RADICALLY ENACTIVE HIGH COGNITION

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Abstract: I advance the Radically Enactive Cognition (REC) program by developing Hutto & Satne's (2015) and Hutto & Myin's (2017) idea that contentful cognition emerges through sociocultural activities, which require a contentless form of intentionality. Proponents of REC then face a functional challenge: what is the function of higher cognitive skills, given the empirical findings that engaging in higher-cognitive activities is not correlated with cognitive amelioration (Kornblith, 2012)? I answer that functional challenge by arguing that higher cognition is an adaptive tool of the social systems we are embedded in, therefore, it is not necessarily aimed at achieving better cognitive states. In order to do so, I suggest interpreting key insights from autopoietic enactivism through REC lenses.
Keywords: Radical enactivism, embodied cognition, autopoietic enactivism, social systems.

Resumo: eu avanço o programa da Cognição Radicalmente Enativa (CRE) desenvolvendo a ideia de Hutto & Satne (2015) e Hutto & Myin (2017) de que a cognição com conteúdo emerge de atividades socioculturais, que demandam uma forma de intencionalidade desprovida de conteúdo. Proponentes de CRE então enfrentam um desafio funcional: qual é a função de habilidades de cognição superior, dadas as descobertas empíricas segundo as quais o engajamento em atividades de cognição superior não é correlato com melhoras cognitivas (Kornblith, 2012)? Eu respondo ao desafio funcional argumentando que a cognição superior é uma ferramenta adaptativa dos sistemas sociais em que estamos imbuídos, portanto, ela não é necessariamente direcionada à melhora de estados cognitivos. Para fazer isso, eu interpreto insights centrais ao enativismo autopoiético pelas lentes de CRE.
Palavras-chave: Enativismo Radical, Cognição Corporificada, Enativismo Autopoiético, Sistemas Sociais.

Introduction

According to enactivism, the unit of analysis of cognition is not the brain (or its internal operations), but the organism as it is dynamically coupled with the environment. Cognition is enactive in the sense that it depends on the organism's actions upon its surroundings and it cannot be fully understood detached from it, for the environmental layout constrains the set of possible actions the organism can undertake, and its actions in turn affect the environmental layout itself. In large timescales, therefore, the causal coupling between organism and environment shapes its inherited (phylogenetic) and acquired (ontogenetic) abilities which dynamically shape its cognitive niche. That means that an organism achieves and maintains its cognitive processes

through its actions, which are the exercise of situated abilities, i.e., abilities that are relative to its bodily morphology, history of development and immediate environment. Hence enactivism is in principle in tune with the idea of *embodied* cognition (VARELA, THOMPSON & ROSCH, 1991).

There is, however, a choice to be made: should we opt for Conservatively Enactive Cognition, which posits special kinds of action-related representations in order to explain all levels of cognition, or should we go radical with Radically Enactive Cognition (henceforth REC), which emphasizes that representational content is not needed to explain a sufficiently large basic level of cognition? On the one hand, although REC has not come as far as to set the precise boundaries of basic cognition, i.e., the level of cognition that does not involve representational content, it has successfully explained a wide range of cognitive phenomena, from navigation (BEER, 2003) and object tracking (THELEN et al. 2001), to coordination (Haken et al., 1985). None of these explanations required positing representational content (CHEMERO, 2009, chapters 3 and 4) – as long as representations are understood as semantically laden structures that have (at the bare minimum) accuracy conditions. On the other hand, there has been no conclusive attempt to naturalize representations and content more generally (which is known as the Hard Problem of Content, cf. Hutto & Myin, 2013). REC, therefore, seems to have the upper hand in the naturalistic framework.

