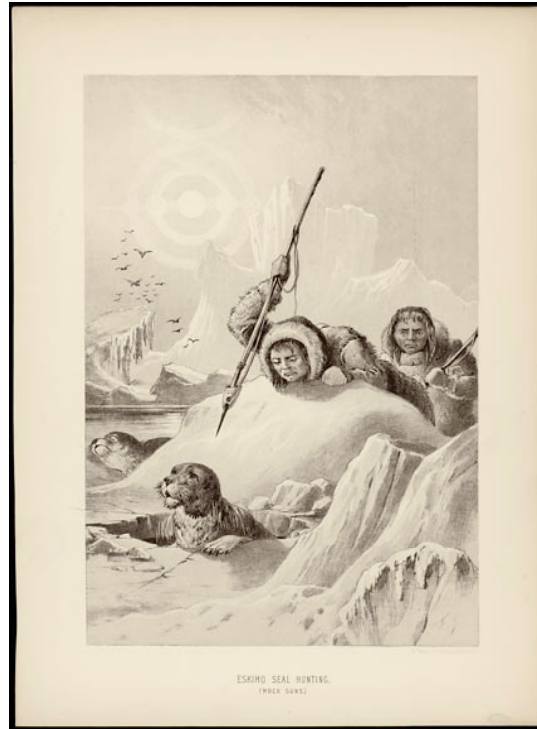


9 Social Intelligence



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9.1 Human Intelligence: puzzle, chess or collective hunting?

Needless to say, our species is one of a kind. We have culture, Internet, writing, language, satellites in space, mathematics, universities, science, arts, etc. We live in every possible climate. We have a large brain able to store a vast amount of information and to solve many problems. How can we explain human uniqueness and its evolution from the first hominid to our world?

Three accounts of human intelligence will be discussed here:

1. **The ecological intelligence hypothesis.** Humans are smart because they are adapted to the complexity of their environment
2. **The social intelligence hypothesis:** Humans are smart because they are adapted to life in society: complex sociality generates complex minds, which increases social complexity which increase mental complexity, and so on.
3. **The socio-ecological intelligence hypothesis:** Humans are smart because they collectively adapted to their environment; social and ecological fused.

Each hypothesis can be illustrated by a different activity: a jigsaw puzzle (humans facing a complex world), chess (humans facing other humans) and collective hunting (human facing a complex world together).

9.2 Ecological and Social Intelligence

Proponents of the Ecological Intelligence Hypothesis (ECH) depicts our intelligence as an adapted capacity to process complex factual information about the world. We are good at pattern recognition and color vision because the challenge of foraging (finding and extracting food) require a lot of learning, memory and inference. Foraging for seasonal fruits requires botanical knowledge; nut-cracking, requires technical knowledge, etc. Moreover, as Richard Potts (1996) argued, the African genesis of the hominid clade took place in conditions of increasing climatic instability, and our species, in its geographic and ecological expansion, faced changing, challenging environments.

While the ECH has been a prominent thesis, many psychologist, primatologist and antropologists favored a Social Intelligence Hypothesis (SIH). Primates are “social experts” or social problem solvers, rather than problem-solvers tout court. Social life comes with a lot of challenges: the formation and monitoring of a network of relationships, cooperation, communication, social understanding, reciprocity, dominances, membership, deception, manipulation, etc. The complexity of social life promote the complexity of individual cognition, and vice-versa: there, according to proponents of th SIH, a co-evolution between social and cognitive complexity. That Explain the “extraordinary transformation”, in about 4 Millions years, from our ancestors who “lived in the world as they found it” (Sterelny, 2007) to our modern societies and our distinctive intelligence. Primates intelligence would be an adaptive response to the complexity of social environment where primates evolved.

