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P17 Empathy or Ownership? Evidence of corticospinal modulation during pain observation

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Objective: Recent studies showed that motor responses similar to those present in one's own pain (freezing-effect) occur as a result of pain observation in others. This finding has been interpreted as the physiological basis of empathy. Alternatively, it can represent the physiological counterpart of an embodiment phenomenon, related to the sense of body-ownership. We know that simply looking at a fake hand, whenever positioned in a body-congruent egocentric perspective, can lead the subjects to experience it as part of their own body. In the present study, we compared the empathy and the ownership hypothesis, by manipulating, during observation-conditions, the perspective of the view of a hand model receiving pain. Similar results in both the egocentric and the allocentric perspective would confirm the empathy hypothesis; a different result in the egocentric perspective (where the embodiment occurs) would confirm the body-ownership hypothesis.

Participants and methods: We used transcranial magnetic stimulation to record changes in corticospinal motor representations of the hand, while subjects (n=24) observed videos showing a) a needle penetrating or b) a q-tip touching a hand model, presented either in egocentric or in allocentric perspective. Motor evoked potentials (MEPs) were recorded from the right first dorsal interosseus.

Results: Compared to the allocentric perspective, a significantly greater reduction of the mean MEPs amplitude (freezing-effect) was found when the hand model receiving pain (needle-penetration) was presented in an egocentric perspective.

Conclusions: This finding suggests that the freezing effect during pain observation can be better explained by the body-ownership than by the empathy hypothesis.