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Abstract: Because the social role of the cerebellum has not been acknowledged until recently, there are currently no training programs to rehabilitate and restore the social functions lost because of cerebellar dysfunctions. In other populations such as ADS, there are a number of evidence-based intervention programs that aim at training participants to improve perspective taking of self versus others (de Guzman, Bird, Banissy, & Catmur, 2016) or to improve communication skills by addressing core deficits in social motivation through increased attention and reinforcement of social responses (Ventola et al., 2014). To our knowledge, however, none of these programs explicitly addressed impairments in the segmentation and sequencing of natural social actions. The aim of this WP is to address this void by developing an evidence-based intervention program addressing these impairments. Note that our lab has some experience in developing training programs, as we have been able to develop a successful short (1 hour) intervention for freshmen students at risk of failing, based on principles of social attribution (Van Overwalle & De metsenaere, 1990; Van Overwalle, Segeberth, & Goldchstein, 1989).

We propose that the novel finding of the social role of the cerebellum in understanding and predicting sequences, may have great potential for improving the metalizing capacities of patients with cerebellar and related impairments (e.g., ASD). As intimated earlier, cerebellar patients are severely impaired in this ability (Tedesco 2017; Cattaneo 12; Leggio 08) and so are patients with ASD for non-routine actions (Zalla, Labruyère, Clément, & Georgieff, 2010; Zalla, Labruyere, & Georgieff, 2006). Research by Nadel et al. (2011) showed that although neurotypical children learned sequences of subgoals already after a first video-demonstration, autistic patients were also able to learn them after a second demonstration. According to Schmahmann (2010) “an important feature that differentiates cerebellar cognition from disorders of cerebral cortex is that the cerebellar lesion can be compensated for, at least in part, by bringing the issue at hand to conscious awareness, focusing on the problem in order to address it.” Awareness about self-related processes and performance is termed meta-cognition. Recent research demonstrated that meta-cognitive thoughts and rumination are strongly involved in many clinical pathologies including anxiety, depression and schizophrenia (Sun, Zhu, & So, 2017) and that treatments focusing on improving metacognitive knowledge and regulation have beneficial effects on several of these disorders (Kurtz, Gagen, Rocha, Machado, & Penn, 2016; Normann, Van Emmerik, & Morina, 2014). Given its potential for cerebellar dysfunctions, this WP will investigate the additional role of meta-cognition on dysfunctional social behavior. Given that ASD patients are typically much more available and younger than cerebellar patients, it will be more profitable to conduct the retraining intervention on young adults with ASD (n = ±20) who show clear cerebellar impairments as indicated be a structural MRI scan.

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