However, if RECers reject the ubiquity of representations, it follows that there is no clear place for higher cognitive activities in the REC framework, given that these activities are traditionally taken to involve the manipulation of representational content[1]. For instance, reflecting on our mental states, inferring predictively and deliberating through counterfactuals are some cognitive tasks where the target-domain is absent, unlike the immediate environment – hence the need for representations and detachability. At this juncture, RECers face a variety of the *scale-up problem* that we can state in a general manner as follows: how could representations (and content more generally) come into play in higher cognition? More precisely, *how could higher cognitive activities take place, given that they cannot be reduced to*

[1] The use of 'higher' to denote a difference in complexity from 'basic' cognitive skills must come with a warning. If enactivism (radical or not) is correct, the traditional cognitivist view on the hierarchical structure of cognition – according to which perception is at the bottom, cognitive processing is in the middle and intentional action is the output – is simply mistaken, for cognition is achieved in loops of action and perception (HURLEY, 2001). I hereby use 'higher' and 'basic' in order to highlight, respectively, the absence and presence of representations in each strata of cognition. I do not hold, for to do so would be inimical to enactivism, that there is a separate and fully detachable level of cognition which is not at least indirectly situated.

naturalistically well-behaved structures and processes? In section 2, I advance the REC program by exploring an answer to that question. In Section 3, I show how that answer leads to another question, what I call the functional challenge, namely: if we are selected to employ our higher-cognitive abilities (whatever they are), how can we account for the widely known limitations of our higher-cognitive skills? In section 4 I offer my solution to that challenge and in section 5 I review some empirical studies that lend indirect support for that solution.

1. Emergence of content and social activity

How do representations come into play in higher cognition? Hutto and Satne (2015) and Hutto and Myin (2017) address that initial challenge by arguing that we are able to track and respond to changes in our immediate environment given our phylogenetic and ontogenetic developments. The paradigmatic case is that of a frog and its catching-flies ability. A frog can successfully track and catch flies because its inherited and developed abilities enable it do so, even though it plausibly lacks representational states. Thus radical enactivists devise what they call *teleosemiotics*, a theory of contentless intentionality that explains our basal directedness through our embodied abilities and their history. Teleosemiotics preserves the most promising feature of teleosemantics developed by Millikan (1984, 1995), namely, that the normative character of intentionality can be naturalized through the development of a *function* in the biological sense. But unlike teleosemantics, teleosemiotics neither implies that intentionality is semantically structured nor that there is a central executive consumer of intentional content, for:

> No one should doubt that creatures can respond to features of current environments in ways that are out of step with the ways that their ancestors would have responded when the kind of responses in question were originally selected for. No doubt responses that are the products of evolution can be misaligned in this limited sense. But this does not establish that in doing so the imagined creatures are "getting things wrong"— that they are representing features of the world in a way that violates a norm of truth. Fundamentally, as Stich aptly highlights, "natural selection does not care about truth; it cares about reproductive success" (HUTTO & MYIN, 2013, p.111-112).

That is: natural selection shapes us to interact proficiently with our environments, and failing to do so is not sufficient to *mis*represent, although it is sufficient to explain normativity within REC: we simply fail to exercise our embodied abilities, thus failing to achieve the relevant cognitive states. The idea of a primitive sort of intentional directedness deprived of content is important because it helps to explain the emergence of contentful cognition. For, if the exercise of our ability to partake in social activities requires

cognition, and if cognition entails intentionality, whereas intentionality does not entail content, contentful cognition arises once an organism is socially embedded and engages in social actions[2]. As Hutto and Myin put it:

> Only minds that have mastered a certain, specialized kind of sociocultural practice can engage in content-involving cognition. Should creatures with basic minds manage to master such practices, they would gain new cognitive capacities and become open to new possibilities for engaging with the world and other creatures (2017, p.134).

Although proponents of Ur-Intentionality do not develop the argument further, a plausible requirement for engaging in "specialized kind of sociocultural practice" is our ability to perform joint action tasks. Gallagher (2008) and Gallagher and Varga (2014) construe that ability in tune with REC by building upon the findings on joint activity by Gallese and his colleagues (GALLESE et al, 1996, GALLESE & GOLDMAN, 1998). According to these results, there is a class of neurons in the primates' premotor cortex, the mirror-neuron system, that discharge not only when the primate is performing goal-related tasks, but also when it observes *other* individuals performing goal-related tasks. Doing so plausibly allows for coordinated social action, where autonomous agents attune their mirror-neuron systems in order to anticipate motor responses of others in loop[3]. This opens way for a REC account of social interaction, according to which:

> There is […] an experiential dimension of interpersonal relationships, which enables a *direct* grasping of the sense of the actions performed by others, and of the emotions, and sensations they experience. This dimension of social cognition is embodied in that it mediates between the multimodal experiential knowledge we hold of our lived body and the experience we make of others (GALLESE, 2006, p.16, emphasis added).

