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**The Biological Basis of the Symbolic: Exploring the Implications of the Co-evolution of
Language, Cognition and Sociality for Management Studies**

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The Biological Basis of the Symbolic: Exploring the Implications of the Co-evolution of Language, Cognition and Sociality for Management Studies

In this essay, we approach the question of what it means for something to be symbolic in a very different way than the usual answers rooted in philosophy, sociology or anthropology: we argue that the symbolic is, first and foremost, rooted in human biology and human evolution. We discuss how the development of the capability to create and share symbols was a key moment in human evolution as it underpins our capability to communicate and store knowledge through language, to think abstractly about problems, and to live and work together effectively in large groups. It also underpins the unique ecological niche – the cognitive niche – that *Homo sapiens* construct using our capability to create and share symbols. We go on to explore some of the implications of an evolutionary understanding of the symbolic for management and organization research.

Keywords: Symbolic, Symbol, Evolution, Cognitive Niche, Language, Cognition

Introduction

In this first essay of the Organizations, Institutions and Symbols Point/Counterpoint we argue that there is an opportunity to move management and organization research forward by developing a substantive and grounded understanding of the symbolic – which we define as the accumulated results of the human capacity for constructing and interpreting symbols – rooted in our rapidly expanding knowledge of human evolution. While management and organization as a field has primarily looked to philosophy (e.g., de Saussure, 2011; Peirce, 1991; Wittgenstein, 2010), sociology (e.g., Blumer, 1986; Mead & Schubert, 1934), and anthropology (e.g., Geertz, 1973; Turner, 1974) for explanations of the symbolic, we believe that there is much to be gained from adding an evolutionary perspective to existing explanations (see the Counterpoint that follows for a compelling alternative explanation drawing on more familiar academic disciplines).

More specifically, we believe that a deeper understanding of the evolution of the symbolic in *Homo sapiens*, and the resulting co-evolution of the triad of language, cognition, and sociality¹, can provide important new insights and open up new research opportunities for researchers in management and organization. Furthermore, evolutionary theory provides a biological explanation of what allows groups of humans to construct a social reality (Berger & Luckmann, 1967) for themselves and an explanation of why this capacity to construct a “cognitive niche” – and the social reality the cognitive niche supports – has evolved (Tooby & DeVore, 1987).

In the next section, we will begin by explaining why we believe an evolutionary understanding of the symbolic is useful and timely. We will then define the symbolic and explore how and why humans have evolved the unique capacity to construct and share symbols. After that, we discuss how the evolution of the human capacity for creating and

sharing symbols underpins human language, cognition, and sociality and introduce the notion of the cognitive niche. In the final section, we will explore some of the implications of this understanding of the symbolic including understanding the biological foundation of social construction and the consequences of this for management and organization theory, deepening our understanding of organizations and institutions as phenomena constructed and maintained through symbols, rethinking culture and related concepts, and providing a foundation for beginning to theorize the role of digital technologies in the production of social reality.

Why an Evolutionary Conceptualization of the Symbolic?

In contrast to more traditional approaches to the symbolic, an evolutionary perspective centers on how the capability to create and share symbols is rooted in specialized systems in the human brain that have evolved gradually over time (Pinker, 2010) and the implications of this for understanding humans and human behavior (see the Counterpoint essay that follows for an interesting alternative perspective for overcoming the limitations of more traditional approaches). This capability, like the ability to hear or see, was selected on due its usefulness in navigating a hostile world and once underway provided the foundation for language, enhanced our ability to manage relationships with other humans, and supported the development of abstract reasoning.

The ability to construct and share symbols is a unique feature of *Homo sapiens* and helps explain the ability of the species to live on every continent and in all climate zones. Building on these ideas, in this essay we argue that the capability to construct and share symbols, and the development of language, cognition, and sociality that this allowed, provides *Homo sapiens* with the ability to construct a “cognitive niche” or the “the set of

cognitive tools, skills, and strategies that humans use to extract resources and overcome the challenges of their particular ecological and social circumstances” (Sterelny, 2012, p. 8).

In a nutshell, people can organize and accumulate knowledge to solve practical problems *because* they have the capability to construct and share symbols. This is in contrast to a view of symbols as “glue or connective tissue in institutional packages [... that] make institutional orders accessible and experienceable” (Meyer et al., 2023, p. 4). The evolved capability to create and share symbols underpins the socially constructed reality that humans live in. This is also reflected in our definition of the symbolic as “the accumulated results of the human capacity for constructing and interpreting symbols.” The cognitive niches that groups of humans inhabit, and that is the basis of our success as a species, is a product of the capacity to produce and share symbols.

From the perspective we adopt here, it is the biological ability to create symbols that allows the social construction of institutional orders in the first place. At the same time, it is important to acknowledge that we do not disagree with the definition of a symbol as a “relationally and reciprocally constituted unity of a sensorily perceivable phenomenon and a collectively shared conceptualization” (Meyer et al., 2023, p. 2). We agree with this understanding of what symbols are, yet we argue that moving beyond a description of what they are to focus on how humans developed this capability has important implications for management and organization research.

An understanding of the symbolic rooted in evolutionary theory is valuable for at least three reasons. First, like biologists before the discovery of DNA, management and organization scholars are currently missing an explanation of the underlying nature of what they study. While biologists had carried out in-depth studies of a wide range of biological phenomena before the discovery of DNA, they had no underlying explanation for the patterns

they observed, how the organisms they studied had come to be, or how the different organisms they studied were related. The discovery of DNA resulted in a revolution in biology, and many different findings could suddenly be understood in a new way. DNA provided the key to understanding the variety of life and how it replicates, as well as an explanation of the underlying mechanism for evolution by natural selection. As a result, the boundaries of biology as a discipline were redefined, exciting new areas of research were revealed, and research in biology was able to move forward rapidly.

For management scholarship, understanding the evolution of the symbolic, and the biological basis of social construction, has the potential to be equally revolutionary. By introducing an evolutionary perspective, management researchers have a new way to understand and theorize about everything from the nature of organizations to innovation processes and organizational culture. Just as DNA provides the key to understanding the evolution of biological organisms, a more comprehensive conceptualization of the symbolic provides the key to understanding the fundamental nature of the phenomena that management scholars study.

Second, developing a new understanding of the symbolic in human life brings with it the potential to integrate various streams of investigation that are currently unconnected in management research. While there have long been repeated calls for more multi-level research (e.g., Klein, Tosi & Cannella, 1999) and for more interdisciplinary research spanning traditional research areas in management (e.g., Roberts, Hulin & Rousseau, 1978), management researchers have struggled to respond. By bringing the symbolic to the forefront in management studies, and by using a more sophisticated understanding of the central role of the symbolic in human life drawn from theories of human evolution, management researchers

can connect many seemingly unrelated phenomena and explain how and why they are connected.