As Sterelny shows, there are at least two reasons why this hypothesis is plausible. First, the complexity of our social world: cooperation inter and intra-generations and the division of labor. Our societies are vertically complex (in terms of hierarchy) and horizontally complex: there is a lot of differentiation at each level (individuals, families, clans, tribes, communities, nations, cultures) in expertise, economic role. Second, there is a feedback loop between culture and cognition: social intelligence increase the complexity of the social world, which select for greater social intelligence. If we can never detect lies, treasons, manipulations, chances are that our species would be extinct. Proponent of the Machiavellian intelligence hypothesis (a version of the SIH) suggest that social chess generates social complexity and vice-versa. Proponents of the Machiavellian Intelligence Hypothesis (MIH, e.g., Byrne & Whiten, 1988, 1997) argue that

the advanced cognitive processes of primates are primarily adaptations to the special complexities of their social lives, rather than to nonsocial environmental problems such as finding food” (MITECS)

Or, as Sterelny puts it, the evolution of hominin cognition depends on features of the environment that hominins have created themselves (2007). Our “Machiavellian” intelligence evolve through an arms race of manipulation, counter-measures, counter-counter measures, etc. that lead to greater social intelligence. A standard way of illustrating this is the Prisoner’s dilemma.

In this game, the police hold, in separate cells, two individuals accused of robbing a bank. The suspects (let’s call them Bob and Alice) are unable to communicate with each other. The police offer them the following options: confess or remain silent. If one confesses –implicating his or her partner—and the other remain silent, the former goes free while the other gets a 10 years sentence. If they both confess, they will serve a 5 years sentence. If they both remain silent, the sentence will be reduced to 2 years. Assuming that Bob and Alice have common knowledge of each other’s rationality and the rules of the game, they should confess. Even if they would be better-off in remaining silent, this choice is suboptimal: they would risk a 10-years sentence if the other does not remain silent. Experimental game theory showed that, contrarily to orthodox game theory, subjects cooperate massively in prisoner’s dilemma, even in one-shot games (Ledyard, 1995; Sally, 1995).

The PD is an example of a collective action problem, such as people rushing out of a building in case of fire. All should calm, but then one could get out faster; knowing this, however, everybody rushes out. The PD applies to any situation where everybody would profit from cooperation, but that would make the temptation of defection too attractive. When the PD is indefinitely iterated, however, cooperation can be rational. Axelrod’s (1984) computer simulations showed that cooperation can be rational if one follow a cooperative reciprocal strategy: cooperate first, cooperate with cooperators, do not cooperate with defectors

According to the MIH, since humans cooperation is both risky and valuable (there is always a risk of being cheated), our evolved psychology dispose use to monitor our interactions with other and to engage in “tit-for-tat” altruism: we cooperate with those who cooperate, and do not cooperate with those who doesn’t. We are endowed with calculative-cooperative disposition, where reciprocity is sustained by self-interest and mutual scrutiny.

9.3 Socio-ecological Intelligence

One problem with the Machiavellian account is that calculative cooperation requires “cooperative score-keeping”, memorization of past interactions, etc. As Sterelny suggest, the Machiavellian theory is a better description of our contemporary, anonymous mass societies where we have to evaluate our engagement with strangers. Our ultrasociality, however, evolved in non-anonymous social worlds. Human cooperation, he argues, is not calculative, but a default option evolved for hunting and defence coalitions (Sterelny, 2007)

The socio-ecological intelligence present an alternative model for cooperation, based on 1) Strong Reciprocity, 2) Symbolically marked groups and 3) Norms of cooperation

Strong Reciprocity

In direct reciprocity (tit-for-tat) model, cooperators compute (consciously or not) the worth of cooperation. However, many findings in experimental economics suggest that Humans are *default* rather than *calculating* reciprocators, such as the ultimatum game and public good games.

In the **ultimatum game**, a ‘proposer’ (Alice) makes an offer to a ‘responder’ (Bob) that can either accept or refuse the offer. The offer is a split of an amount of money. If Bob accepts, he keeps the offered amount while Alice keeps the difference. If Bob rejects it, however, both players get nothing. According to a standard interpretation of the game, rational agents must behave as follows: Alice should offer the smallest amount possible, in order to keep as much money as possible, and Bob should accept any proposed amount, because a small amount should be better than nothing. Thus if there is \$10 to split, Alice should offer \$1 and keep \$9, while Bob should accept the split. The ultimatum has been studied in many contexts where different parameters of the game were modified: culture, age, sex, the amount of money, the degree of anonymity, the length of the game, and so on (Oosterbeek *et al.*, 2004; Samuelson, 2005). The results show a robust tendency: the game-theoretic strategy is rarely played, because people tend to make ‘fair’ offers. While proposers offer about 50% of the amount, responders tend to accept these offers and reject most of the unfair offers (less than 20%). They are thus ready to lose money in order to punish unfairness. In a **public good game** players may contribute an initial endowment to a common pool where it get bonified or free-ride by contributing nothing and receiving their share of the bonified common pool. While self-interest recommend free-riding, subject participate massively and punish free-riders, even in one-shot games (Ledyard, 1995; Sally, 1995).