A REC construal of Gallese's point allows to say that we directly, i.e., non-representationally, perceive the mental states of others, which paves the way for more complex sociocultural practices that involve contentful cognition, such as the use of verbalized language to convey information among

[2] This is the point where REC meets cognitive integration, the view that 'cognizers are embodied and located in a situation which has both physical and social aspects, and that some bodily interactions with the environment constitute cognitive processing' (MENARY, 2010: 227; see also: MENARY, 2013).

[3] Traditionally, this result has been interpreted as a simulation process (GOLDMAN, 2005), in which the agent creates "pretend states" in herself and use these states to match the states of others. Therefore, Goldman's simulation theory makes use of the idea of building an internal model in order to explain mind-reading cognitive activities, preserving a central role for representational content in sociocultural cognition. However, it is doubtful that the representational content in pretend states could explain the resonance of the mirror-neuron system, for the system exhibits motoric states of *anticipatory* and *complementary* actions, so they do not simply *match* the mental states of others, nor there is any discrimination between individuals made by the mirror-neuron system itself (GALLAGHER, 2008).

others individuals that share the same cognitive traits. Alternatively, it is because we are able to entertain non-representational sociocultural cognition that we engage in patterns of activity which are favorable for the emergence of higher cognition, given our specific ability to partake in linguistic practices. Note that if sociocultural practices require cognition, and if cognition entails representational intentionality, that explanation would not be available, for it would be plainly circular.

Analogously to the way basic cognition arises in the maintenance of the sensorimotor loop between an organism and its immediate environment (HURLEY, 2001), high cognition arises in the maintenance of the "social-loop", so to speak, between an organism and its social environment. Therefore, the emergence of both basic and high cognition is the outcome of biological functions, which have been selected due to their success in our activities[4]. Importantly, as Hutto and Myin acknowledge, our distinct sociocultural activities and wide use of content entail an *evolutionary discontinuity* (2017, p.134-135), that is, it sets us apart from other cognitive beings. However, given that we share the same kind of basic, contentless cognition with other creatures, evolutionary continuity is present in basic minds[5].

2. The functional challenge

Assuming that high cognition arises through our sociocultural practices, what function do high cognitive activities have? It is traditionally thought that humans have a distinctive range of cognitive abilities, such as reflection, viz., the capacity to perform cognitive acts aimed at one's own cognitive states and processes. For instance, Sosa (2007) influentially argued that the ability to form accurate beliefs through stable epistemic dispositions about one's own first-order beliefs marks the difference between human and animal knowledge. Although RECers reject a sharp evolutionary discontinuity, as we saw above, it remains an intuitive position that to think about our own states is something we can do par excellence, whereas not many (if any) other animals are able to reflect. Similar remarks also seem to hold for other attitudes such as conscious judging, performance assessment, decision making,

[4] Hutto's and Myin's REC tries to remain faithful to naturalism, albeit of a non-reductive variety, for they recognize that the emergence of higher cognition is at least partially sociocultural and not reducible to the physical and the chemical realms.

[5] A plausible suggestion for evolutionary continuity in basic minds is offered by *tau theory*, in which *tau* is the variable for the inverse of the relative rate of expansion on the retina of an incoming object (Lee, 2009). Tau enables individuals to achieve information of incoming objects without representational content, and it explains not only human cognition, but also the behavior of diving gannets and possibly even plants in timescales usually imperceptible to animals (CALVO et al. 2014).

explicit rule following, thinking counterfactually and so on. What bounds these acts together is that they are usually understood as involving manipulation of representational content. Nonetheless, as we have seen, teleosemiotics is deeply rooted in an evolutionary view, so claims about how one *ought* to perform higher cognitive tasks must be explained by the functional development underlying the abilities relevant for performing such tasks.

