

## **Interoception and Its Role in Connecting Empathy, Bodily Perception and Conceptual Representations: A Cross-Cultural Online Study**

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**Abstract :** According to embodied cognition theories, higher-order cognitive functions and complex behaviors seems to be affected by bodily states. For example, the polyvagal theory suggests that the human autonomic nervous system evolved to support social interactions. Accordingly, integration and perception of information related to the physiological state arising from the peripheral nervous system (i.e., interoception) play a role in the regulation of social interaction by modulating emotional responses and prosocial behaviors. Moreover, recent studies showed that interoception is involved in the representations of conceptual knowledge, suggesting that the bodily information carried by the interoceptive system provides a perceptual basis for the embodiment of abstract concepts, especially those related to social and emotional domains. However, to the best of our knowledge, no studies explored the relationship between interoception, prosocial behaviors, and conceptual representations. Considering the privileged position of interoception in mediating higher-order cognition and social interaction, we designed a cross-cultural study to explore the relationship between interoception, the sensitivity of bodily functions, and empathy. We recruited Italian, English, and Hebrew participants, and we asked them to fill in a questionnaire about empathy (Empathy Quotient), a questionnaire about bodily perception (Body Perception Questionnaire), and to rate different concrete and abstract concepts for the extent such concepts can be experienced through vision, hearing, taste, smell, touch, and interoception. We observed that in all languages, interoception ratings for abstract concepts were greater than for concrete concepts. Importantly, interoception ratings for abstract concepts were positively correlated with empathy and sensitivity of bodily functions. Our results suggest that participants with higher empathy and sensitivity of bodily functions show also a greater embodiment of abstract concepts in interoception, providing further evidence for the importance of the interoceptive system in regulating prosocial behaviors and integrating conceptual representations.

**Keywords :** conceptual representations, embodiment, empathy, empathy quotient, interoception, prosocial behaviors

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