Social Mediation and the Epistemic Logics Framework: An Inquiry into Ecological Epistemology

Jar Žiga Marušič
Department of Psychology
University of Primorska
Koper, Slovenia
jar.marusic@famnit.upr.si

Abstract

This paper develops an evolutionary-ecological account of social epistemology, where human reasoning (judgment on acceptance or rejection of assertions made in natural language) is conditioned by the social and ecological payoffs of the selected judgment. I begin with the primary premise that cognition is fitness-oriented, justified with reference to ecological realism and 4E cognition. I formulate the basic principle as "fitness over truth, truth insofar as it serves fitness", while noting my divergence from the stronger anti-truth position proposed by the interface theory of perception. I proceed with the social brain hypothesis as support for the inference from fitness-orientation to social-embeddedness, culminating in the principle of social mediation. The latter is my proposed rationale for the assertion that consensus and other social cues can (in many contexts) be more salient than truth for the purposes of reasoning because of their more immediate action-relevance. I conclude by proposing a provisional taxonomy of "epistemic logics" (descriptive formalizations of different reasoning criteria) informed by the established theoretical framework.

Keywords / Ključne besede

ecological reasoning, social epistemology, social mediation, evolutionary epistemology

1 Introduction: Evolved Cognition

It is a deeply felt intuition of mine that any properly evolutionary approach to examining human cognition *must* be grounded in one key premise and two derivatives. Human cognition has three characteristics:

1. It is fitness-oriented
2. It is heuristic (satisficing and proxy tracking)
3. It is socially embedded

Fitness-orientation is the basic evolutionary inference: if cognition is a product of natural selection, its evolved function is to orient the organism's activity in a *viable* manner. Viability, in this context, refers to the minimal threshold of successful need-satisfaction, problem-solving and goal-achievement necessary for semi-reliable reproduction.

Since natural selection does not "represent" fitness (nor do organisms themselves), this ultimate goal can only be approached as a by-product of an orientation toward proximate, positively-sought goals that act akin to *satisficing* heuristics (satisficing borrowed from Herbert Simon [12]). I will not explicitly argue for this premise here, but it is, for example, fundamental to contemporary evolutionary psychology (for Tooby and Cosmides [19], organisms are adaptation executors rather than fitness maximizers, see also evolutionary mismatch).

Instead I will focus on the basic *fitness-orientation* premise and its other derivative: *social-embeddedness* in the context of human *reasoning*, understood narrowly as acceptance or rejection of natural language statements (claims such as X is Y).

I do this through a five-step inference. (i) For cognition to ensure viability, it needs to properly guide action, giving practical concerns precedence over "truth" in the abstract. (ii) "Truth" (understood in the ecologically realist sense elaborated in the next section) is *instrumental* and in contention with other action-guiding cues for the consideration of ecologically situated agents. (iii) This is especially the case for social species (such as humans), where the relevant ecology is strongly social (made up of other minds capable of mutual communication and interaction).

(iv) The intermediate conclusion is that truth, in the abstract, is ordinarily only as salient to human cognition as it is relevant to action-guiding purposes in the given context. And, insofar as various social cues (such as the current consensus) are contextually more relevant, they will be *more* salient and inform reasoning more strongly than considerations of "truth".

(v) Adding an additional premise, that sociality has been a constant feature of human ecology for a very long time, such that higher-cognition likely "co-evolved" with the capacity to navigate complex social interaction, allows us a further and somewhat more speculative inference: *natural selection is likely to have produced minds that give social information a default weighting advantage over considerations of truth in the "abstract".*

In the remainder of the paper, I will attempt to justify these two premises and derive their implications for reasoning. I develop the *fitness-oriented* premise through ecological realism and 4E cognition, and integrate these two approaches with the social brain hypothesis (SBH) to justify the *socially embedded* premise through the *principle of social mediation*.

I then outline the implications of these two premises for reasoning via an attempt at an *evolutionary social epistemology*: my epistemic logics framework (ELF) that models the effect of

Permission to make digital or hard copies of part or all of this work for personal or classroom use is granted without fee provided that copies are not made or distributed for profit or commercial advantage and that copies bear this notice and the full citation on the first page. Copyrights for third-party components of this work must be honored. For all other uses, contact the owner/author(s)
Information Society 2026, 5–9 October 2026, Ljubljana, Slovenia
© 2026 Copyright held by the owner/author(s).
https://doi.org/10.70314/is.2026.cogni.67

different action-relevant criteria on the acceptance and rejection of claims.

