emotion of any kind. He has never felt joy, sorrow, delight, or despair, shame, annoyance, excitement, gratitude or regret.
- He doesn't have any intuition of how others feel.

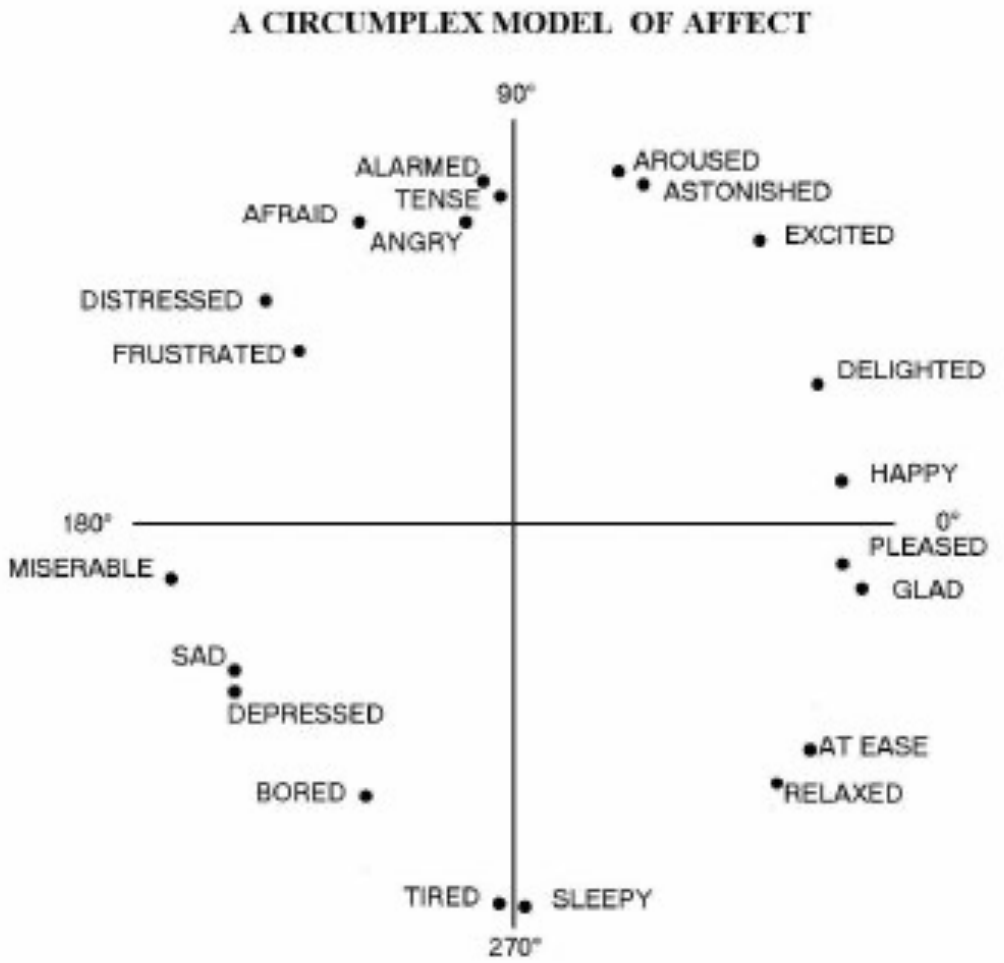
Does he perceive emotion?

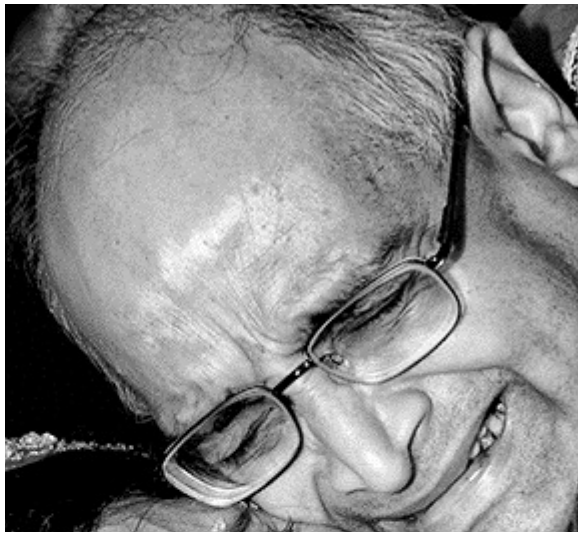
Does he reciprocate emotion expression?

