

The Evolutionary Interpretation of Man: the Matryoshka Model

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This article analyzes the problem of why the human being has so many varied behavioral characteristics. Based on the latest insights of primatology, evolutionary psychology, anthropology, and sociology, it reconstructs the overall trends of human evolution and identifies five main steps of human development. Every step creates a specific type of construct, each of which in turn leads to certain behavioral „programs.” These constructs are built on top of one another, creating a “Russian Nesting Doll” (also called a Matryoshka doll)-type system. The article describes what happens when a human being is confronted with an environmental challenge. The challenge triggers a matching response and thus produces a behavior that is selected from the “menu” of possible “programs.” The results encompass a broad behavioral spectrum, ranging from human ethology and the modules of evolutionary psychology all the way to rules of thumb and rational decision-making. The article also argues that in order to understand the development of different social institutions (religion, state, morality, market), one needs to reconstruct and follow these evolutionary steps.

Key Words: Cultural evolution; Behavioral programs; Evolutionary psychology; Evolution of institutions; Symbolic revolution; Cultural niche.

One of the most interesting problems of the history of thought and science is the question: “*What is man?*” Experience suggests that depending on his life situation, man is characterized by contradictory features: he may be selfish and altruistic, foolish and wise, rational and irrational, full of empathy and prone to blind faith, or ready to kill others mercilessly. Religion was first in seeking an explanation for this complex behavior; philosophy was next in trying its hand at the problem. An autonomous scientific approach to the question was

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made possible by the creation of the concept of evolution. In the 20th century the various social sciences revealed in detail the fundamental complexity of human behavior. In economics, for instance, the notion of the “homo oeconomicus” was supplemented by a model of behavior that allows for emotional influence; e.g., giving in to peer pressure or, indeed, even irrationality (Gintis, H. et al., 2005, Kahneman, D. 2003.163.) Additionally, the model of evolution has also become an accepted method of describing behavioral complexity in the social sciences. In the present article – based on the latest results – we will propose a general framework to understand the behavioral complexity of human beings. For this purpose we will identify the crucial stages of man’s biological and social evolution, we will present the adaptive evolutionary constructs created during these stages, and, finally, we will show how these – built on top of one another – establish the essence of man.

The Evolutionary Perspective

Seen from an evolutionary angle, beings are continuously forced to solve problems emanating from their environment (Popper, 1994). In so doing, they rely on the “tools” they inherited – their nails or feet, a change in their physical features, their associations, or their built nests. Occasionally, the environment will change substantially: climate is altered, the ecological environment is transformed, or a new competitor appears. In such situations, problems – so-called adaptive problems – arise that cannot be solved with the existing instruments (Barkow, J. et al., 1992.) That is when the “craftsman” mechanism of evolutionary construction is set in motion. Chance mutations and the evolutionary pressure exerted by the environment combine to achieve the formation of new instruments that – insofar as they prove effective – become fixed by virtue of selection. They are then passed on from generation to generation. Sometimes a whole new species will come into existence.

Yet the relationship is not unidirectional; it is not only the environment that shapes the various species, but – at least partly – it is itself also shaped by the latter. An environment transformed by beings can create new adaptive problems of its own, which in turn feed back

on the populations and exert pressure on the genetic makeup and the further modifications of behaviors. As a result of the particular reciprocal interaction of beings and their prevailing environment at any given point in time, an evolutionary ladder may arise (Lenton, T. et al., 2004, 913.) Species may advance ever higher on the “staircase” of their evolutionary environment, which is shaped by the chance interaction of climatic and ecological conditions, as well as existing beings.

Beings will indelibly carry on themselves the imprint of their evolutionary history: over the course of their species’ evolution, they will at least partly retain elements of their (genetic) structure as it was formed at previous stages of evolution. This structure preserves the species’ life experiences “frozen” in the form of genes. Evolution does not discard structures that may have worked in the past but are no longer useful as a result of new conditions. At most, they are relegated to disuse (Massey, D. 2002, 16.) During the later stages of evolution, the particular life experiences of individuals lead to the development of more flexible behavior. Finally, communal experiences may also be inherited between generations – as a result of social learning –, as behavioral patterns that enhance fitness. This evolutionary scheme in and of itself points to the development of a hierarchically-structured behavioral programs.