Before I proceed, a minor qualification is in order. Conscious agents can represent both truth and fitness abstractly (e.g., truth = claim-world correspondence; fitness = phenotype-niche adaptedness). Once represented in this way, either can become an explicit goal of deliberation via *slow* cognition (in the dual-process sense).

But that is beside the point, as my evolutionary inference regards ordinary, *fast* cognition. The latter (I argue) does not normally adjudicate natural-language statements by separately representing their epistemic and non-epistemic action-relevant characteristics. The lines between the criteria upon which we might accordingly judge statements are instead "blurry" precisely because they are all different proxies for the ultimate goal of viability.

2 Ecological Psychology: Fitness Over Truth, Truth Insofar As It Serves Fitness

What I am provisionally calling the "fitness-orientation hypothesis" is relatively well established in contemporary cognitive science, given the prominence of 4E cognition (*embodied, embedded, enactive,* and *extended*; [3, 10, 21]).

The 4E model represents a step away from the Cartesian conception of cognition as a detached faculty producing neutral representations of the world. Instead, the contemporary understanding is that cognition is an adaptive orientation system arising from the embodied organism's active engagement with an environment. As Thompson [17, p. xxv] puts it:

> The basic idea of the enactive approach is that . . . cognitive processes belong to the relational domain of the living body coupled to its environment.

The present argument, however, diverges from the enactive approach in one key aspect (despite being broadly in line with it). Instead of rejecting a "pregiven, perceiver-independent world" (cf. [21]) as the reference point for perception, I treat the action-relevant structure of the environment (its *affordances*) as *relational but real*, per Gibson's [5, p. 133] ecological realist formulation: "an affordance points two ways, to the environment and to the observer". Action possibilities are present even if unregistered, allowing an agent to misappraise them.

Importantly, while ecological realism does reinterpret perception in terms of fitness-relevant action guidance rather than detached truth representation, successful fitness-tracking nevertheless presupposes sufficient truth-sensitivity (sensitivity to the ecologically relevant structure of the environment).

I formulate this as "fitness over truth, truth insofar as it serves fitness", which puts me at odds with one of the more prominent *fitness over truth* frameworks in cognitive science, the *interface theory of perception* (ITP), which explicitly disentangles fitness from truth.

The argument, based on evolutionary modeling and genetic algorithms, is that a *non-veridical* perceptual field – a species-specific interface shaped by fitness payoffs – outcompetes a *veridical* one [8].

I emphasize veridicality to highlight the crux of the issue, which is that the ITP mistakenly infers a "deceptive" interface from fitness–conducive perceptual transformations outperforming perception of the world "as it really is". This is a mistaken equivocation of *truth* with *veridicality* over *accuracy*. Where the former is about representing the world in its own register (sans interface), the latter entails *satisfactory preservation of the causal structure of the world* (by the interface).

Consider the example of *acidity* (a chemical property) and the taste of *sourness*. Sourness (the "icon") quite obviously does not capture the essence of acidity (the "code"). And yet, sourness is systematically affected by acid-related variables (such as concentration, pH, anion species; [14]), thus acting as a reliable-enough indicator of the underlying chemical property of acidity.

This is fully in line with the fact that, in an ecological sense, an organism's environment is a set of constraints and options (broadly, *affordances* per Gibson [5]). These orient need-satisfaction and goal-directed action – an apple is »something to eat« (apprehended via the embodied mechanisms that signal this quality to the organism) before it is »an apple« in the definitional sense (an affordance in the "forum for action" before an object in the "place of things", to use Petersonian terminology [11]). Objects need not be represented "as they are", as what is salient is what they *afford*, not what they *are*.

Hence, for perception to be conducive to fitness, it must translate the "distal" environment as it »is« into a set of "proximate" percepts that correlate with the distal action-relevant properties well enough to ensure viability (this is "ecological validity" for Brunswik [1]). Gibson [5] expresses the same necessity as picking up "invariants": stable relational structures in the organism-environment field that persist across variation and thereby specify actionable affordances.

This is also broadly in line with evolutionary epistemology. Cognition is selected for because it works, and it works because it is at least partially fitted to the causal and statistical structure of the environment [9]. Natural selection does not »care« about truth as such, but it does register the consequences of error, meaning that perception cannot systematically misrepresent aspects of the environment that are relevant for successful action. In this limited but crucial sense, fitness-tracking presupposes tracking truth (in the sense of accurate-structure-representation).