Does he predicts and reciprocate Feeling?

Cynthia Breazeal, MIT Media Lab, Emotion and Social aspects of Humanoid Robot

2D model of Emotion

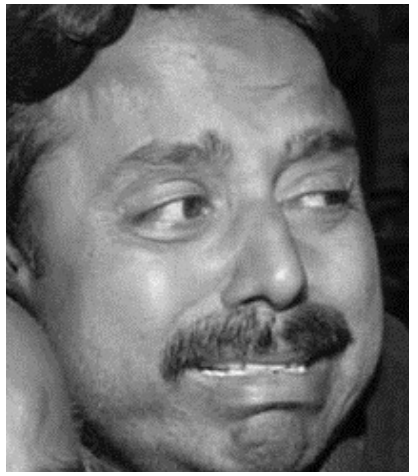


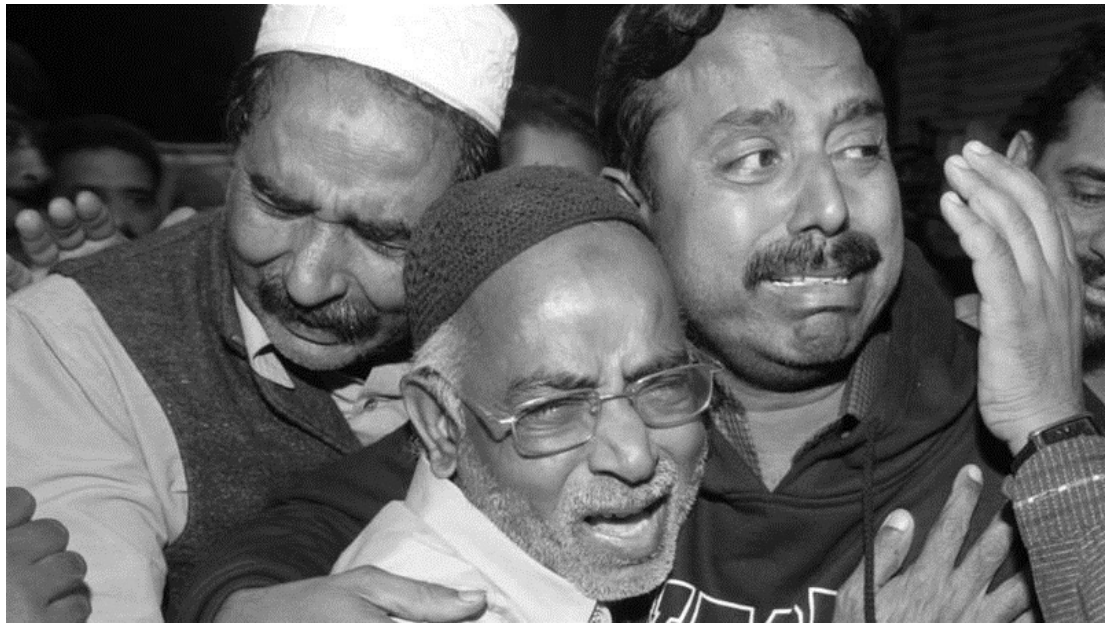


Emotion Communication

Context matters !

The faces on the left and right may appear similar in eliciting emotion. However, the context of the wedding and bomb blast makes the two appear and feel different later.





Emotion is Embodied – Key Question

Experience of Emotion relies on Expression of Emotion ?

If you cannot express the emotion, you would not be able to experience the emotion?

Emotion is Embodied – Empirical studies

- **Inability to express emotion due to Botox surgery might influence the way we experience emotion, due to paralyzed facial muscles (Niedenthal et al., 2005).**

- **People also showed difficulty in identifying other peoples emotion (Hussey & Safford 2009; Pitcher et al., 2008).**

- **Contrary, Davis et al. (2010) showed no difference in pre-post emotion experience after Botox surgery, whereas they observed a change in experience when compared with control group for mild emotion stimuli**

- **People with amygdala damage don't feel fear and anger, and they typically fail to recognized others expression of those emotion in others (Adolphs et al., 1999).**