Approaches to the Evolutionary Understanding of Man

The first consistently evolutionary explanation of human behavior was advanced by sociobiology. This approach traced human behavior back to ethological “programs,” and it viewed the understanding of human behavior as a natural extension of the persuasive results achieved by the evolutionary understanding of animal behavior. (Wilson, E. O. 1992.) In the context of numerous social phenomena it became indeed possible to show the imprints left by processes of biological adaptation (Eibl-Eibesfeldt, I., 1989.) This course of scientific research, which began to gain ground in the 1980s, was accompanied by sharp disputes – often fraught with misunderstandings. By today, the dispute has abated, at least in the sciences. It has become clear that ethology plays an important, though

not exclusive, role in the understanding of human behavior.

The scientific program of evolutionary psychology (EP) was formulated in the early '90s in response to the persuasive results Note to author: It isn't clear what persuasive results you're referring to and obvious deficiencies of the interpretive framework offered by sociobiology (Cosmides, L. - Tooby, J., 1997.) EP did not reject the interpretive framework offered by sociobiology – which was based on ethology –, but sought to complement and develop it further to make it more accurate. It traced human behavior back to so-called “mental modules” forming in the brain at the time man became human. It interpreted said modules as the “imprint” of the characteristic of the environment – referred to by EP as the environment of evolutionary adaptedness (EEA) - that prevailed during the time period in question. As a result of the influence of these modules, preferences and attitudes emerged that push man – without rational reflection – towards an adaptive behavior that matches the given environment. The existence of mental modules is a generally accepted notion, though the debates surrounding its interpretation have not mellowed. Experience shows that these modules, building on ethological programs, become activated under certain circumstances and exert a substantial impact on human behavior. At the same time, the debates have also shown that the modules – even complemented by human ethological programs – are not sufficient for explaining complex human behavior.

The third approach of the evolutionary interpretation of man (and culture) is associated with the “meme metaphor.” The notion of memes as “units of cultural transmission” was introduced based on the model of elementary units of biological heredity (Dawkins, R., 1989, 178.) According to this view, culture consists of elementary units established through the practice and the memories of individuals and the community, as well as in the form of objects. Man, born into a given culture, acquires, applies, transforms, and passes on the memes. Unlike genes, however, cultural memes are not received from parents only. This fact explains the greater dynamics of culture compared to biology. Viewed in its entirety, however, the meme theory – though it

is helpful in interpreting many cultural phenomena – has remained stuck at the level of metaphors and has failed to morph into a consistent theory (Bloch, M., 2006.)

The fourth approach towards the evolutionary interpretation of man is associated with the concepts of extended phenotype (Dawkins, R., 1982) and “niche construction” (Odling-Smee et. al., 2003.) The foundation of both these approaches is the insight that beings often create fitness-enhancing constructs “outside” their body: material structures (nests, dams, webs) and communal or individual structures for guiding behavior (caring for offspring, hunting in pack, mutual assistance.) Such evolutionary constructs are inherited by beings – similarly to the morphological and physiological features of their bodies – who then bequeath them further. This has a fundamental impact on their fitness. That is why it is reasonable to view these as inalienable parts of their essence. In human societies the importance of these constructs – since culture may be regarded as an inherited evolutionary construct – can become decisive (Boyd, R., et al., 2011, 10.918.)

The last model trying to explain the diversity of the human behavior is the so-called dual-inheritance model. It explains the complexity of human behavior taking into account simultaneously two different but interacting evolutionary mechanisms of biology and culture. This model can be regarded as the evolutionary variant of the earlier philosophical concept of man. In the dual-inheritance model, culture is acquired through social learning and it develops further based on a Darwinian evolutionary process (McElreath, R. Henrich, J. 2007. 432.)

All approaches listed above have contributed to the interpretation of certain categories of human-(related) phenomena. What they have in common is that they consider the inclusion of both, biological and social evolution alike, as ineluctable for the understanding of man. They also accept the existence of some evolutionary constructs that emerge in the course of evolution, and which jointly constitute the essence of man. However, they do not explain the possible evolutionary levels, the reasons behind the

emergence of certain evolutionary constructs, the way they work and “cooperate” in creating a given behavior. In the next section we provides a universally applicable framework model that can explain the full complexity of humans.