To summarize, from a properly ecological perspective (where how an object interacts with an organism exhausts the significance of "what it is"), perception *must* present an "accurate image", i.e. an interface that preserves the underlying causal structure with sufficient fidelity to enable successful activity.

The interface may "hide the code", but it does not mislead the user – except for when it does, as in the case of social interaction and communal life, especially once propositional reasoning and natural language communication enter the picture. We thus attempt to rehabilitate the Hoffman et al. [8] inference by transposing it into the domain of social cognition.

3 Socially Embedded: The Principle of Social Mediation

Having provided a general outline of what will henceforth be referred to as "ecological psychology", I now shift to one of its underdeveloped implications: what *reasoning* actually *is* for

humans as *evolved* organisms, its relation to *truth,* and how this shapes evolutionary accounts of epistemology.

Let us bring attention to Trivers' [20] strategic self-deception hypothesis:

> If . . . deceit is fundamental to animal communication, then there must be strong selection to spot deception and this ought, in turn, to select for a degree of self-deception [implying that] natural selection [might not] favour nervous systems which produce ever more accurate images of the world.

This perspective, along with signaling theory, underlies Simler and Hanson's [13] "hidden motives" framework: self-deception facilitates social deception by allowing agents to pursue norm-violating or self-interested strategies without consciously representing them as such.

This provides a precedent for an analogue of the idea that the icons misrepresent the code to the user in the realm of social cognition. But to understand the underlying ecological logic, we must turn to the SBH and derive the principle of social mediation.

The SBH proposes that human (and primate) cognition evolved to solve adaptive problems (such as acquiring resources for sustenance and avoiding predation) by first solving problems of *social coordination* and *cohesion* (C&C) [4]. Dunbar [4] presents it as a two-step explanation: the proximate mechanism is solving C&C within bonded groups, which enables the solution of the underlying ecological problem (mainly predation and resource gathering).

Leaning on ecological realism, I propose a stronger interpretation. If cognition is designed to produce viable behavioral orientation, and if (in humans) this is most readily achieved by optimizing for solutions to problems of C&C, a primary faculty of our minds must be the ability to navigate social landscapes *before* solving any specific adaptive problem or facilitating abstract reasoning.

If we accept this interpretation, we must also infer that the ecological-realist link between accuracy and fitness can drift under socially mediated conditions. This "social mediation" of agent-environment interaction (by social interaction with other agents and shared rules-of-navigation) changes the environment's affordance structure. The »physical« ecology becomes mediated by the social ecology, creating incentives for cognition to attune to the social-symbolic affordance structure (the causal structure of "social" reality) rather than to the original target (the causal structure of "physical" reality)[1].

This is the basis of my *principle of social mediation*: social organization alters the causal pathway through which an agent encounters and solves an ecological problem. A similar conclusion is reached by Sterelny [15, p. 719], who characterizes social and ecological adaptation as intertwined, given that individuals encounter ecological filters "with others," and with socially accessed technology and information.

To provide an illustrative example, human infants are the clearest case of social mediation of the environment. Infants are, ecologically speaking, not individuals because they lack self-sufficiency. They satisfy their needs and solve adaptive problems wholly through their relationship with their caretakers (in a socially mediated manner).

We can transpose this principle to modern forms of social life and propose that even adults occupy a largely mediated ecology. Rather than ecologically individual, modern adults are embedded in larger political-economic systems that alter the pathway to need-satisfaction and goal-achievement. One crucial aspect is *money* (or exchange media in general), which allows individuals to procure food (and other goods) by participating in activities with monetary returns, instead of getting them directly "from nature".

This changes the causal structure of the problem-domain (from "hunt deer → get food" to "earn money → get food") and consequently also changes the adaptively relevant "slice" of the environment that minds need to accurately "represent" (in the ecological realist view which this paper appropriates). In other words, it is just as important that they represent the causal structure of *nature as socially mediated through rituals, narratives, and social exchange* as it is to represent the causal structure of nature "in itself"[2].

The implication is that social mediation can create incentives against truth-tracking in reasoning, because truth is not always the most salient criterion within a socially mediated ecology, bringing us to the social epistemological point of this paper.

4 The Inference: The Epistemic Logics Framework

The *epistemic logics* or the *logics of reasoning* are my analytic reconstruction of observable *descriptive* (not normative) criteria of epistemic arbitration that determine distinct "rules of reasoning". In the framework I'm developing, they govern five formal operations. The syntactic operations are *claim acceptance* and *inferential licensing*, whereas the semantic operations are *intension-specification*, *reference* and *predication* (shortened as A, I, S, R, P)[3].