However, psychology of reasoning has shown that we are widely unreliable reasoners, and the results expand to other higher cognitive abilities. There is abounding empirical data showing that real human beings diverge considerably from idealized rationality norms. For instance, conscious decision and explicit judging are more effortful and less reliable than heuristic procedures, i.e., processes that occur below the threshold of consciousness (the distinction between the Systems 1 and 2 is an attempt to explain these facts, see WASON & EVANS, 1975)[6]. We are systematically prone to fail at simple logical tasks, most notoriously the wason selection task (WASON, 1968) and the conjunction fallacy (TVERSKY & KAHNEMAN, 1983). Reflection – the ability which is sometimes taken to be distinctively human – does not offer consistent results in identifying the sources of our first-order beliefs and explaining why we hold then (for an overview of the literature on the matter, see HALBERSTADT & WILSON, 2008). As Kornblith (2012) insists against philosophers that hold on to a crystalized ideal of reflection that simply is not manifested in normal individuals, we are more likely to confabulate and rationalize the beliefs we already hold than to critically evaluate them – not to mention the many different biases we systematically manifest. The overall conclusion is that there is no clear correlation between higher cognition and cognitive amelioration. Thus, given the functional tone underlying REC, the function of higher cognitive abilities presents a genuine puzzle, which is all the more surprising giving our widespread evolutionary success: *Why would we have developed such unreliable adaptive tools vis-à-vis cognitive amelioration?*

3. Higher cognition as an adaptive tool of social systems

So *why* have we developed an adaptive tool that is unreliable vis-à-vis cognitive amelioration? In order to offer a tentative explanation, the first thing to notice is that REC alone is insufficient for the task – for it is a view about the contentless nature of basic cognition, and by itself it offers no functional

[6] However, the dual-process model does not match the distinction between basic and higher cognition. According to REC, basic cognition is necessarily contentless, and higher cognition is contentful. Heuristic procedures that typically fall within system 1, insofar as they use symbols, are not basic cognitive skills.

explanation of higher cognition. It does, however, give us a hint of a possible explanation, through its take on the emergence of contentful cognition through social activities. The suggestion I want to explore is that higher cognition did not develop as adaptive tools for ameliorating our cognitive states – so we must look at the picture from a different angle: it serves social purposes rather than individual ones.

As mentioned, REC per se offers no explanation, but Autopoietic Enactivism (AE) is a live contender. According to AE (MATURANA & VARELA 1980, Thompson 2007), the distinguishing feature of living systems is their autonomy or self-regulation, i.e., the ability to maintain their identity through self-organizing and self-producing dynamics. This is called *autopoiesis* in the biological domain, and the paradigmatic case is that of a living cell. An autonomous system itself determines, through its operations and structural organization, how to maintain its homeostatic equilibrium, without which the unbounded increase of energy leads to systemic death. By contrast, a heteronomous system is designed by an external agent and thus lacks the capacity of self-sustainment. In order to maintain its identity, an autonomous systems must remain organizationally and operationally closed, where "organizational closure refers to the self-referential (circular and recursive) network of relations that defines the system as a unity, and operational closure to the reentrant and recurrent dynamics of such a system" (THOMPSON, 2007, p.45). Thus a system that loses its organizational and operational closure tends to dismantle itself and become something else altogether – consider a living organism turning into a molecular soup by failing to maintain a state of homeostatic equilibrium.