The “Matryoshka” Model of Human Essence

Many scholars coming from a variety of approaches have proposed during the past decade that the behavior of humans is best understood if we view hierarchically organized fitness-improving constructs as their foundation. MacLean was the first to introduce the model of a brain built up of three tiers of “decision centers” layered on top of one another (MacLean, 1990.) D. Dennett – with a philosophical approach – also argued for a hierarchically ordered model, though he proposed the existence of four layers (Dennett, D., 1996, 400-412.) In his model interpreting human behavior, Merlin, D. advanced the idea of a hierarchical evolutionary program. In so doing, he identified three major transitions on the road that charted the course of evolution from anthropoids all the way to humans. All of these were paired with a “complex set of new cognitive modules” (Merlin, D. 1991, 29.) Jablonka and Lamb argue for a three-tiered structure of behavioral programs built on a genetic basis (Jablonka, E.- Lamb, M., 2005, 341-344.) In their recently published book, Hodgson and Knudsen also based their general model of social evolution on a hierarchical system that is best interpreted as a hierarchical behavioral program (Hodgson, G. Knudsen, T. 2011.123.)

De Waals’ model, which identifies three tiers of morality – moral sentiments, social moral expectations, and moral judgments – built on top of one another, may also be interpreted as a hierarchical behavior model (De Waal, F., 167-174 and 39.). Vugt et al. also provide a similar four-level hierarchical model that describes the development of political behavior in human beings (Vugt, 2008, 188). Finally, the notion of systems of rules that regulate human behavior and are built on top of one another also crops up in E. Ostrom’s – the winner of the Nobel Prize in Economics in 2009 – most recent writing. Therein the author refers to the *instinct* of equity, then to social *norms*, then to *heuristic rules* (of thumb), and, finally, to the model of *bounded*

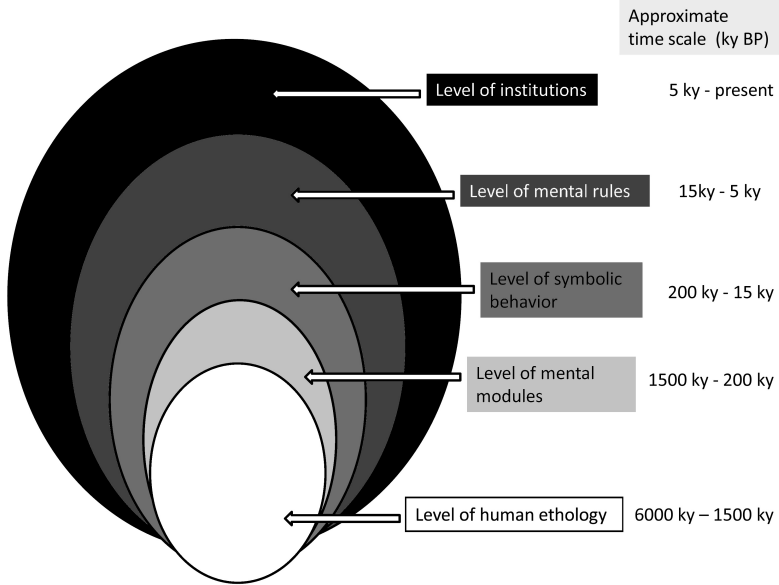
rationality, as hierarchical levels of decision-making (Ostrom, E., 2010, 659-660.)

All of the above-mentioned models invoked hierarchically ordered human behavioral programs, but they differed in terms of the considerations they focused on, the number of tiers they assumed, and how they characterized the latter. It still needs to be clarified how these tiers can be integrated into the process of evolution. We must gain an understanding of when, why and how they were created, and the substantially differing mechanisms of their respective operations. To fulfill the task at hand, we will first draw up a general framework model, which helps illustrate the evolutionary ladders.

In summarizing the above-cited scientific results we can observe that evolution “crafts” ever newer instruments – including new behavioral programs – to address the novel adaptive problems that regularly crop up. In so doing, it mostly draws on the previously designed components as “parts” – just like a busy or thrifty “craftsman” who has neither the time nor the inclination to design and build new instruments from scratch – and “crafts” the instruments for solving new problems from the instruments at hand. It retains the older ones – either integrated or merely falling into disuse – as reserves, and when a situation unfolds that matches an earlier level it reaches for them again and begins applying them. And then it simply “adds” the new constructs to the existing ones, or builds them on top of one another. That is how a structure emerges that is reminiscent of the Matryoshka (“Russian nesting) doll.