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REVIEW
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Expanding Simulation Models of Emotional Understanding: The Case for Different Modalities, Body-State Simulation Prominence, and Developmental Trajectories

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Recent models of emotion recognition suggest that when people perceive an emotional expression, they partially activate the respective emotion in themselves, providing a basis for the recognition of that emotion. Much of the focus of these models and of their evidential basis has been on sensorimotor simulation as a basis for facial expression recognition – the idea, in short, that coming to know what another feels involves simulating in your brain the motor plans and associated sensory representations engaged by the other person's brain in producing the facial expression that you see. In this review article, we argue that simulation accounts of emotion recognition would benefit from three key extensions. First, that fuller consideration be given to simulation of bodily and vocal expressions, given that the body and voice are also important expressive channels for providing cues to another's emotional state. Second, that simulation of other aspects of the perceived emotional state, such as changes in the autonomic nervous system and viscera, might have a more prominent role in underpinning emotion recognition than is typically proposed. Sensorimotor simulation models tend to relegate such body-state simulation to a subsidiary role, despite the plausibility of body-state simulation being able to underpin emotion recognition in the absence of typical sensorimotor simulation. Third, that simulation models of emotion recognition be extended to address how embodied processes and emotion recognition abilities develop through the lifespan. It is not currently clear how this system of sensorimotor and body-state simulation develops and in particular how this affects the development of emotion recognition ability. We review recent findings from the emotional body recognition literature and integrate recent evidence regarding the development of mimicry and interoception to significantly expand simulation models of emotion recognition.

Keywords: sensorimotor simulation, body-state simulation, emotion recognition, development, interoception

The components of Emotion

Play or Threat ?

Experience

Evaluative – eg. Appraising the threat of spread of infection/ attack

Physiological – eg. Change in heart rate, blood pressure, sweating

Phenomenological – eg. Experience , feeling pleasant and unpleasant

Expressive
E.g. dilated eyes, upper eyelid raised, jaw dropped, lips stretched

Behavioural
E.g. tendency to flee, threatening others, casually response, grocery shopping

Mental
E.g. Focusing attention, decision making

What happens when you are approached by any of these ?