Third, evolution has shaped the human body, but it has also shaped the human brain. As a result, evolutionary principles are indispensable for understanding human behavior. Recognizing the evolutionary basis of the symbolic connects management research to one of the most powerful theories in science: evolution by natural selection (Darwin, 1859; Dawkins, 1976). Ideas from evolutionary theory have revolutionized the biological sciences and are well on their way to revolutionizing the human sciences as well. But management has been largely unaffected by the leaps in the understanding of human evolution that have taken place, despite the immense potential benefits from integrating these ideas into management studies. Work on the evolution of cognition (e.g., Donald, 1991), language (e.g., Pinker, 1994; Planer & Sterelny, 2021), culture (e.g., Gangestad & Simpson, 2007), and the organization of social life (e.g., Gamble, Gowlett & Dunbar, 2014) are just some of the interrelated areas that are of direct relevance to studies of management and organization.

But in addition to its usefulness in conceptualizing the symbolic, we believe that evolutionary theory can contribute to management research more broadly. While some management scholars might struggle to see the relevance of our evolutionary history to understanding human cognition and behavior today, our existing theories do not explain behavior in and around organizations so completely or accurately that exploring ideas from evolutionary theory is unnecessary. Testimony to this state of affairs are the many topics, theories, and perspectives in management and organization research that are inconsistent with each other and disconnected from the facts of human evolution. We believe that incorporating evolutionary theory into management and organization research has the potential to help

resolve some of the long-standing issues that have plagued management and organization research, and open up exciting new avenues for research.

However, we want to be clear that we are not suggesting that theories of management and organization can somehow be replaced by theories of human evolution – theories of human evolution explain very different things and are part of a very different approach to the study of human behavior. Our argument in this essay is that these ideas are useful for conceptual integration, for theory extension, and to improve the mutual consistency across theories of management and organization and between management and theories of human evolution. Researchers in management and organization have a lot to gain from engaging with theories of human evolution, but this will require moving beyond metaphorical theory borrowing to a genuine engagement with evolutionary theory.

Theorizing the Symbolic

The lack of clarity around what it means for something to be symbolic is unfortunate. The phenomena that interest management and organization researchers are inherently symbolic and researchers therefore need a well-developed conceptualization of the symbolic that explains what the symbolic is, its role in human activity, and where the symbolic has come from. The last point – that we need to know where the symbolic has come from – may seem unnecessary and has been largely ignored in management and organization. Yet, “knowing how something originated often is the best clue to how it works” (Deacon, 1997, p. 23). In fact, we believe that understanding more about how the capability to create and share symbols evolved in *Homo sapiens*, and why the capacity to symbolize was selected upon in the first place, is a good place to start if we wish to develop a better idea of what the symbolic is and to better understand its ramifications for management and organization research.

***Homo sapiens* and the Symbolic**

The extraordinary human capability to create and share symbols developed at some point after our last common ancestor with our closest relatives, the African great apes, approximately 7 million years ago (see Gamble et al. 2014 for an excellent summary). Following this important fork in our evolutionary tree, the ancestors of *Homo sapiens* began the long evolutionary march to becoming modern humans.

Perhaps the most obvious physical change since that point was the move to walking upright around 4.4 million years ago. While the great apes have, of course, retained the long arms and short legs that support walking on all fours, an ancestor of *Homo sapiens* – *Homo erectus* – evolved the long legs and shorter arms necessary for bipedalism. This was a revolutionary moment. As Everett (2017, p. 48) describes:

The greatest hunter. The greatest communicator. The most intrepid traveler. Perhaps the greatest distance runner on earth, *Homo erectus* was the unsurpassed marvel of its time. No other creature has ever contrasted more starkly with all of the animals that had ever lived.

But evolution didn't stop and after this major shift in body shape, changes in teeth and jaws reflect changes in diet and the domestication of fire. Stone tools grew in importance from about 2.6 million years ago (the beginning of the stone age) followed by a period of rapid brain growth beginning about 600,000 years ago. Anatomically modern humansⁱⁱ appeared about 200,000 years ago, although the evolution of the soft tissues of the brain continued as the brain evolvedⁱⁱⁱ. These anatomically modern humans presumably had some form of language, but probably not as we think of language today. By around 60,000 years ago, *Homo sapiens* spread across Europe and Asia. The epoch of *Homo sapiens* as the dominant global species had begun.

But what about the symbolic in all of this? Godfrey-Smith (2014) summarizes the more mainstream view when he argues that it is likely that our capability to create symbols

evolved later in this period, with what is recognizably modern “symbolic behavior” appearing among *Homo sapiens* between 40,000 and 100,000 years ago^{iv}. Others, such as Everett (2017), argue for a much earlier emergence of this capability, pointing to genetic and fossil evidence that, he believes, support his view that the capability to engage in symbolic behavior first appeared more than a million years ago with *Homo erectus*.

For us here, whether it was *Homo erectus* or *Homo sapiens* that first developed the ability to construct and interpret symbols is not as important as the fact that it was *Homo sapiens* who developed this ability to the point that it became a defining characteristic of the species (Berwick & Chomsky, 2016). And, therefore, understanding why this capability evolved provides important insights into the nature of what it means to be the “symbolic species” (Deacon, 1997) and how the symbolic underpins human behavior and the dramatic success^v of *Homo sapiens*. Understanding why the human capacity for symbols evolved highlights that it is rooted in our DNA rather than being something we learn; it is shared by all humans; and, as we discuss below, is the foundation for the incredible variety of ways of life humans have developed. In other words, the capacity for symbolic behavior is rooted in physical changes to the human brain that occurred through processes of evolution by natural selection, and it plays a key role in the radical distinctiveness of *Homo sapiens* as a species including our willingness to engage in non-kin cooperation and our extensive use of technology.

The point at which the capability to create and share symbols appeared in the evolution of *Homo sapiens* was a defining one for our species and a unique one in the process of evolution on Earth. Prior to this moment, no symbol had ever, as far as we know, existed. Symbols came into being with the evolution of *Homo sapiens* and this important fact underscores that symbols do not exist without a group of humans who create symbols as they

interact and communicate. The symbolic is, in many ways, the defining feature of *Homo sapiens* and explains our success as a species that lives on every continent and in every climactic condition on earth.

The capability to create and share symbols provided advantages for early humans that overcame the significant disadvantages of the large and energy intensive brain required to process symbols and the high maternal death rates that come with trying to give birth to babies with the large heads needed to house these large brains. These advantages included the capability to communicate through language (Pinker, 2003), a greatly improved capability to live together in social groups (Gamble et al., 2014), and new forms of cognition where symbols provide ways to think abstractly through problems (Clark, 2006). We will talk about each of these at some length in later sections. But this brings us back to a more fundamental question: what is a symbol?

What is a Symbol?

We find a broad definition of a symbol the most useful: “A symbol is something that someone intends to represent something other than itself” (DeLoache, 2004, p. 66). This definition has three parts – intentionality, representation, and generality – and all are equally important aspects of symbols. Only by combining these three parts – a symbol being intentional, representative of something, and general – are people able to achieve “dual representation” where the symbol is both a material object^{vi} and at the same time an abstract representation of something else: for example, when we as authors include the word “cat” in this sentence we act intentionally, we are creating a material object (the writing on the page you are reading), and bringing the notion (the generalized idea) of a cat to mind for you as a reader of this sentence. We will discuss these three dimensions of a symbol and then return to the question of defining “the symbolic” based on this understanding.