We employ the Matryoshka doll model merely as a metaphor, for purposes of illustration rather than as evidence. The real doll features five-six dolls of decreasing size placed inside one another. The dolls stacked into each other all resemble one another, but the outer ones always conceal the innermost dolls within them. Taking several Matryoshka dolls apart, it will become obvious that the external “surfaces” are very varied in terms of their design, but the dolls inside tend to become increasingly alike, and the last ones feature almost identical designs. The human essence may be conceived of as following the Matryoshka doll design: the colorful “exterior” conceals

constructions folded into one another that invoke ever older, historical or “animalistic” pieces of the past.



Graph 1: The Matryoshka Model of Man

The “animalistic” and the “human” tiers consist of complex constructs, as we will show below. First, the modules of evolutionary psychology and then the increasingly complex structures of cultures are built on top of the foundation of ethological programs. In the following, we will specifically identify the individual tiers of the Matryoshka model and present their operating mechanisms. To do so, we will review the crucial stages of social evolution with the help of the most recent research on the subject, and we will reveal the new adaptive constructs that emerged at the individual stages.

The Level of Ethological “Programs” of Behavior

The starting point of the history of human evolution was when – roughly 6-4 million years ago – the common ancestors of today’s humans and the chimpanzees began diverging, and humans entered

onto their own evolutionary path (Wood, B. et al., 2011, 347.) At this point the behavior of the being that was en route to become man was determined by ethological programs that had been created gradually over the course of evolutionary history. In its general outlines, the structure matched MacLean's three-tier brain model (MacLean, 1990, 46.) At the bottom of this system lie the behavioral programs of the "reptile brain" – matching the simplest type of environment – that are "wired" into the genetic structure. Over the course of evolution, new constructs are generated, which are more complex than the ones theretofore, to solve problems emanating from a more complex environment.

Most recent research has unveiled those evolutionary challenges that gave rise to the growing size and increasing complexity of the so-called "reptile brain." In the course of this process, the so-called mammalian brain emerged – a characteristic feature of mammals –, which controls social behavior (Roew, T. B. et al, 2011, 955, and Ladeveze, S. et al., 2011, 83.) Finally, the anthropoid's "new mammalian brain" – the third tier – is built on top of the "mammalian brain." It is capable of emotional judgment and certain elements of rational decision-making.

The effect of the ethological level is discernible to this very day. This is apparent in a whole range of behavioral patterns, such as social attraction, aggression, group aggression, social ranking, adherence to rules and linguistic communication, and in a variety of elements of sexual partnerships (Eibl-Eibesfeldt I., 1989.) These deep-seated ethological elements – which are concealed by the "upper" layers – crop up when a human finds himself in an environment that is reminiscent of his animalistic past. In such instances the ethological program is "activated" and its effects "radiate out" to human behavior. In other words, when the human finds himself in a life-threatening situation that requires an immediate response, his actions – devoid of any type of rational considerations – are determined by the programs of the "animal past." When on the other hand a human finds that he has time to consider, then rational and ethical considerations also influence his behavior (Frey, B.S. et.

al., 2010, 4866.) The effect of ethological programs similarly crops up typically in the area of mating and partnerships when the circumstances – in whichever sense, for instance in the case of speed dating – invoke the era when man became fully human (Todd, P. M. et al., 2007, 15011.)

The Level of Mental Modules

(the Revolution of Modern Man)

The next crucial turning point in the process of becoming human – the emergence of the species *Homo* – occurred roughly 2.2-1.5 million years ago. The life conditions – full of chaos and dangers, plenty of hunger, continuous migration, small groups composed of individuals that were related to one another – of the being that was gradually morphing into a human being are characterized as an EEA that embodies specific challenges (Cosmides, L.- Tooby J., 1997) During this time, the factor that proved decisive in terms of the subsequent evolutionary history was the substantial increase in brain size and the characteristic transformation in brain structure (Wynn, T. - Coolidge, F. 2010. S6-S8.) Within this timeframe, the crucial period in terms of the growth of the human brain was the time between 500,000 and 100,000 BCE (Holloway, R., 2008, 10.) From this time on humans increasingly regulate their behavior by turning on their growing brain. The signals received from the outside world “pass through” the brain’s newly developed parts (frontal lobe), and, based on the impressions gathered there, the being designs its behavior. This is the period when novel types of characteristics – uncovered by evolutionary psychology (EP) – emerge in human behavior. In the interpretation advanced by EP, the regularly recurring problems that fundamentally affect survival led to the creation of imprints – “standardized responses” – in the brain, resulting in mental modules. These mental modules are problem-solving units that have been acquired by using the trial and error method. They were continuously tested and, once their efficiency was ultimately “recognized,” they were implanted above the existing (ethological) constructs and “turned on” as problem-solving units. The characteristic challenges wrought by the environment create a particular setting that “pushes”

behavior in predetermined directions. As compared to ethological programs, the modules are more flexible, but at the same time they also work more slowly.