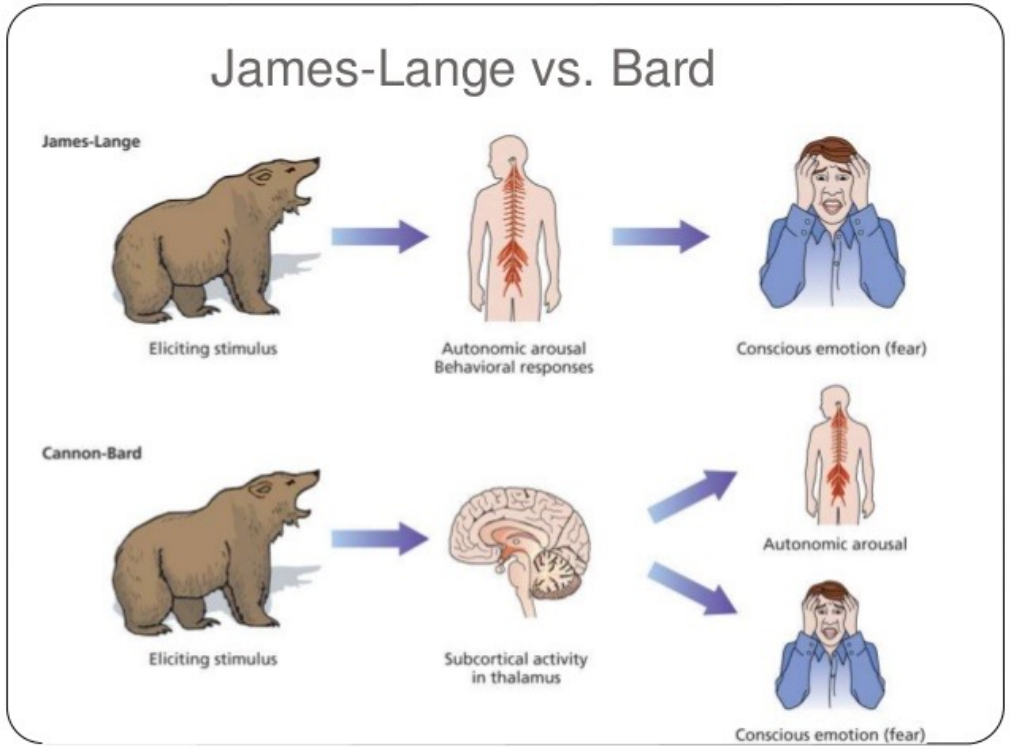




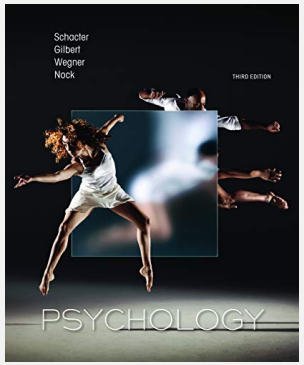


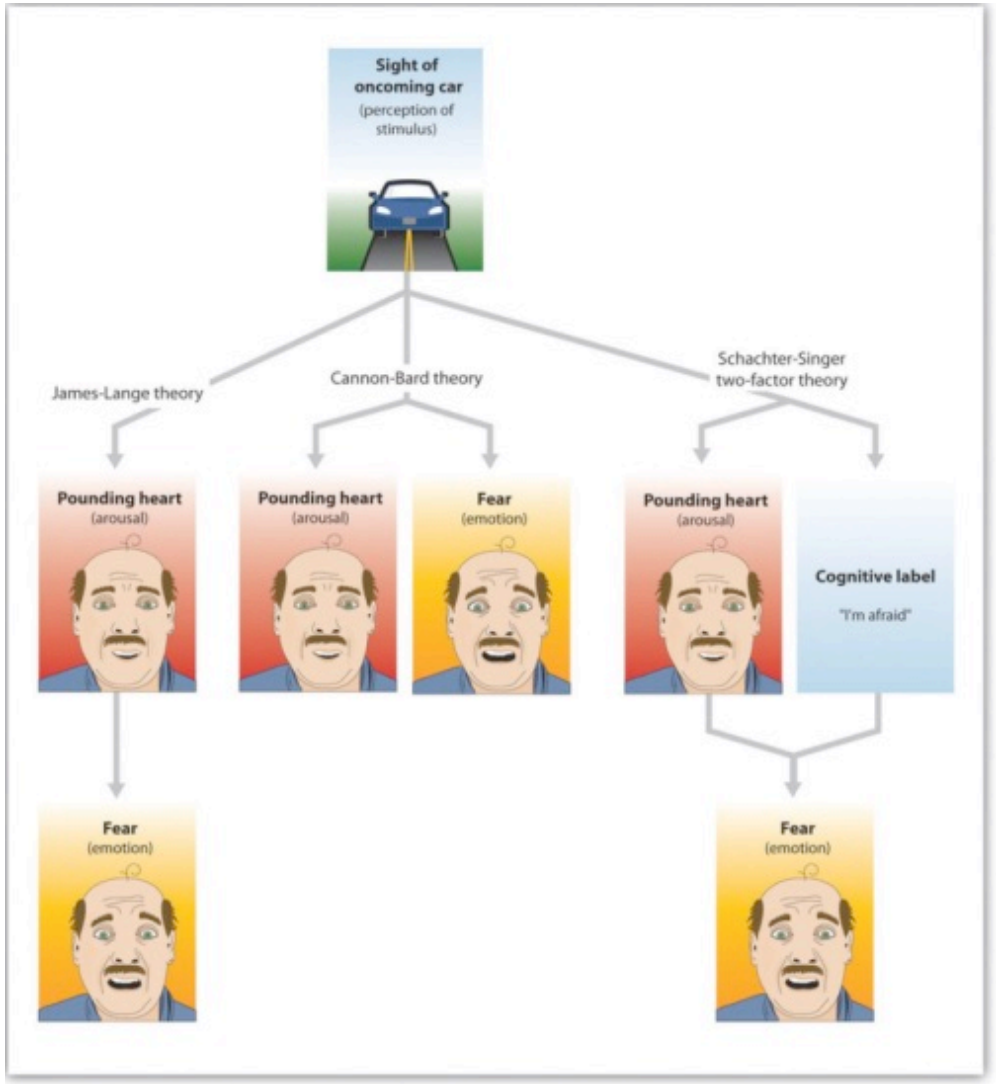
Cognition-Emotion-Body-Brain-and-Action