Because of scope limitations, I will limit myself to outlining their role in determining acceptance (based on distinct binary criteria) and reference. My usage of "epistemic logic" is distinct from *formal epistemic logic*, the field concerned with the logic of knowledge and belief; but I believe the scope of determination (A, I, S, R, P) of these "rules of reasoning" justifies the term "logic".

Most fundamentally, the "logics" determine what characteristic a proposition must possess to be »accepted as true« or *gain uptake* within a given communicative context. This is the basic qualification for my assertion that the "interface" may

[1] The distinction is functional, rather than ontological. The affordance structure created by interaction with agents is different from the affordance structure created by interaction with objects.

[2] There is a diachronic aspect to social mediation resulting from the "nested" structure of the human ecology (social subsystems, embedded in a larger social system, itself embedded in the "natural environment"). These mediating systems act as *buffers,* temporarily suspending and modifying selection pressures stemming from the »base layer« of *level-0 constraints*. Strategies that are viable in an environment unmediated by social interaction become subordinated to strategies adapted to navigating social reality – the »law of the jungle« is replaced by the »law of civilization«. Because the mechanism by which natural selection eliminates error is negative feedback for maladaptive behavior, the buffering effect of social systems allows maladaptive strategies to persist by deferring costs onto the mediating system. The best analogy is a large company with various subsidiaries. A minority of these subsidiaries may represent economic losses, but because the rest are run at a profit, the overall system is capable of sustaining itself.

[3] This is elaborated in detail in my work-in-progress doctoral dissertation.

"hide the code" in the domain of social cognition. They are my attempt to formalize patterns deduced from personal observation as well as observed in various philosophical, sociological, and psychological theories into a provisional taxonomy. Due to length constraints, I have mostly omitted these influences in the present paper, as well as the two other premises that properly license the inference to the ELF (*natural language statements as affordance-bearing objects* and Champagne's [2] *Umwelt normativity*, both addressed in detail in my work-in-progress thesis).

I begin from the basic assumption that, to navigate the complex and dynamic structure of our socially mediated environment, natural selection has equipped humans with fast, context-dependent modes of epistemic filtering that identify a natural language statement's most salient feature under a given problem structure. The epistemic logics can thus be understood by analogy with Gigerenzer and Goldstein's [6] fast-and-frugal heuristics: they reduce complexity by isolating one decisive criterion and use it as a ground of acceptance or disqualification.

In my research, I have identified at least four salient domains (and their respective judgment-criteria): *causal constraint-navigation* (truth-as-accuracy), *consensus* (propriety), politics as coalition-building and competition (allegiance), and *hierarchy* (authoritative decision). While the epistemic logics deal with the linguistic instantiation of these domains, they can be reasonably proposed to have a pre-linguistic basis. *Truth as accuracy* corresponds to sensorimotor accuracy: striking a target or hitting a nail on the head. Authoritative decision, propriety and allegiance, on the other hand, all correspond to aspects of social life and group-maintenance.

Authoritative decision corresponds to the social function of hierarchical stratification or »rank ordering«. The pre-linguistic basis of propriety may be found in group-boundary maintenance. *Consensus* (group-agreement) means something is correct for us ("our group"), rather than "objectively" correct, but it is often naturalized into the latter. Territorial markers separate "us" from "them", and the same affective machinery that regulates pathogen avoidance may also contribute to moralized aversion toward outsiders, as proposed by the moral foundations theory and parasite-stress theory [7, 18]. *Allegiance* is likewise rooted in distinguishing between "us" and "them", but related to jockeying for advantage through coalitional politics and actively maintaining boundaries (rather than simply establishing them).

When transposed onto the level of propositional reasoning, these translate to the logic of *reason* (truth), *politics* (allegiance), *power* (authoritative decision), and *normativity* (propriety). Each of these logics, as strategies for reasoning about the acceptability of claims, is based on a binary criterion:

- *Reason* → accept/reject claim *iff* claim is true/false
- *Normativity* → accept/reject claim *iff* claim is proper/improper (per operative moral standard)
- *Politics* → accept/reject claim *iff* claim is aligned/adversarial (per coalition's current agenda)
- *Power* → accept/reject claim *iff* claim is authorized/forbidden (by sovereign decision)

There is a fifth, meta-logic: the *logic of survival*, operating by the criterion of pragmatic utility or viability. It differs from the others because of its dual status. *Synchronically*, it functions as a meta-heuristic that selects among the other logics (reasoning modules) according to the demands of the present ecological situation. *Diachronically*, however, it functions as a Darwinian-pragmatic filter by subjecting different modes of reasoning to natural selection by their consequences. Those that continue to produce viable outcomes under real ecological constraints are selected in favor of others; thus, »proving« their outputs to have been »true« in a Darwinian sense.