The mental modules are important because of their role in shaping the preferences that influence – without conscious consideration – the choices that a being is confronted with throughout his or her life. Let us take the example of choosing a sexual partner – mentioned above –, in the EEA period. When beings search for “partners” to “produce” offspring, their choice is (also) controlled by the cheat-detection or reliability-checking module of EP. The woman opts for a partner who is more likely to help her raise her child, while the man chooses a woman who – in addition to giving birth to healthy offspring and being capable of raising said offspring – will in all likelihood be faithful; that is, a woman as to whom cheating is less of a risk. The “imprints” that are still effective today yield the result that the two parties assess cheating differently. The woman is concerned that the man cheats on her not only physically, but also “misplace” his affections. In such a situation there is namely a danger that she will be abandoned. The man, however, predominantly becomes jealous when the possibility arises of being cheated on physically: Note to author: Readers will wonder what the evidence is that this is true, that males predominantly become jealous for this reason in such cases, there is an increased probability that his “partner” carries the child of another man

The Level of Symbolic Behavior (the Symbolic Revolution)

The process of becoming human arrived at another crucial turning point around 220,000-180,000 years ago. This is when the anatomically modern human (AMH), the *Homo Sapiens* emerged. The growth of the brain, which went from roughly 400 cm³ to 1350 cm³ in the course of a one and a half million years, comes to a halt (Gavrilets, S. - Vose, A., 2006, 16.824.) Subsequently, a 100,000 years later – and 120,000 years before our time –, the first signs of modern human (symbolic) behavior (MHB) appear. The debate about the interpretation of the intervening 100,000 years is still ongoing, but the majority of scholars agree that the AMH and MHB do not coincide.

(Nowell, A. 2010. 447.) Between 200,000 and 100,000 BCE a peculiar evolutionary experiment is afoot. As a result of the environmental challenges, the size of groups continually grows and the use of instruments becomes ever more refined. Both these trends advance demanding requirements calling for the coordination of communication and communal behavior. Symbolic objects (decorations, sculptures), symbolic activities (funerals, festivities), symbolic creations (paintings, drawings), and symbolic signs begin to appear and gradually become more and more widespread. By 60,000 BCE, they become regularly used mass phenomena (Balter, M., 2009, 709.) At this time, closely intertwined with the above, speech and language as we understand it today emerge as well (Lieberman, Ph., 2007, 42-45.) Because of the factors elaborated previously, it is justified to view this level as a whole new level, distinct from the prior levels (Knight, Ch. et al., 1995.)

At this point in time development takes a turn in a fundamentally new direction, the creation of the cultural sphere. The generation of evolutionary constructs continues simultaneously in two different directions – “within” the brain and “outside” the brain. The newly minted instruments manifest themselves in material tools on the one hand, and objects of symbolic significance (drawings, ornaments) on the other. The social environment becomes more complex, the instruments used become more varied and refined, and – through the symbols – they become tied to individual persons. The other group of adaptive constructs is crafted within the mind and operates as a mental model for describing the external world (Rossano, M. J., 2010, S92-S94.) “Above” the level of mental modules, there is therefore built a tier of constructs consisting of words (language) and symbolic signs. This tier is entrusted with the task of collecting, recording, testing, renewing, and – by surpassing plain imitation, and with the help of language and the transmission of the elements of material culture – passing on individual and social experiences.

This is when the cultural sphere emerges, which separates society from the natural environment, enhances fitness, provides security, but nevertheless presents its own, particular kind of challenges. The

environment is “suffused” with things and symbols that bear cultural significance. The symbols rearrange the ranking of preferences, which was originally set by instincts and then by modules, assigning them greater or lesser weight. Behavior – which, similarly to prior times, is geared towards mating, the individual’s position in the hierarchy, the development of prosocial behavior, the battle for dominance, the search for food or avoiding a threat, and which was previously controlled first by biological programs and then by mental modules – is now replaced with or guided by symbolic signs. The “search for symbols” becomes integrated into human behavior, and the symbols – “superseding” ethological and evolutionary psychology behavioral programs – decisively influence our choices. Adherence to social rules is fundamentally based on norms: the desired behavioral rules of the community, the socially transmitted behavioral patterns that everyone must respect and help enforce (Sigmund, K. et al., 2010, 861-863.)