Symbols are Intentional

First, a symbol is used by someone for a purpose. Symbols are not something that occurs in nature (as opposed to indices and icons which we will come to shortly), but are uniquely human creations. They are the result of an intentional act that requires effort on the part of the person using the symbol. Indeed, “[n]othing is inherently a symbol; only as a result of someone using it with the goal of denoting or referring does it take on a symbolic role” (DeLoache, 2004, p. 67).

The fact that symbols are used by someone and for someone highlights that symbols exist in social interaction in two senses. First, symbols are inherently social as they underpin and exist in human relationships. Where the complex social organization of ants and bees are underpinned by genetically pre-determined roles and chemical signals, human social organization is underpinned by generalized symbols and the symbolic. Whether it is our endless chats about nothing with close friends or the complex language of international trade agreements, human relationships from the most mundane to the most formal are created and sustained through symbols. The development of the capability to create and share symbols created important advantages for humans as they live and work together. Much of this advantage lies in the capability to communicate with others in order to create and manage social relationships, but the complex cognition required to make sense of social interactions is also rooted in the symbolic (Gamble et al., 2014).

Second, symbols are social in the sense that they are based on arbitrary social conventions that vary dramatically across human groups. As Peirce (1991, p. 168) succinctly explained, “what a thing means is simply what habits it involves.” Symbols are meaningful because there is a tacit agreement or an explicit code that a particular sign has a certain meaning which we teach to humans who join our group: “A wedding ring symbolizes a

marital agreement; the typographical letter “e” symbolizes a particular sound used in words (or sometimes, as in English, what should be done to other sounds); and taken together, the words of this sentence symbolize a particular idea or set of ideas” (Deacon, 1997, p. 471). While the capability to create symbols is shared, every group uses this shared capability to produce its own unique sets of symbolic conventions that allow for the production and interpretation of particular symbols.

The fact that symbols are based on social conventions also means that their meaning is situated and local: “symbols, like the vortices of the river, may be *stable* structures or patterns that persist for a long time, but they are not timeless and unchanging” (Kelso, 1995, p. 1). As these conventions evolve, the meanings of the symbols that depend on them also change. The meaningfulness of symbols is therefore a situated, local accomplishment, and the symbolic is therefore also situated and local. This has important ramifications, of course, for the generalizability of theoretical claims about regularities in human behavior. We will return to this point later in this essay.

Finally, it is important to emphasize that this capability to create the social conventions that underpin symbols is uniquely human. While animals of various sorts can learn some simple versions of our social conventions (some dogs can learn what the command “sit” means, for instance), only humans have the capability to engage in the production of the systems of conventions that underpin symbols and accrue all of the benefits that come from having access to the symbolic. This does not mean that animals do not engage in all sorts of semiotic behavior, nor that they do not create all sorts of signs of various kinds. But it does mean that they do not engage in the creation of generalized symbols, and they are therefore not able to participate in social construction. This last point is crucial as we will see in the section on the cognitive niche.

Symbols Represent

Second, a symbol represents in the sense that it refers to something other than itself. As such, symbols are a type of sign and semiotics, or the science of signs, is helpful to us here. Ferdinand de Saussure, one of the founders of the field of semiotics, argued that signs are composed of a signifier and a signified (de Saussure, 2011): a signifier is the material inscription of the sign that is observable and interpretable by someone; the signified is the idea or meaning that the sign represents. These two aspects of signs are inseparable and all signs have both a signifier and a signified. A common metaphor used in semiotics to explain this relationship is that the signifier and signified are like two sides of a sheet of paper and you cannot have a sheet of paper without having both sides; there are no signifiers without signifieds and no signifieds without signifiers.

The sign may also have what de Saussure referred to as a referent, which is a thing in the world to which a sign refers. Going back to the example of the word “cat” that we introduced earlier, the letters on the page are the signifier, the general idea of a cat the signified, and if we are referring to some actual cat in the world (e.g., Nelson’s cat, Chopina) then that cat is the referent. It is, of course, in connecting to referents that signs are implicated in the social construction of reality and are most of interest to management and organization scholars. Interestingly, de Saussure did not believe that this connection to the social world was within the remit of semiotics. More recently, however, the subfield of social semiotics has been developed to look at just this connection (Hodge & Kress, 1988).

Beginning with this understanding of signs, the work of another semiotician is particularly useful in understanding what symbols are and how they may have evolved. Charles Saunders Peirce was an American philosopher who contributed to many fields including to the study of language. One of his most important and influential contributions

was to semiotics. In his work on signs, Peirce (1991) differentiated between indices, icons, and symbols. All are signs, but they work differently, and differentiating them provides important additional insight into the workings of signs.

Beginning with indices, an index is something with a direct physical relationship to the thing represented. As such, indices are direct references to things in the world. So, a thermometer is an index of the temperature; a smile is an index of a positive emotional state; and a red stoplight is an index that it is time to stop. Indices also occur in nature. A footprint in the forest is an index that an animal has recently passed by; smoke rising through the air is an index of a fire; and dark clouds are an index of rain. Indices are commonly interpreted by animals and, in fact, almost all animals have some sort of sensory system to detect indices associated with things like food, danger, and sexual reproduction. These sensory systems vary in complexity and range from simple photoreceptor cells that detect light in single-celled organisms to complex systems in higher animals like humans involving multiple senses including sight, hearing, touch, taste, and smell.

Icons, in contrast, physically resemble some quality or characteristic of something else. The stick figures on the doors of public bathrooms indicating the gender they are intended for are icons; a picture of your face is an icon of you; the skull and crossbones on a pirate's flag are an icon of death; and the little picture of a floppy disk for saving files in many computer programs is also an icon (and an increasingly unmoored one as less and less computer users have actually seen a floppy disk). Some onomatopoeic words are also iconic in the sense that they sound like the thing they mean. So "bark" sounds like the bark of a dog and can be considered an index due to this physical similarity.

Finally, symbols are characterized by an arbitrary and conventional relationship between a signifier and a signified, where the relationship "must be agreed upon and learned"

(Chandler, 2007, p. 36). The symbol “5” means a particular number of objects by social convention. The symbol doesn’t share any resemblance to the idea of “fiveness” and there is no physical connection between the signifier and the signified. It is simply a social convention that “5” refers to the idea of “fiveness”. As such, symbols can only happen in the context of human social relationships as we discussed in the previous section. It also means that symbols are not something that occurs naturally or that other animals can create or understand.

This last point has been the source of substantial debate. A number of great apes have learned versions of sign language and most people know a dog that seems to understand at least a few simple words. While the symbolic communication of ideas through language seems intuitively simple, most scholars agree that there is a difference between “the rote understanding of words that my dog possesses and the semantic understanding of them that a normal human speaker exhibits” (Deacon, 1997, p. 70). Indeed, communication is organized by semiotics, or an underlying order that differentiates between different referential associations. This is why the above differentiation between indices, icons, and symbols is essential for the human capacity to create and maintain symbols in order to achieve outcomes.