This is also what ultimately makes the logic of reason indispensable. Social mediation turns individual empirical observation and rational deliberation into an inefficient alternative to inference from different social cues, but the possibility of an unmediated affordance structure re-imposing itself on the individual organism should necessitate a »module« for orientation in such a context[4].

The four binary criteria establish the syntax of the "rules of reasoning" determined by the logic operative in a given social context. The semantics *follows from the syntax* and, for the present paper, concerns the operative *regime of reference*, determining which object-label attachments are legitimate, briefly outlined below.

Under the logic of reason, reference works by *denotation*: the name must match the empirical properties of the object. An apple is an "apple" if it fits the descriptive definition grounded in observation.

Under normativity, reference works by *connotation*: X is <*evaluatively charged term*> if both share the same evaluative coding in the operative discursive context (regardless of match or mismatch between conventional definition and empirical properties)[5]. A discursive phenomenon characteristic of the logic of normativity is the disqualification of truth claims because of their »improper« (or politically incorrect) nature, regardless of or despite empirical evidence in their favor[6].

The logic of politics determines reference on the basis of allegiance: a label is applied when it is beneficial to one's agenda, withheld when it is detrimental (in this sense, it is partially entwined with the logic of normativity, as the latter is often the backdrop determining the utility of the label based on its evaluative load).

The logic of power is an interesting special case in that it is arbitrary rather than algorithmic, unlike the other three (which can be neatly formalized as strict rules). Its referential regime is decisionist in that the sovereign's act of naming (or suspending a name) makes it "real", creating X out of not-X, even if this contradicts any of the other referential regimes. This,

[4] I am using "truth" in an ecological sense as accurate representation of the causal structure of distal reality, which corresponds most closely to socially unmediated observation and deliberation. The other criteria (propriety, cost-benefit, and authority) are often more efficient than direct inquiry, but less reliably coupled to the causal structure of distal reality due to social mediation and cost-buffering. Only direct inquiry and individual judgment are directly answerable to environmental feedback. Furthermore, module is used loosely, rather than in the strong massive modularity sense.

[5] I elaborate at length on the difference between denotative and connotative reference (descriptive versus evaluative determinacy, to be precise) in a different manuscript.

[6] I discuss this as "moralistic argumentation" in a previous paper.

coincidentally, is how Strong [16] characterizes the Hobbesian-Schmittian sovereign in his foreword to the English translation of *Political Theology*.

The logic of power is »anti-logical«, as it suspends epistemic adjudication and reference regimes in particular cases (creating particular exceptions) while preserving them in general. To use a trivial, non-representative but clearly intelligible case: if there is a clear-cut rule for what counts as "fruit", an arbitrary break in the social attribution of "fruit-status" to a specific class of object indicates the logic of power at play. Less trivially, a rule for social acceptance of claims (as true) not applying to one class of statement within a shared "family of resemblance" or one specific group of speakers, similarly indicates the logic of power.

Besides syntax and semantics, there is also the domain of pragmatics, through which the operative logic of a discursive context is made legible. One cannot determine meaning-in-practice by consulting a dictionary or reasoning from first principles. Instead, it is done by observing social reactions to the assertion of truth claims and the attachment of labels. If the behavioral consequences of a positive or negative designation match expectations, then the label is *socially true*, regardless of whether it is "literally" true. Likewise, if a statement is accepted as true based on a non-truth criterion and despite empirical evidence to the contrary, it is *socially true*.

In this sense, the logics operate socially (at the level of *discourse*) and individually (at the level of *reasoning*). The former refers to the communicative norms of a given social context, while the latter refers to how individuals privately judge truth claims (whether there is a clear line between the two is something I have not yet been able to determine with full confidence).

In summary, truth, as commonly understood, is only one possible criterion by which humans judge descriptive claims that lead to their uptake in communicative contexts. It is also *weakest:* generally overwritten by its fast and frugal alternatives because of its slow and expensive nature.