The still living and ongoing legacy of this period is the “search for symbols,” which is enhanced in situations involving uncertainty. We identify people and relations on this basis. Within the community, symbols fundamentally aid orientation. We approach those who boast our “own” symbols with confidence, while we withdraw support from those persons who are marked with “strange” symbols. The obligation to provide help – e.g. sharing resources – no longer extends only to those who are genetically related, but also to persons who may be regarded as “relatives” based on the symbols. Social status, too, is marked by symbols – rather than biological markers – and this provides the basis for our decision whether to submit or not. When searching for a mate we make our decision by weighing the symbols that signify the success and power in a given community. Existing examples of decisions made on the basis of symbols: in extreme situations we are willing to sacrifice ourselves based on our own symbols; in everyday situations requiring decisions – for instance in shopping malls when we are uncertain – we rely on brand names to inform our choice.

The Level of Mental Rules (the Neolithic Revolution)

The neolithic revolution, which occurred some 10.000 years ago,

also raised – adaptive – problems that were different from those that arose previously (Bowles, S. et al., 2010, 7-14.) The human's immediate environment becomes a socially cultivated area, “furnished” with cultural objects and artefacts. A thick protective layer of culture separates man from nature, his life becomes safer and more predictable. The things necessary for life become goods: they are needs that are culturally produced, acquired through exchange and satisfied culturally (Cohen, M. N., 2009, 592.) The size of communities grows, they become more heterogeneous; and inequalities and differences, which were previously biological, are now socially inherited. The community is hierarchically organized and becomes a society controlled by power. The phenomenon of war appears, which will play an increasing role at the level of group selection. Histories of origins and religious – or religious kind of – world models concerning the roots of the community play an increasing role in the lives of communities (Kuijt, I., 2008, 175-178.) The lifestyles and social structures of neighboring communities become almost identical (Hill, K. R., 2011, 1286.) As a result, their cultures also become similar, while the systems of symbols employed by the communities – which are mostly shaped by chance factors – evolve differently and emerge as identity-generating factors. At this time, and as a result of this, those cultural universals emerge which delineate the “deep structure” of all societies that exist today – the basic structure of all known communities appears (Brown, D. E., 1991.) It is because of the existence of cultural universals that the meme-metaphor emerges as a useful model for understanding society. These contain the entirety of a given community's elementary cultural units: material objects (e.g., clothing and jugs), technological rules (food or arrow and bow production), social relations (chieftain/warrior, old/young), symbols (jewelry, decorations), and mental elements (words and norms.) The rapidly developing set of concepts and the *mental rules* built on the latter reflect with increasing comprehensiveness the complex natural and cultural world. Man thus becomes capable of “simulating” complex situations in his mind and of making a decision based on the potential outcomes associated with

various courses of action. This provides the basis for rational action.

In these increasingly complex situations a wide variety of cultural rules provide orientation. These rules are – mental – cultural constructs: the community has tested and verbalized them, and successive generations have passed them on to each other – as rules of “thumb.” Rules of thumb are signposts that refer to numerous everyday life situations that require decisions. They are never questioned, nor in need of justification; they are perceived as given, at most it will be a subject of consideration whether they are applicable to the situation at hand or not (Ostrom, E., 2010, 659.) The “selection of partners” is from here on out directed by strict rules – mandating for example that all people should stick to their own kind – prescribed by the traditions of the social group. These rules fundamentally serve the interests of the family: the main consideration in choosing is the “dowry” in economic or power terms that the envisioned partner will bring. Additionally – and though it is a subordinate consideration it is nevertheless generally applicable – they provide the parties to be married with the opportunity to show that they are capable of fulfilling their expected roles: the girl cooks well and sews beautifully, cleans conscientiously, while the boy is well-versed in taking care of animals, is strong and skillful.

