High Stages of the Motor Hierarchy: Distinct (Motor) Computations and Their Putative Role in Autism

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Recent views attribute to the motor system not only a role in planning, controlling, and executing actions, but also in more abstract and complex (motor) computations. These views go beyond the definition of a strict and well-defined neural network supporting motor processes, and they suggest that motor computations are mediated by complex nodes involving parieto-frontal regions (Giese and Rizzolatti, 2015; Rizzolatti and Sinigaglia, 2016). In addition, nonhuman studies indicate that also ventrolateral prefrontal regions and pre-supplementary motor area (F6) contribute to furnish contextual flexibility to visuomotor transformations mediated by AIP/PFG-F5 "classical" grasping network (Gerbella et al., 2017). Taken together, these evidence suggest that the notion of *motor representation* can help to bridge the gap between nonhuman and human studies. Even more intriguingly, the notion of motor representation may help to clarify high-level motor computations in clinical conditions such as Autism Spectrum Disorder (ASD) (Casartelli et al., 2017a).

ASD is a neurodevelopmental condition that impacts on, among others, the social domain (Lai et al., 2014). Recent studies hypothesize that high-level motor computations contribute to support social functioning, and anomalies in processing these computations in ASD may spark intriguing insights on this condition (Casartelli et al., 2016). Benefiting from studies on motor interference phenomena (Becchio et al., 2007; Parma et al., 2013; Casartelli and Parma, 2017), distal planning (Fabbri-Destro et al., 2009; Casartelli et al. 2017b), and motor resonance (Cattaneo et al., 2007; Rochat et al., 2013), I try to disentangle distinct computations belonging to the high stages of the motor hierarchy. This perspective is intriguing to explore the way in which one (motorically) *maps* the world, and I tackle these issues from a theoretical and empirically-driven approach.

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