References

[1] Egon Brunswik. 1956. Perception and the Representative Design of Psychological Experiments. University of California Press, Berkeley.

[2] Marc Champagne. 2011. Axiomatizing Umwelt Normativity. Sign Systems Studies 39, 1 (2011), 9–59. DOI: https://doi.org/10.12697/sss.2011.39.1.01.

[3] Andy Clark and David Chalmers. 1998. The Extended Mind. Analysis 58, 1 (1998), 7–19.

[4] Robin I. M. Dunbar. 2016. The Social Brain Hypothesis and Human Evolution. Oxford Research Encyclopedia of Psychology. Oxford University Press, Oxford. DOI: https://doi.org/10.1093/acrefore/9780190236557.013.44.

[5] James J. Gibson. 1979. The Ecological Approach to Visual Perception. Houghton Mifflin, Boston.

[6] Gerd Gigerenzer and Daniel G. Goldstein. 1996. Reasoning the Fast and Frugal Way: Models of Bounded Rationality. Psychological Review 103, 4 (1996), 650–669. DOI: https://doi.org/10.1037/0033-295X.103.4.650.

[7] Jesse Graham, Jonathan Haidt, Sena Koleva, Matt Motyl, Ravi Iyer, Sean P. Wojcik, and Peter H. Ditto. 2013. Moral Foundations Theory: The Pragmatic Validity of Moral Pluralism. Advances in Experimental Social Psychology 47 (2013), 55–130. DOI: https://doi.org/10.1016/B978-0-12-407236-7.00002-4.

[8] Donald D. Hoffman, Manish Singh, and Chetan Prakash. 2015. The Interface Theory of Perception. Psychonomic Bulletin & Review 22, 6 (2015), 1480–1506. DOI: https://doi.org/10.3758/s13423-015-0890-8.

[9] Konrad Lorenz. 1977. Behind the Mirror: A Search for a Natural History of Human Knowledge. Harcourt Brace Jovanovich, New York.

[10] Albert Newen, Leon de Bruin, and Shaun Gallagher (Eds.). 2018. The Oxford Handbook of 4E Cognition. Oxford University Press, Oxford.

[11] Jordan B. Peterson. 1999. Maps of Meaning: The Architecture of Belief. Routledge, New York.

[12] Herbert A. Simon. 1956. Rational Choice and the Structure of the Environment. Psychological Review 63, 2 (1956), 129–138. DOI: https://doi.org/10.1037/h0042769.

[13] Kevin Simler and Robin Hanson. 2018. The Elephant in the Brain: Hidden Motives in Everyday Life. Oxford University Press, New York.

[14] Richard A. Sowalsky and Ann C. Noble. 1998. Comparison of the Effects of Concentration, pH and Anion Species on Astringency and Sourness of Organic Acids. Chemical Senses 23, 3 (1998), 343–349. DOI: https://doi.org/10.1093/chemse/23.3.343.

[15] Kim Sterelny. 2007. Social Intelligence, Human Intelligence and Niche Construction. Philosophical Transactions of the Royal Society B: Biological Sciences 362, 1480 (2007), 719–730. DOI: https://doi.org/10.1098/rstb.2006.2006.

[16] Tracy B. Strong. 2005. Foreword. In Carl Schmitt, Political Theology: Four Chapters on the Concept of Sovereignty, vii–xxxvi. Translated by George Schwab. University of Chicago Press, Chicago.

[17] Evan Thompson. 2016. Introduction to the Revised Edition. In Francisco J. Varela, Evan Thompson, and Eleanor Rosch, The Embodied Mind: Cognitive Science and Human Experience, xvii–xxxiii. Revised ed. MIT Press, Cambridge, MA.

[18] Randy Thornhill and Corey L. Fincher. 2014. The Parasite-Stress Theory of Values and Sociality: Infectious Disease, History and Human Values Worldwide. Springer, Cham.

[19] John Tooby and Leda Cosmides. 1992. The Psychological Foundations of Culture. In Jerome H. Barkow, Leda Cosmides, and John Tooby (Eds.), The Adapted Mind: Evolutionary Psychology and the Generation of Culture, 19–136. Oxford University Press, New York.

[20] Robert L. Trivers. 1976. Foreword. In Richard Dawkins, The Selfish Gene. Oxford University Press, Oxford.

[21] Francisco J. Varela, Evan Thompson, and Eleanor Rosch. 2016. The Embodied Mind: Cognitive Science and Human Experience. Revised ed. MIT Press, Cambridge, MA.