Fehr and his collaborator coined the term ‘**altruistic punishment**’ to describe situations where people punish defectors, at a cost to themselves, through a non-utility-maximizing action, even in anonymous one-shot interactions or when they did not interact with the free-rider. Altruistic punishment, as research on public good games experiments showed, enforces cooperation: free ridings is less common and contribution to public good rises in groups where punishment is possible (Fehr & Gächter, 2000, 2002; Smirnov, 2007, p. 490). Punishment promotes cooperation by making it *rational* since defection has a cost and *predictable* since conditional cooperators can expect others to cooperate (Shinada & Yamagishi, 2007).

Hence we are Strong reciprocator rather that direct reciprocator: we cooperate by default, cooperate with cooperators, do not cooperate with non-cooperators, and punish cheaters.

Symbolically marked groups & norms of cooperation

Clans, tribes, associations, etc. all mark their affiliation through language, custom, values, cultural artifacts tattoo, symbols, decorations of tools, etc. Different groups, from street gang to business associations, have different symbolic practices that allow them to recognize each other as belonging to the same “tribe”. Instead of memorizing and computing before cooperating, we cooperate more easily with those who identify themselves as “ours” (with all the problem that tribal instincts may generate, of course).

But deeper than symbols, norms is one of the most important cooperation-enforcing device. Norms make cooperation rational, and does not require “cold computation” of benefits: “rule-following” is easier than calculation. Moreover, cooperation is facilitated, and defection more obvious, in a society with explicit cooperative norms, such as food sharing between hunters. In a cooperative world, it is easy to cooperate, and easy to detect free-riders

Rather than remembering past interactions and calculating the “cooperation score” of someone humans decide *who* to cooperate with. Cooperation, Sterelny argues, should be construed as a collective action, not a sequential exchange of favours. For most of their evolutionary history, humans lived in small foraging bands. Security and food, among others, were secured through n-person public goods games and not dyadic interactions (as in reciprocity models). Hunters and vigils do not compute each of their partner cooperative score: they assume that everybody will cooperate and comply with the norms of cooperation.

According to Socio-Ecological Intelligence Hypothesis (SEIH), humans are not purely ecological or social problem solver, but both. Our species is one of social foragers: there is no clear distinction between ecological and social intelligence. The cooperative, technology-dependent foraging typical in our species induce need for social skills: learning, communication, imitation. Collective and Big Game hunting requires a fusion of social and ecological skills

Foragers must have information of the animal and their technology (ecological skills) and must also be social experts: mutual knowledge, communication and coordination, and division of labour are necessary for collective success. The acquisition of foraging skills also necessitate social skills: social learning, language, imitation, teaching, etc. These cognitive tools for culture were selected for their use in the acquisition and deployment of ecological skills In learning foraging skills, the social and the ecological merge in the economic domain:

Individuals did not face the ecological filters on their environment alone, but with others, and with the technology, information and misinformation that their social world provides. Ecological and social complexity became fused, as the ecological problem of extracting resources as individuals from a world we did not make became the economic problem of extracting resources collectively from and in a human world

What is the function of a TOM (Theory of Mind) in this Socio-ecological model? Principally, it is part of the toolkit for cooperation. With a TOM, we can use other minds as sources of information about the world. More importantly, TOM make teaching possible more efficient. One need to understanding the skills for teaching it, and the teacher must understand

what the student knows in order to monitor its progress. In facilitating communication and the transmission of skills, TOM is an adaptation both to the ecological and the social environment.

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