AE and REC are not, however, straightforwardly compatible. As Hutto & Myin (2013) stress, proponents of AE also hold the *strong life-mind continuity thesis*, according to which a basic tenet of life and cognition is *sense making*. If sense making is understood semantically, AE implies a representational conception of basic minds, thus committing it to a conservative variety of enactivism. De Jesus (2016) accurately pinpoints the source of the problem: insofar as our phenomenology is the ground for the strong life-mind continuity thesis, and insofar as our phenomenology seems to be contentful, given that we are socially embedded creatures; it follows that all cognition (and all life) is contentful – hence widespread sense making. My argument here, however, does not depend on the strong life-mind continuity thesis, and even if it did, we could either review our phenomenological approach and clarify that our sociocultural practices are not representative of all cognition or construe "sense making" in a deflationary manner, such as the

contentless attitude of specifying environmental points of interest that serve as the basis for cognitive engagement.

What is central for our purposes is that, according to AE, the causal relations between subsystem and system (or part and whole) are nonlinear or dynamical (THOMPSON, 2007, Appendix B). This means that the network of relations that constitute the emergence basis for the system as a whole is causally constrained by the organizational structure of the system itself: the system emerges from the relations within it, but also causally constrain its own internal dynamics, thus securing its operational and organizational closure. Moreover, so conceived, the emergence of systemic identity is explained through the internal dynamics of the system without positing a central executive agent to plan and organize its structure.

With these points in mind, consider now a social system, e.g., a community of speakers of a certain language, a group of scientists working within the same research program, a political party, a family, etc. Although Varela and Maturana in their groundbreaking work on autopoiesis hesitate to construe social institutions as living systems (1980: 83), the inevitable association was quickly made in the preface written by Stafford Beer. Beer speculates whether it is instructive to adopt an epistemological stance according to which social systems are strictly autopoietic, for they show some striking resemblances to living organisms. For instance, social systems are not conceived beforehand, at least not normally, nor are they reducible to the sum of their members. Rather, they develop organically, and even if their members change, they tend to remain the same[7]. Moreover, social systems determine their own public rules according to their interests, internal dynamics and organizational structures, and it is the fact that the members of the system endorse these rules that promotes social identity. If Beer's suggestion is correct, it means that the manner through which the rules are actually used within a social system is what grounds their correct use (consider, for instance, what makes a legislation legitimate – it certainly is not the simple fact that it is written as a law), whereas a social system that fails to maintain its organizational and operational closure tends to lose its identity (consider a research program that becomes incoherent at its core). Thus, the normative character of public rules within a social system is dynamical and emergent, for it is dependent on how these rules stablish the social relations within the

[7] Beer also maintains that the strong continuity between life, mind and *social* life explains the struggle for autopoiesis that social systems undergo, for each system can be understood as contained within larger one that tend to recognize its subsystems as allo-poietic (or heteronomous) rather than autopoietic (MATURANA & VARELA, 1980, p.71). Hereby I do not endorse that more controversial view, for my argument depends only on the claim that social systems are autonomous.

system and how these rules are endorsed by the ongoing relations realized among its members.

High cognition, on the view I am proposing, is an adaptive tool of *social systems*, and as such is not primarily aimed at the cognitive amelioration of the members within the system. Notice first that, according to REC, high cognition emerges only insofar as individuals take part in sociocultural practices – therefore, the emergence base for content is *publicly* shared rules. Following Beer's analogy, it stands to reason that the fact that individuals develop and exercise higher cognitive skills in specific manners is what ensures that the social system they are part of remains operationally and organizationally closed. So, in a social system, an individual is construed as a subsystem that is bound to the larger system through a network of relations with other individual subsystems. Importantly, the normative relations between system and subsystem are nonlinear in the sense we saw above: it is because a set of individuals acts in accordance to a set of rules that the rules become publicly endorsed, and the individuals act in accordance to these rules because they constrain their set of possible actions. Publicly shared rules (including those relative to contentful cognition) thus become one mean by which the social system defines its organizational and operational closure, hence, maintaining its own social identity (or social homeostasis).