This tripartite classification of signs is complicated by the fact that the same signifier (or material inscription) can be more than one type of sign at the same moment. One could imagine a carving of a young woman that is both an icon (it is a realistic and interpretable depiction of a young woman) and a symbol if it is located in a Catholic church where the young woman is interpretable by the initiated as the Virgin Mary but recognizable as a young woman by any human observer. Whether the carving is an icon or a symbol in this case depends on the interpreter.

Symbols are General

The use of the word “something” twice in our definition of a symbol is purposeful and done to indicate that symbols are general in two ways. First, symbols can be made out of anything that leaves a physical trace. Symbols can be spoken words, electronic signals, images, clothes, written words, colors, architecture or virtually anything else that can be perceived by the human senses. This includes things that can only be perceived through technologies for encoding and decoding material traces that are not directly perceptible by humans. Examples of such technologies are computer hard drives (which return visual symbols on a computer screen) and LP records (which return audio symbols through a speaker). What makes these things symbols is not something about the material artifact that is used to create or express the symbol. Rather, the symbolic interpretation of a thing happens in the brain of the person who interprets a symbol.

But symbols are general in another way. While symbols may have specific referents in the world, their signifieds are general ideas, not specific material objects^{vii}. The signified of the word “cat” is the general idea of a cat, not a particular cat. The generalized nature of the signified allows humans to solve problems by abstracting away from concrete situations, to store general solutions to problems once they are worked out, and to understand the world as being composed of elements made meaningful by general ideas available in the symbolic infrastructure of a group. So, people are having an argument or a conversation; the weather today is fair or stormy; and this situation is an opportunity or a challenge. These generalized understandings form the basis of the symbolic in human life and underpin how modern humans encounter social reality.

This is a very important characteristic of symbols as it is this characteristic that both underpins social construction and allows the development of language, new forms of

cognition, and human sociality. The generalized nature of symbols is the evolutionary step that provided the foundation for human success and the cognitive niche. We will return to these different human capabilities that are built on the symbolic in a later section.

The Evolution of the Symbolic

Building on this understanding of a symbol, and as we said above, the symbolic is *the accumulated results of the human capacity for constructing and interpreting symbols*. It is a uniquely human phenomenon and one that is rooted in our evolved capacity to construct and share symbols. The capacity to construct symbols had a fundamental impact on *Homo sapiens* as it allows us to apply already evolved cognitive capacities to generalized abstract problems, to communicate through language, and to manage complex social relationships. As DeLoache (2004, p. 66) describes it, “[t]he emergence in evolution of the symbolic capacity irrevocably transformed our species, vastly expanding our intellectual horizons and making possible the cultural transmission of knowledge to succeeding generations”.

How this happened and what evolutionary changes underpin this capacity for symbols takes us back to indexes, icons, and symbols. Almost all animals have some capability to interpret indices. However, humans at some point developed a higher-order capacity to create, share, and interpret symbols. One compelling explanation is that the capability to interpret indices generalized into a capability to create icons (to, for example, flap one’s arms to indicate a bird or bark like a wild dog) as cognitive capacity increased, and that this then led to the capability to produce symbols whose meaning was merely based on social convention. This process is sometimes referred to as “sign progression theory” (Everett, 2017, p. 6) and provides a potential pathway for the gradual evolution of the modern human capacity for producing and sharing symbols (Pinker, 2003).

This step to the symbolic has been a source of extensive debate and discussion. For some scholars, the apparent lack of usefulness of a limited ability to create and share symbols means that there must have been some moment when this ability appeared in a single leap of evolution. However, the general consensus is that the truly remarkable symbolic capabilities of modern humans are the result of a gradual process of evolution like other complex biological systems such as eyesight or hearing (Pinker & Bloom, 1990; Berwick & Chomsky, 2016). And, of course, the evolution of the symbolic allowed the development of capabilities like language, cognition and sociality that spurred on the further development of our dexterity with symbols. Given the fit with general theories of evolution as a slow incremental process, this latter explanation (that the capability to create and share symbols evolved gradually) seems to be more convincing (see Planer & Sterelny (2021) for a more extended discussion).

The fact that the human ability to create and share symbols is the result of evolution by natural selection is key to understanding what the symbolic is and what this means for management and organization research. The symbolic is a product of a capability to create and manage symbols that evolved like any other system in the human body. It is not something external to the human body that can be studied as a part of the natural world but rather a key part of what it is to be *Homo sapiens*. Understanding the symbolic is therefore about understanding this human capability, how it evolved, and what this means for understanding humans as the “symbolic species”.

The Symbolic Species

As we have mentioned above, the evolution of the capability to create and interpret symbols formed the foundation for the development of three unique capabilities that set *Homo sapiens* apart from other animals and that underpin our success as a species: language, sociality and cognition. These aspects of human behavior are all core concerns of

management and organization researchers that make an evolutionary perspective highly relevant. We will discuss each of these in turn in this section before turning to the cognitive niche in the next section.

Language

First, the development of the ability to create symbols underpins the development of language. The combinatorial system of language – a language’s grammar – allows speakers to express an infinite number of ideas with a finite number of general symbols (words). This combination of grammar and words is unique to *Homo sapiens*: “There is a wide and deep linguistic chasm between humans and all other species. Communication systems of the animal kingdom are unlike human language. Only human languages have symbols and only human languages are significantly compositional.” (Everett, 2017, p. 8). Hence, the development of the symbolic enabled the development of language:

Language is the interaction of meaning (semantics), conditions on use (pragmatics), the physical properties of its inventory of sounds (phonetics), a grammar (syntax, or sentence structure), phonology (sound structure), morphology (word structure), discourse conversational organizational principles, information and gestures. Language is a gestalt – the whole is greater than the sum of its parts. (Everett, 2017, p. 15)

Language is, ultimately, a communication system whose ultimate purpose and accomplishment is the construction of communities, cultures and societies. While we use language to solve practical problems on occasion, we mostly use it to build relationships and manage the connections to others that form the bedrock of sociality in humans.

Sociality

Homo sapiens are extreme outliers in terms of our ability and preference for living and working together. But unlike ants and bees, who also prefer to live and work together, we do not have social roles and modes of interaction determined by our DNA. Instead, we negotiate our relationships as we go along through complex interactions. While we have an

evolved a preference to live and work together, how we do that is flexible, local, and evolves through time. Even a cursory look at how different human groups live and work together shows huge variety in how activities and ways of living are organized; the differences in social organization between humans and other highly social animals could not be more stark.

At an individual level, this means that social relationships must be managed in real time and under a high degree of uncertainty. The actions of others must be interpreted, a theory of mind applied to understand their motivations, and an estimate formed regarding to how they are feeling. Humans need to see the world as others see it in order to predict the likely effect of their actions. This must be done not simply one move into the future – I do something and you react somehow – but multiple moves and countermoves must be foreseen in order to manage relationships effectively.

