An interoceptive take on touch and temperature

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In the past two decades, interoception has received increasing attention in the fields of psychology and cognitive science, as well as neuroscience and physiology. A plethora of studies adopted the perception of cardiac signals as a proxy for interoception, but recent findings have cast doubt to the methodological and intrinsic validity of the tasks used thus far. Interoception includes signals from inner organs but also from thin afferents in the skin, providing information about the body's physiological state. According to some views grounded on anatomical and physiological evidence, skin-mediated signals such as affective touch, pain, and temperature have been re-defined as interoceptive. Nevertheless, there is no agreement at this regard. Furthermore, the functional relationships between interoceptive submodalities are unclear, and thermosensation as skin-based interoception has rarely been considered. Here, I will discuss some of the anatomical, physiological, and experimental arguments supporting the scientific study of interoception by means of skin-mediated signals. I will describe a recent study where we used a battery of five tasks to examine the relationships among cardiac awareness, thermosensation, affective touch, and nociception. Thermosensation was probed with a classic temperature detection task and the new *dynamic thermal matching task*, where participants matched perceived moving thermal stimuli in a range of colder/warmer stimuli around thermoneutrality. We also examined differences between hairy and non-hairy skin and found superior perception of dynamic temperature and static cooling on hairy skin. Importantly, the performance at the thermal matching task on hairy skin was stable across two testing sessions. Thus, our results suggest that dynamic thermosensation might offer a promising avenue for the development of novel interoceptive methods and provide further support to the scientific and clinical study of interoception by means of skin-mediated signals. Notably, no significant correlations were observed across interoceptive submodality accuracies (except for cold and pain perception in the palm), which indicates that interoception at perceptual levels should be conceptualised as a set of relatively independent processes rather than a single construct.