Emotion-Body-and-Brain

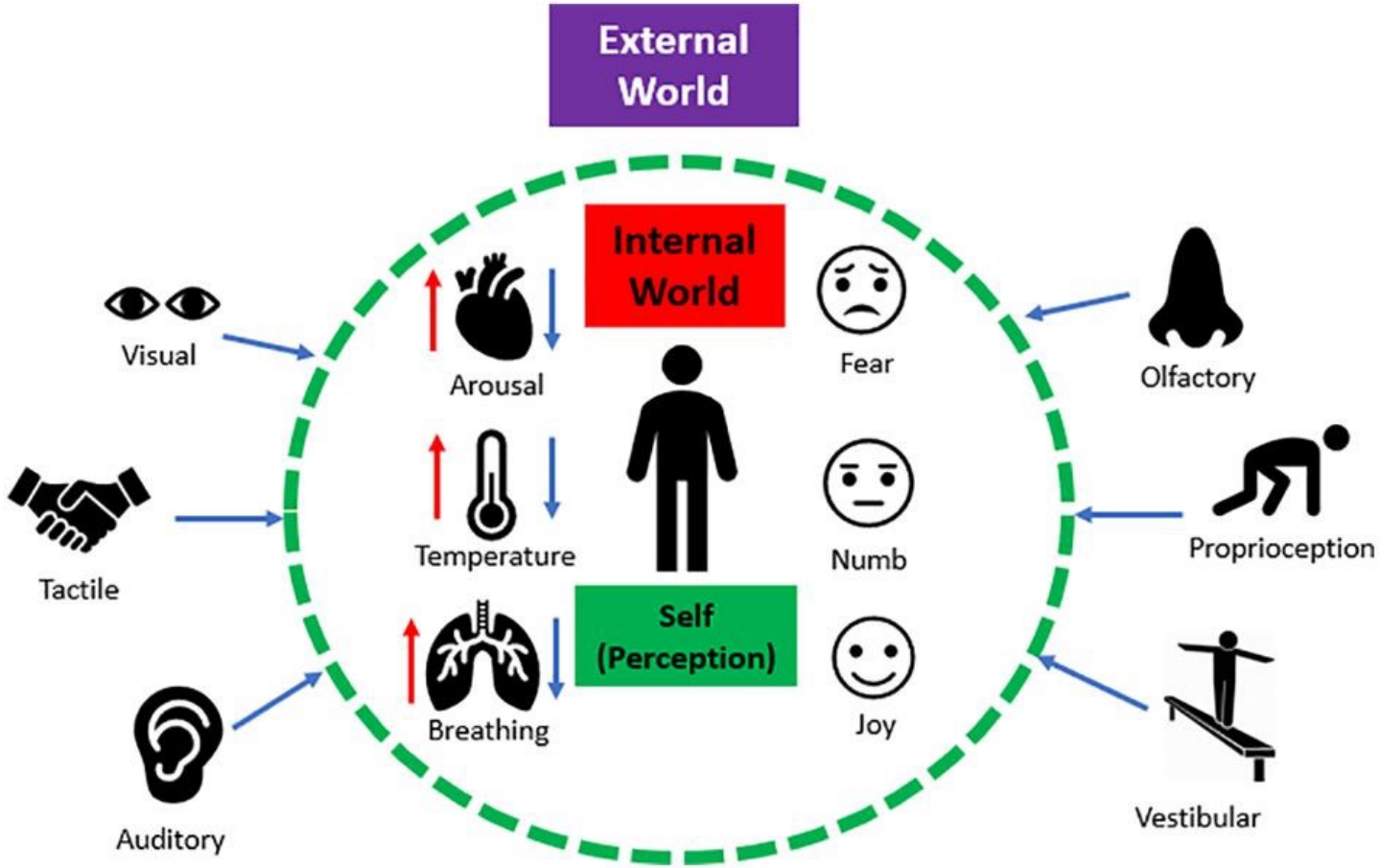


How these theories, Somatic feedback, somatic feedback with cognitive appraisal theories have worked so far ?