The capacity to create and share symbols helped us to manage increasing numbers of complex social relationships. As Dunbar (1993) has persuasively argued, the rapidly growing brains in hominins (all of the ancestors of *Homo sapiens*) was an evolutionary response to the advantages of living in larger social groups and the requirements that this entailed to manage growing numbers of social relationships and to predict what other members of our social group might do next. Being able to use symbols to apply general rules and to produce narratives of why our friends and family do things and what they might do in the future turned out to be highly valuable in thinking through the complex social world humans encounter in their daily lives. Complex societies – and the many diverse types of human relationships that they entail – therefore require significant increases in processing power with regards to social relationships and interactions. The ability to manage this complex social world requires the symbolic and the cognitive capacity to manage the cognitive load in real time.

A commonly cited exception to this pattern of ever-growing brain size is *Homo neanderthalensis* who preceded *Homo sapiens*, but who had slightly larger brains. However, they also had larger bodies and once the brain volume necessary to manage these larger bodies is accounted for, the “corrected” brain size was smaller for Neanderthal brains compared to early human brains (Pearce, Stringer & Dunbar, 2013). Furthermore, as Pearce and colleagues (2013) explain, brain size is not the only factor that determines intelligence. The shape and organization of the brain, as well as the complexity of neural connections, are also important factors. In general, the brain of Neanderthals was more elongated than that of *Homo sapiens*, with a larger occipital lobe (associated with visual processing) and a smaller parietal lobe (associated with higher cognitive functions such as spatial awareness and problem-solving). While likely giving the Neanderthal an advantage in hunting and similar visual pursuits, they faced a disadvantage in developing sophisticated social systems and the material cultural that may be an important part of the explanation for why *Homo neanderthalensis* became extinct about 40,000 years ago while *Homo sapiens* thrived in the same environment.

Cognition

Finally, the development of the symbolic enhanced cognition (Donald, 1991). Animals without language can, of course, think, but being able to think in language (as humans do) facilitates cognition and allows the application of cognitive capacities to general versions of problems. Thinking in language is slow and cognitively intensive, but it allows the application of general principles to problems and allows us to bring solutions from one arena of social life to another as we work to innovate new solutions to problems. It also allows us to reframe and rethink problems in different terms as we search for solutions abstracted from the concrete problem at hand.

The symbolic, the part of human life that is constructed and experienced through symbols, allows us to think into the future and the past in ways that are unique to *Homo sapiens*. Also, it enables us to store knowledge in ways that have revolutionary impact on our capability to think through problems. The development of the symbolic was, therefore, also a cognitive revolution.

Pulling this all together, the capacity to create and share symbols is a result of evolution by natural selection pressures faced by the earliest humans, and it is unique to humans. The symbolic – that part of human life that is constructed and interpreted through symbols – is a large part of what makes *Homo sapiens* the dominant primate and is a defining characteristic of the species. The combination of intentionality, representation, and generality allow for dual representation, where a symbolic artifact is both a material object and at the same time a representation of something else. This characteristic of symbols dramatically increases our capability to communicate, to think, and to share and store solutions to problems. It also allowed fundamentally changed the relationship between *Homo sapiens* and the environments in which they lived by allowing them to construct a cognitive niche.

The Cognitive Niche

As we argued above, the ability to create and share symbols underpins the triad of language, sociality, and cognition. This triad (see Figure 1) constitutes the symbolic resources that allow us to actively construct, and then inhabit, the cognitive niche. The theory of the cognitive niche (Tooby & DeVore, 1987) is important as it explains “the constellation of zoologically unusual features of modern *Homo sapiens* without resorting to exotic evolutionary mechanisms” (Pinker, 2010, p. 8993). These “zoologically unusual features” include things like our extreme hypersociality, our long childhoods, our extended lifespans, and the varied and complex ways of life of different groups of humans.

The combination of cognitive mechanisms (including intelligence about physics, geometry, biology, and psychology), linguistic mechanisms (grammar, phonology, and syntax), and affective mechanisms (moral emotions, remembering individuals and their actions) is a large part of the explanation of what enables humans to be so dominant as a species. In this section we will discuss the cognitive niche that humans inhabit and argue for its relevance to research in management and organization.

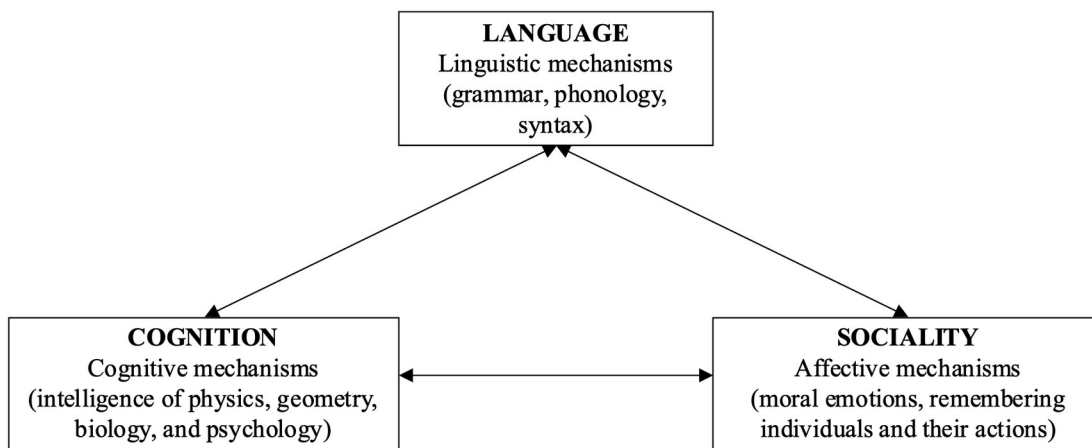


Figure 1: The Symbolic Resources in *Homo sapiens*

Ecological Niches and Niche Construction

The idea of an ecological niche is central to studies of ecology and evolution, where the term is shorthand for how an organism fits into its environment. An organism’s ecological niche includes both the physical and environmental conditions it requires, as well as its interactions with other species (for example its role as predator or prey); it is a particular *configuration* of physical, environmental, and interactive conditions. Species that have narrow niches (like koala bears that only eat eucalyptus leaves and live in specific climate conditions) are known as specialists while species with broad niches (like racoons that eat many things and live in many geographic areas with varying climates) are generalists.

No two species can occupy the same ecological niche for long or else one – the one with a higher “level of fitness^{viii}” – will outcompete the other. To avoid dying out, the less fit

species will either have to evolve new and better ways to compete or adapt and move to another niche. This does not mean that two different animals cannot occupy the same physical space. But if they inhabit the same physical space – for example, racoons and deer co-existing in the same forest – then they need to depend on different configurations of resources and interactions – a different ecological niche – or else one will outcompete the other.

But some species do more than simply passively occupy an ecological niche. Instead, they are actively involved in the construction of the niches they occupy. As Iriki and Taoka (2012, p. 10) describe, niche construction “denotes an evolutionary process whereby the activities of organisms modify their habitat, to which in turn the organisms evolve to adapt, thus creating their own ‘ecological niche’ in the environment”. For example, beavers build dams, birds build nests, and bees build hives that all play an important role in their success as a species and that shape the selection pressures they face.