The Level of “Institutionally” Determined Behavior (the Institutional Revolution)

Roughly 5,000-2,000 BCE another qualitative transformation takes place. Economy and trade become inseparable parts of the reproduction of life. Note to author: If you don’t mean to suggest merely sexual reproduction, you might want to think of a different way of expressing your meaning here. The division of labor and social inequalities become fixed, social classes and hierarchies of power emerge. Studies have clearly charted the general pattern of how complex political organizational structures evolved. Their route of evolution runs from inherited leadership roles all the way to the modern state (Currie, T.C. et al., 2010, 801.) These scientific insights suggest that development – depending on the circumstances – leads to the evolution of ever more complex communities through numerous,

mutually intertwined steps. Yet the process also allows for the possibility of regressive steps. On this level, the efficient operation of communities that are heterogeneous in cultural, economic, and power terms (monarchies and empires,) and the “setting” of socially desirable behavior were no longer ensured by previously existing instruments – instincts, mental modules, systems of symbols, and heuristic rules (of thumb) (Sigmund, K. et al., 2010, 861.) Since the previous instruments guaranteeing social integration became insufficient, cultural evolution has to continue to “build itself up.”

On the one hand, the fundamental institutions of a developed society emerge: state, politics, religion, ideology, science, morality, laws, and market. These institution-type structures, which consist of rules, roles, relations, and material elements (e.g., buildings, symbolic objects, and objects of art) and are operated based on a system of rewards and penalties, control man’s behavior. Furthermore, institutions also shepherd man as an invisible fence of sorts: in all moments of life they influence, support, ban, teach, prescribe, and monitor adherence to rules through systematized incentives (rewards and penalties). (Henrich, J. et al. 2010. 1480.)

On the other hand, “construction” continues “inside the brain:” mental symbols and rules give rise to complex mental models. The “pattern-searching” activities – hitherto instinctive – gradually become institutionalized. The organization of community life increasingly requires the active participation of the group that – within the societal division of labor – is specialized for this purpose: the intellectual class. The search for, the filtering, testing, and laying down of those insights that are especially crucial for society becomes the task first of religions and then of science (Johnson-Laird, P.N., 2010, 18.240.)

The changes described signify a qualitative change, which is why we are justified in treating them as a distinctly new level – at the level of institutions – of evolution. This is when we reach the level of modern society as we understand it today. From here on, human behavior can only be understood by “taking into account” those institutions that man inherits, that he is born into, and which he

shapes and then, having transformed them, passes on to his offspring. Influence exerted by the way of institutions – in everyday situations – supersedes pressure from “rules of thumb,” such as symbols, mental modules, indeed, even the instinctive pressure of human ethology. When for some reason – e.g., war, natural disaster – these institutions disintegrate, however, awful phenomena arise. All this shows that the man of the modern age is incapable of surviving in the absence of these institutions, suggesting that these institutions are inseparably entwined with him – as the dam is with the beaver. That is why we assert that institutions form the Matryoshka model’s outermost layer of skin.

How the Matryoshka Model Works

The different approaches, cited earlier, concentrated on certain types of behavior programs, and cannot explain the links and cooperation between different types of behaviors. The Matryoshka model – as proposed in this article - provides a general framework for explanation of the real complexity of human behavior. In our model, Man - as a product of biological and social evolution - is a composite of evolutionary constructs that mutually influence each other and are built on top of one another, tiered in hierarchically ordered layers. At least five layers – shaped by evolution and boxed into one another – need to be simultaneously taken into account to understand “human phenomena.” The different layers not only coexisting, but having effects upon each other. I suppose that as the evolution reaches the level of culture, the new layers – at least partly – modify the behavior the existing ones.

In charting his behavior, the human being – consciously or instinctively – weighs the situation at hand, and then proceeds to use the behavioral program from the level that this analysis identified as matching the given situation. In other words, how a human will act in a given situation: such as, will human ethological programs control his behavior or will it be the other way round, will cultural programs supersede ethology. If we seek to understand the variety of behaviors in a diverse range of situations, we need to identify what level of the Matryoshka doll is likely to become “activated” by the situation in

question.

Similarly, when we strive to understand institutions and phenomena that surround modern man – religion, ideology, morality, market, and the state –, we also need to identify the evolutionary history of these. This is the framework that helps us understand which evolutionary constitutive elements and which challenges give rise to the increasingly developed constructs that supersede the previous, less developed constructs, as well as how these form like the layers of the Matryoshka doll. As institutions develop, the evolutionary antecedents – the evolutionary “composite parts” that developed at earlier, i.e. lower, levels – from which these institutions were crafted are always identifiable. Thus be it religion, ideology, or the developed institutions of politics, all alike make use of ethological instincts – organized into a system –, of certain types of EP modules, of certain types of symbols and rules of thumbs.

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