REALITY as experienced by communication between internal and external world



(Harricharan et al., 2021)

REALITY as experienced by communication between internal and external world

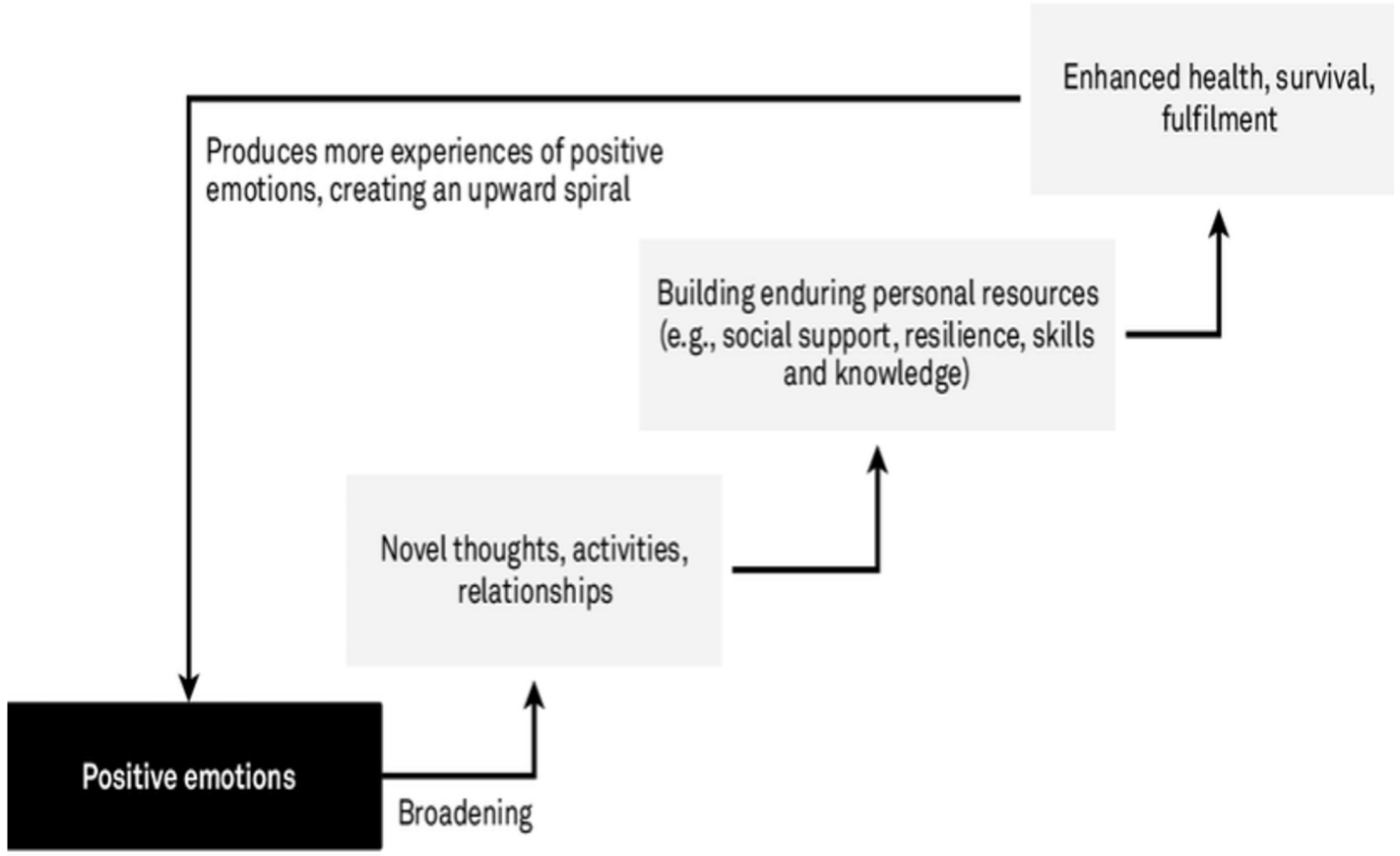
State of Mind: Hot and Cold

Idea of Self

State of Body: Health

(Compos et al., 2020, Beck, 2008)

Broaden and Build model – Theory of Positive Emotion, advocates the role of positive emotion in broadening the scope of cognition, e.g., attention, in processing information and building resilience, *c.f.* role of motivation in changing the scope of cognitive processing and building resilience.



Barbara Fredrickson

intellectual resources

develop problem-solving skills

learn new information

physical resources

develop coordination

develop strength and cardiovascular health

social resources

solidify bonds

make new bonds

psychological resources

develop resilience and optimism

develop sense of identity and goal orientation