This last point is important. These niche construction activities change the fitness landscape (that is, the nature of the ecological niche and what fitness entails) and therefore affect the ongoing evolution of the species. In other words, there is a feedback loop from niche construction to evolution by natural selection. For example, by building a hive, bees create new selection pressures such as the need to manage hive temperature, that results in selection of new generations of bees that better fit life in the hive by, for example, evolving behaviors that allow bees to cool the hive when it is in danger of overheating. In other words, their niche construction activities affect the selection pressures they face and over time they evolve to fit the niches that they have constructed.

Homo sapiens are master niche builders. The ecological niches we construct are so vast in scale and comprehensive in scope that they differ fundamentally from the niche

construction activities of other animals. But they also differ in another important way. All ant hills built by the same species of ant are essentially the same; all beaver dams are built in more or less the same way; and all bee hives are constructed following the same principles. This is not surprising since the behaviors that lead to the niche construction are coded in these animals' DNA. But the niches constructed by different groups of humans vary wildly in terms of how they are constructed. Mumbai, London and Sao Paulo are very different cities and life in each is very different. What explains this variation and how does one species construct such varied niches?

Theorizing the Cognitive Niche

Humans are special organisms in that our niche construction activities are more complex than simply changing the physical world that we encounter in our daily lives. In addition to changing the physical environment, our niche construction activities involve the construction of a symbolic world using our evolved capacity for creating and sharing symbols. We build niches that include vocabularies, know-how, and cosmologies as well as physical infrastructures such as computers, highways, and space stations. In fact, as Tooby and DeVore (1987, p. 209) argue, the core of our distinctiveness as a species lies in a capacity for “conceptually abstracting from a situation a model of what manipulations are necessary to achieve proximate goals that correlate with fitness”. In other words, we use our symbolic capacity to create general solutions to problems that allow us to thrive in a variety of physical environments.

To understand why the ability to construct a cognitive niche was selected on we need to begin with a clear view of evolution and the natural world. In nature, there is a constant battle between predators and prey as both evolve better and better adaptations to either succeed in eating the other or in evading being eating. For example, predators evolve sharper

teeth and faster strike speed while prey evolve armor and spines and chemical defenses like poisons and bad smells. This is also true of plants who evolve difficult to eat leaves or poisonous substances that make herbivores ill or even die. But while these adaptations evolve slowly in other animals and plants through a process of natural selection, changes in the cognitive niche can happen quickly through learning and innovation making it impossible for prey (whether animals or plants) to evolve defenses quickly enough. The symbolic gives *Homo sapiens* an unassailable advantage in this battle of predator and prey. The disappearance of the woolly mammoth, the dodo, and a myriad of other animals that disappeared after *Homo sapiens* appeared, and conquered, their ecological niche can attest to the superiority of the symbolic to traditional evolution in this ancient struggle.

The triad of cognition, language, and sociality together constitute the symbolic resources that allow us to actively construct, and then inhabit, the cognitive niche. This triad is fundamentally important as it enables humans to plan for the future, remember the past, and create the shared understandings that allow humans to live in large groups. Work in the evolution of cognition argues that the unique evolutionary path that led to modern humans involved the development of an ability to create, understand, and manipulate symbols in a way that made working together in groups ever more valuable. The huge disadvantages of *Homo sapiens'* very large and energy intensive brain, and the high levels of maternal mortality that came with a large infant skull, required significant advantages to make this evolutionary path worthwhile. The ability to use symbols in this way was integral to the process of standing upright, moving out of the trees and onto the plains of Africa, and living in ever larger and more complex social arrangements. The availability of language for communication, and the cognitive resources to process social interactions and predict the impact of our actions, allowed for the development of complex forms of organization.

Furthermore, the development of more complex forms of organizations created the need for writing and led to the development of ever more complex “cognitive niches” with ever more expansive collections of knowledge to be passed from one generation to the next.

The cognitive niche is “a mode of survival characterized by manipulating the environment through causal reasoning and social cooperation” (Pinker, 2010, p. 8993). Scholars hypothesized that the cognitive niche emerged among others because of “the psychological faculties that evolved to prosper in the cognitive niche can be coopted to abstract domains by processes of metaphorical abstraction and productive combination, both vividly manifested in human language.” (Pinker, 2010, p. 8893). We also pass these niches down to our offspring and these activities change the selection pressures. In fact, the cognitive niche

incorporates facts about the cognitive, affective, and linguistic mechanisms discovered by modern scientific psychology rather than appealing to vague, prescientific black boxes like “symbolic behavior” or “culture.” To be specific: the cognitive adaptations comprise the “intuitive theories” of physics, biology, and psychology; the adaptations for cooperation comprise the moral emotions and mechanisms for remembering individuals and their actions; the linguistic adaptations comprise the combinatorial apparatus for grammar and the syntactic and phonological units that it manipulates. (Pinker, 2010, p. 8996)

The Cognitive Niche and the Symbolic

The human capacity for using symbolic resources to construct a cognitive niche explains our success as a species in organizing and innovating in a way that allows groups of humans to live successfully in every corner of the globe, no matter how seemingly inhospitable. Where other species evolve to fit an ecological niche, or perhaps make some material changes to their ecological niche through niche construction, we build a *cognitive* niche complete with practical knowledge, ways of living together, and a cosmology to offer various ways to explain why and how the world is as it is. It is therefore a biological

explanation of what allows groups of humans to construct a social reality (Berger & Luckmann, 1967) for themselves, and reasons for why they do so.

And, perhaps most importantly, this body of literature provides a different explanation of symbols than the literature that is usually drawn on in management research. Rather than taking the symbolic for granted and then describing its characteristics like social scientists and philosophers, evolutionary biologists provide an explanation of where the symbolic comes from, why it developed, and why it works the way it does. Natural selection provides a mechanism for its development and the process of human evolution has important implications for understanding human behavior, human cognition, and why and how we organize.

Understanding and conceptualizing the symbolic in this way is fundamentally important for management and organization research. All of the phenomena that management and organization scholars study are part of the cognitive niche. Organizations, institutions, practices and all of the other bits of social reality that management and organization researchers focus on are fundamentally constructed and maintained through the production and sharing of symbols. Therefore, approaching these phenomena as if they were somehow independently existing and not constructed through symbols limits what we can understand about them and the theoretical validity of our research.

Second, the unique human capabilities rooted in the symbolic – language, sociality, and cognition – that have been identified and explained by evolutionary theory are also core concepts in management and organization research. There is a tremendous opportunity for researchers in these areas to draw on the sophisticated theorizing that exists about the evolution of the human brain and how these aspects of human behavior function. As we argue

above, just as the discovery of DNA caused a revolution in biology, understanding the symbolic provides a way to dramatically accelerate our understanding of these topics.

To sum up, the symbolic is the accumulated result of the human capacity for constructing and interpreting symbols; and the cognitive niche is the accumulated total of a particular human group's symbolic construction. The ability to create and share symbols allowed *Homo sapiens* to evolve in the way we did, constructing and inhabiting the cognitive niche and our evolution was shaped by the selection pressures that resulted from this process. The cognitive niche rests on the triad of cognition, language, and sociality and has important implications for how we think about the study of management and organization. We now turn to the relevance of the evolutionary perspective on the symbolic to management and organization studies.