If that hypothesis is correct, it is predictable that different social systems may develop different sets of rules, so that the members of these systems perform higher cognitive activities according to their social settings. This is not equivalent to the universally accepted claim that some cultures have idiosyncratic world-views (including empirical beliefs and moral values, and even metaphysical backgrounds as well). What follows from the hypothesis above is a slightly more controversial claim, namely: members of different cultures may perform the *same* cognitive task *differently* (because these performances are in part what characterize their social identity). The controversy does not rest on the alleged fact that this is implausible, but on the fact that there is a widely shared assumption among traditional philosophers that higher cognitive skills are homogenous across the board, thus somehow detached from the social and situational backgrounds of specific societies. Although that expectation is independently plausible (*pace* traditional philosophers of course), only recently cross-cultural researches have suggested that there are significant differences in cognitive procedures across different cultures. In what follows, I will discuss some of that empirical evidence.

4. Empirical support

One of the earliest notable findings on cross-cultural epistemic differences is that of the Azande by Evans-Pritchard (1937). According to Evans-Pritchard, members of the Azande, an isolated tribe that lives in Central Africa, believe that witchcraft is an inherited physical trait which is transmitted from father to son. However, they also believe that not all sons of healers are healers themselves, so they accept the conditional 'if X is the son of a healer, then X is a healer', accept the antecedent for a given individual, but may reject the conclusion, even systematically so. If this construal of their faulty reasoning is correct, the hypothesis I am advancing here is that a widespread cognitive mistake among the Azande is in part what characterizes their social identity, and that is why it is reinforced and accepted further. This case is not sufficient to stablish our point, however, because it is controversial whether the Azande were correctly translated. It may be the case that they believe that witchcraft is an inherited *ability* which is not necessarily exercised by every healer's son (see COLIVA, 2010, p.196). Moreover, not enough data about the frequency of such error were raised, and it remains dubious whether this inferential mistake translates to other topics outside witchcraft and to other patterns of reasoning, such as the modus tollens.

More compelling evidence has been presented by Nisbett and his colleagues (2008). They speculate that different world-views in ancient Chinese and Greek cultures ground present day social differences between East Asians and Westerners. Contemporary social differences are responsible not only for the different naïve metaphysical views and tacit epistemologies of each group, but also for the different nature of the cognitive processes of their members (2008, p.956). Specifically, the traditional Chinese world-view is based on social obligation and accordance to the whole, so that features of the world are primarily understood according to their relational properties instead of their intrinsic ones. This subsequently led to more attention to the field in understanding physical events and to the development of holistic thought, which is "associative, and its computations reflect similarity and contiguity" (2008, p.956). Overall, this explains the underdevelopment of Chinese formal systems of thought and the emphasis on thought procedures similar to Hegelian dialects. In contrast, the Greek ideals of social autonomy through debate, categorization and formalization led to the development of analytic and scientific thought in the western culture.

Accordingly, there is compelling evidence that contemporary East Asians and Westerners significantly differ in sensitivity to hindsight bias, i.e., the tendency to assume that one knew all along that an otherwise surprising

outcome was likely. Because Easterners deploy holistic reasoning, they tend to ascribe relevance to a wide variety of facts in explaining a given event, whereas Westerners tend to focus their explanations on specific causes. That suggests that Easterners encounter more difficulty than Westerners in explaining why an outcome could not have been predicted. In a study conducted by Choi and Nisbett (2000), Koreans and Americans were asked to predict the outcome of a story about a Good Samaritan who was late for an appointment and found someone in pain on the way. Both groups ascribed similarly probabilities (around 80%) that the Good Samaritan would help the person in need. In one condition, they were told that he actually did not help, and then were asked what they *would* believe if they had not been told so. Americans mainly manifested surprise and held the same probability as before, whereas Koreans in general said it was just as likely that the Good Samaritan would not help, thus being more sensitive to hindsight bias. If this is correct, it shows that the ability to interpret former mental states – which classifies as higher cognition insofar as it deals in representations and even metarepresentations – is subject to change across different cultures.

