



The contribution of self-regulation processes to innovation in human children and non-human primates

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Abstract:

Self-regulation allows for flexible adaptation to different situations (e.g. Hofmann, Schmeichel, & Baddeley, 2012), often by finding innovative means to attain a specific goal. Our capacity of being innovative is regarded as the major cause for explaining the rise of the human species. But how does innovation develop in human ontogeny? Which basic skills are needed for being innovative? And how do we differ from other species? These questions remain largely unexplored until today. To help fill this gap we plan to study innovative tool use in preschoolers and capuchin monkeys (a non-human primate species), and to relate this capacity to self-regulation (i.e. executive functions EF). We thus take an interdisciplinary comparative approach to investigate the cognitive prerequisites of self-regulation in their relation to innovative tool-use.

Developmental and comparative research on tool innovation is scarce with few exceptions (Beck, Apperly, Chappell, Guthrie, & Cutting, 2011; Chappell, Cutting, Apperly, & Beck, 2013; Cutting, Apperly, & Beck, 2011; Cutting, Beck, & Apperly, 2013). None of these studies considered developmental and comparative perspectives on tool innovation in relation to executive functions. Our own hypotheses regarding the relevance of self-regulation for innovative tool use are

based on the following line of arguments: Innovation requires divergent and convergent thinking; you need to broaden attention in order to consider multiple alternatives (divergent thinking), and you need to focus attention to select the most promising strategy and avoid distractions (convergent thinking). Executive functions (EF), which include working memory, attention shifting, and response inhibition (e.g. Miyake et al., 2000), are relevant for both, divergent and convergent thinking (see also Zelazo, Carter, Reznick, & Frye, 1997). Hence, it seems plausible to assume that innovative tool-use and self-regulation are associated. In addition, one may speculate that the advantage of humans over other species regarding innovative tool-use has to do with differences in executive functions. To investigate this issue empirically psychologists and biologists need to work together. We plan to conduct a corresponding study together with primatologists in Rome (E. Visalberghi) with whom we already cooperated successfully in the past.