Implications of an Evolutionary Explanation of the Symbolic for Management and Organization Research

In this essay, we have sought to answer a deceptively simple question: What does it mean to say that something is symbolic? To answer this question, we have focused on how the capacity to create and share symbols evolved through natural selection, and how this formed the foundation of the co-evolution of language, cognition and sociality in *Homo sapiens*. We have also introduced the concept of the cognitive niche and argued that understanding the cognitive niche explains much about human social behavior and the success of modern humans.

But beyond providing an interesting additional perspective on the symbolic, we believe that the evolutionary perspective we have outlined has important implications for management and organization research. We will discuss four of these implications in this

section. First, it is crucial for management research to connect directly to evolutionary theory as it provides a much-needed explanation of what it means to be human and a new window on human behavior. Second, evolutionary theory is helpful for management research as it provides a well-developed biological explanation for processes of social construction. Third, an evolutionary perspective is useful in highlighting that organizations and institutions are ongoing accomplishments constructed by actors and is rooted in evolved capabilities. Finally, we discuss two research areas – culture and technology – that are particularly relevant to consider from this new perspective as examples of how evolutionary theory can be mobilized in management research.

Management Research and Theories of Human Evolution

Despite its roots in the natural sciences, theories of human evolution are having an increasing impact across social science and the humanities. Evolutionary theory provides new ways of thinking about how *Homo sapiens* came to be, new approaches for analyzing and understanding human behavior, and new ways of understanding the nature and origin of cognition, language, and sociality. In fact, academic disciplines as diverse as cognitive psychology (e.g., Bereczkei, 2022; Buss, 2015; Shapiro & Epstein, 1998), archaeology (e.g., Bettinger, Garvey, & Tushingham, 2015), and linguistics (e.g., Pinker, 2003) have already been profoundly affected by ideas from evolutionary theory.

Yet, management and organization research has been almost untouched by the leaps of understanding made in evolutionary theory. When ideas from evolutionary theory are drawn on at all, it is in metaphorical ways such as by treating organizations as the focus of evolution (e.g., Hannan & Freeman, 1977), by applying ideas from the evolution of organisms to the evolution of ideas (e.g., Weick, 1989), or by applying ideas from evolution to cultural change (e.g., Brahm & Poblete, 2022). Little work has been done by management

and organization researchers actually drawing on theories of human evolution and applying them in areas of interest to management scholars (cf. Pierce & White, 1999). We believe it is critical to move beyond metaphor and to begin connecting conversations in management and organization with relevant areas of evolutionary theory. This will allow the development of new conceptual scaffolding that can greatly enrich management studies.

Recent work on human evolution has much to say about human behavior and there is tremendous potential in creating cross-disciplinary conversations combining the insights of theories of human evolution with existing work in management and organization. An example of the potential of this sort of interdisciplinary conversation is the “Lucy to Language: The Archeology of the Social Brain” project funded by the British Academy from 2003-2010 (Gamble et al. 2014). This project was, at that point, the largest project ever funded by the British Academy and brought together archeology and psychology to answer a profound question: How did we come to be human? As the team describes:

The possibilities that such an endeavor offered seemed positively limitless. The academic world was just beginning to grapple with the integration of psychology and archeology. The previous decade had witnessed the creation of cognitive archeology under the driving force of the British archeologist Colin Renfrew and the American archeologist Thomas Winn. The main focus of this approach had been understanding the cognitive demands of toolmaking and the production of works of art. But we felt that recent developments in our understanding of the behavior of our nearest living cousins, the monkeys and apes, and in the process underpinning important areas such as brain evolution, would enable us to go one step beyond to say something about the social life of hominins^{ix} (Gamble et al. 2014, p. 9).

This project brought together insights about human evolution and ideas from psychology and archeology (and, to a lesser degree, other social sciences including anthropology and sociology) to develop the “social brain hypotheses” (see Gamble et al. 2014) that argues that the evolution of the human brain is a result of handling the challenges of an unusually complex social world. The result is an exciting and greatly expanded

understanding of the evolutionary pressures that resulted from living in larger and more complex groups and how this led to the evolution of modern humans with their unique ability to live and work together.

While a fascinating project in its own right, it also points to the potential of developing similar kinds of interdisciplinary projects across evolutionary theory and other areas of the humanities and social sciences including management and organization research. Fundamental questions such as “what allows humans organize the way they do?”, “what does the idea of the cognitive niche mean for understanding institutions?”, and “how does the biocultural^x nature of language shape organizing?” become open to entirely new ways of thinking when we bring together evolutionary theory and management and organization research.

For example, if we think about the relationship between language and organization, there is general agreement in our field that organizations are socially constructed through language. But evolutionary theory shows that language is a biocultural capacity (i.e., a combination of biology determined by DNA and the culture of the group), which means that the social construction of organizations needs to take into account biology as well as culture. If we were to take biocultural capacities seriously, we would by default understand anything related to language, sociality, and cognition – including all of the phenomena of interest to management and organization researchers – as being a product of a cultural context *and* DNA. Underpinning all these questions, of course, is a shared interest in the symbolic and how the evolution of the symbolic led to human cognition, language, and sociality.

At the same time, connecting with evolutionary theory also creates challenges for management and organization researchers. While there is much to gain from connecting to a

new theoretical area, it also challenges us to attend to conceptual consistency with the new ideas that are brought into the field. As Cosmides, Tooby, and Barkow (1992, p. 12) argue:

[C]onceptual integration simply involves learning to accept with grace the irreplaceable intellectual gifts offered by other fields. To do this, one must accept the tenet of mutual consistency among disciplines, with its allied recognition that there are causal links between them. Compatibility is a misleadingly modest requirement, however, for it is an absolute one. Consequently, accepting these gifts is not always easy, because other fields may indeed bring the unwelcome news that favored theories have problems that require reformulation.

In other words, beyond conceptual integration, we need to look for mutual consistency between theories of human evolution and theories of management and organization. Just as theories of chemistry need to be consistent with theories of physics, theories of management need to be consistent with what we know about human evolution. In particular, theories in management should be consistent with the basic tenets of evolution including natural selection, mutation, adaptation, and the cognitive niche. What is important is that there is a clear evolutionary mechanism that underpins the phenomenon being explained and that explains questions like: Why was it selected? What was the mechanism of selection? How have we taken the biocultural nature of evolved capabilities into account in our theorizing? How does the phenomenon in question fit into the cognitive niche of the group in question and what role does it play in the group's success?

Ensuring such consistency provides a critical check and increases the chances that our theorizing captures what is important about the phenomena we are theorizing. Our arguments in this essay are an excellent example: conceptualizations of the symbolic need to be consistent with what we know about human evolution. For example, aligning our discussions of the symbolic and symbols drawn from the humanities and social sciences with sign progression theory allowed us to deepen and extend the usual understanding of indices, icons and symbols drawn on in management and connect this important discussion with ideas from

human evolution. There is much more to do, of course, but we hope that this limited example clarifies what we are proposing.