Similarly, Ji and her colleagues (2015) speculate that the difference between Chinese and Euro-Canadians lay theories of change – i.e., "beliefs on how events develop and change over time" (JI *et al*, 2015, p.2-3) – underwrite varying tendencies to believe in the gambler's fallacy and in the hot hand fallacy. Euro-Canadians typically think of change linearly, emphasizing constancy and inertia, whereas Chinese typically think of change cyclically, so that an outcome is due to be replaced by a radically different one, (negative events lead to positive ones and vice-versa). Now, the gambler's fallacy is the belief that a positive (or negative) outcome will follow a series of negative (or positive) ones, despite the fact that the trials are independent (as in dice throw). The hot hand fallacy is characterized by the belief that a successful outcome will follow a series of successful ones, becoming more likely over time, even if the trials are independent. If there is a substantial difference in lay theories of change, it is predictable that Euro-Canadians are more likely to commit the hot hand fallacy, and Chinese are more susceptible to the gambler's fallacy. The findings by Ji and her colleagues in two studies, one involving coin toss and the other one involving basketball shots, confirm that prediction.

Both cases above constitute suggestive evidence for different cognitive tendencies in individuals of different cultural backgrounds, but the stronger case for radically different cognitive procedures is made by Medin and his colleagues (MEDIN *et al.* 2006, BURNETT & MEDIN, 2008). In a task assigned two groups of fishermen living in North Wisconsin (European-

Americans and Menominee Indians), they found notable differences in folkbiological taxonomy procedures. In that task, participants were presented with a set of cards, where each card had the name of a kind of fish on it. Participants were then asked to group the cards according to the fish that "go together by nature" (BURNETT & MEDIN, 2008, p.941). They were later asked to build larger and smaller categories, producing a "downward-branching hierarchy of biological kinds" (*ibid.*). Although both groups live in the same area, interact with the same kind of fish, share the goal of catching adult fish only and use the same methods, they differed in their categorization reasoning. While the European-Americans used mainly morphological and taxonomic justifications to group the fish (e.g., belonging to the bass family), the Menominee preferred ecological ones (e.g. river or pond fish, bottom feeders, etc.). Next, participants of each group had to infer what kinds of fish were more liable to manifest a fictional disease. Although the task of performing inductive inference was similar for both groups – for both European-Americans and Menominee arrived at their beliefs based on their knowledge base – their taxonomic differences manifest different ways of representing the fish, thus showing that they differed on high cognitive procedures, as our hypothesis predicts. Burnett and Medin note that:

> Even among reasoners with the same knowledge, cultural factors may influence how this knowledge is organized, or the relative accessibility of different pieces of the knowledge base […] Differences in organization or accessibility may, in turn, be reflected in how reasoning strategies are derived from the knowledge base (2008, p.940).

Importantly, the evidence above does not confirm the hypothesis that *higher cognition is an adaptive tool of the social system*, but it does lend strong support for its consequence, namely, that *some social systems may have developed specific higher-cognitive skills*.

Conclusion

Here I attempted to build upon RECers' claim that high cognition emerges through sociocultural practices. This leads to the following challenge: what is the function of higher-cognitive attitudes, given the data according to which high cognition is not correlated with cognitive amelioration? The answer I offered for this question must be seen as an attempt to advance the REC program by sketching the general outlines for future research: the adaptive function of high cognition is not cognitive amelioration, but the maintenance of the social system within which contentful cognition arises.

It is important now to clarify what I am *not* claiming. I am not claiming that achieving true beliefs and avoiding false ones should not be the

ultimate aim of our higher-cognitive performances. I am not advancing the relativistic views that everything goes, or that truth does not matter, or that manipulating representation is epistemically useless. It does seem clear that to retreat into a crystalized realm of *a priori* normativity is no longer tenable, given the significant findings in psychology of reasoning that demystify our cognitive abilities – but that is not to say that we are unable to recognize objectively bad cognitive performances, such as fallacious reasoning and selective bias. We are clearly able to do so, and we are able to correct these mistakes within our limitations. That possibility is still open in this framework because it does not rely on the view that the norms we actually employ in exercising our cognitive skills are strictly a priori. On the contrary, I assumed – alongside with level-headed naturalists – that the naturalized normativity of publicly shared rules is contingent, so we could, in principle, correct systematic errors in our cognitive procedures. Therefore, the achievement of cognitive amelioration would promote changes, in the long run, within the social systems we are part of.

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