Evolutionary Theory and the Biological Basis of Social Construction

One profound implication of this biocultural view is that, put simply, it challenges the subjectivist/objectivist debate that has unhelpfully divided management and organization research for decades (Burrell & Morgan, 1979; Gioia & Pitre, 1990). Understanding the evolution of the symbolic, and the intimate connection of language, sociality, and cognition in the construction of the cognitive niche, leads to the inescapable implication that there is a biological foundation for theories of social construction (Berger & Luckmann, 1967; Gergen, 2001). As a result, there is an evolutionary argument for adopting a strong social constructionist perspective on the social world with all of the radical implications that this brings, but also a biological foundation for social construction that is far too often overlooked by social constructionists.

Theories of human evolution support the contention of social constructionists that the social reality that *Homo sapiens* encounter in their everyday lives is constructed in the interactions of individuals as they come to shared understandings that solidify into a way of life or what we have referred to as a cognitive niche (Berger & Luckmann, 1967). And while this same process can be observed among all humans, the diverse ways of life of different groups of humans attest to its flexibility and variation across space and over time.

This, in turn, means that the current weak social constructionist epistemology that has come to characterize the study of management and organizations needs to be revisited, and the radical implications of this observation explored. We need a new foundation for organization and management studies that puts the incredible human capacity to create and

share symbols – to abstract communication, sociality, and cognition away from the material reality of life – at the very center of research and theorizing.

This also means that what is *not* socially constructed are the underlying human capacities for language, sociality, and cognition that underpin the process of cognitive niche construction itself. Our theories need to be more strongly founded on an understanding of the nature of these biocultural capacities and how they make the construction of the cognitive niche possible, but also shape what is possible in terms of human behavior and the construction of the cognitive niche.

Rather than maintaining the current struggle between objectivist and subjectivist camps, we need a new integration of these ideas and a new area of research in management – called, perhaps, *evolutionary organization theory* – informed by theories of human evolution. This new area of theorizing would bring together both the objectivist elements rooted in our evolution and our biology; and the socially constructed cognitive niche which constitutes many of the phenomena of interest to management and organization researchers. While the development of this new area of theorizing will not be straightforward, the end result has the potential to radically improve our understanding of management and organization.

Interestingly, an evolutionary view of the symbolic provides a new answer to the perennial question of why management and organization research has had so little impact on management practice (e.g., Davis, 2014; Hambrick, 1993; Reinecke, Boxenbaum, & Gehman, 2022). Perhaps it isn't that we aren't scientific enough, but that we have been paying attention to the wrong science. In trying to apply highly quantitative statistical methods to study what is inherently symbolic, we produce findings that are neither very profound nor rooted in the socially constructed nature of the cognitive niches that we study. The result is much research that tells us little about either the construction of cognitive niches

generally or about the specifics of particular cognitive niches. If evolutionary theory is correct, then generalized knowledge about the content of different cognitive niches that applies across different groups of people and over time should not be the goal of management and organization research as it does not exist in anything but the broadest sense.

This means that we need to think anew about what we can actually learn from management and organizational research given the inherent constraints revealed by an evolutionary perspective. At the same time, the way that groups of humans construct cognitive niches is generalizable as it is rooted in their DNA. The ability to organize is built on evolved capacities that do not change—or at least only change in evolutionary time. Yet, at present we lack the language to talk about these issues. Thinking through the implications of this as a new field of evolutionary organization theory will move our research agenda toward looking at underlying, basic organizing principles which might allow us to have more impact.

Organizations, Institutions, and Human Ultra-Sociality

The evolutionary view of the symbolic also has important implications for our understanding of organizations. First, humans are, as Wilson (1975) described, one of the four pinnacles of social evolution along with colonial invertebrates, social insects, and non-human mammals. But the human ability to organize is based on completely different principles from other highly social animals like termites and corals and on a completely different scale than the non-human animals. Where social organization in other highly organized species is based on the members of the society being closely related or genetically identical, in humans unrelated individuals are able to organize on a grand scale with individuals who are unrelated. This is a unique capability in the animal kingdom and

“humans are, arguably, a new page in the natural history of animal cooperation” (Richerson & Boyd, 1998, p. 71).

Interestingly, patterns of genetic relatedness and reciprocal altruism support a diversity of small-scale societies in our near relatives, the monkeys and apes. But in humans our “ultra-sociality” is based on a “massive dependence on adaptive social and technological traditions” (Richerson & Boyd, 1998). In other words, the development of the biological capability to create symbols and the subsequent mutually reinforcing development of cognition, language, and sociality led to the development of ultra-sociality.

An understanding of human evolution therefore provides a new and exciting way to think about what organizations are and why humans can organize at the scale and complexity that we do (Gamble et al. 2014). While much work needs to be done to work out the implications of this connection, what is clear is that an understanding of human evolution – and particularly sociobiology – helps us to understand why humans organize the way we do, the biological limits of the ultrasociality we have developed, and some of the patterns in the way we organize. Just as theories of human evolution have provided new ways to think about language, they also provide a new lens to study organizations that is not simply another metaphor (Morgan, 1986), but rather a biological explanation of the human capacity to organize.

The understanding of the symbolic that we developed here also has important implications for how we think about institutions. At their most basic, institutions are conventions that are self-policing (e.g., Douglas, 1986). Within the tradition of new institutional theory, scholars define institutions more specifically as “historical accretions of past practices and understandings that set conditions on action” through the way in which they “gradually acquire the moral and ontological status of taken-for-granted facts which, in

turn, shape future interactions and negotiations” (Barley & Tolbert, 1997, p. 99). Institutions influence behavior because departures from them “are counteracted in a regulated fashion, by repetitively activated, socially constructed, controls” (Jepperson, 1991, p. 145). In other words, deviations from the accepted institutional order are costly in some way, and the more highly institutionalized a particular social pattern becomes, the more costly deviations from those patterns are (Lawrence, Winn, & Jennings, 2001).

The perspective we have developed in this essay provides an explanation for what institutions are and how they are constructed that goes beyond existing discussions. While the existing literature clearly recognizes that institutions are socially constructed and symbolic, an evolutionary perspective provides an explanation of where the capacity for social construction has come from and how it works. It also highlights the biological basis for the symbols out of which institutions are constructed. In fact, institutions as they are defined are a part of the cognitive niche and the theory of the cognitive niche needs to be integrated into institutional theory to provide a deeper explanation of the “black box” of institutionalization that goes beyond the linguistic theory that has been used to date (e.g., Phillips, Lawrence & Hardy, 2004).

At the same time, the idea that actors engage purposefully in processes of social construction has become increasingly accepted in management and organization research. In particular, the idea of institutional work – “the purposive action of individuals and organizations aimed at creating, maintaining and disrupting institutions” (Lawrence & Suddaby, 2006, p. 215) – has gained significant traction among institutional theorists as a way to capture the important role of purposive action by actors in institutional processes. More recently, Lawrence and Phillips (2019) have developed the more general concept of “social-symbolic work” to capture the way that actors purposively engage in the social

construction of a wide range of “social-symbolic objects” – “a combination of discursive, relational, and material elements that constitute meaningful patterns in a social system” (Lawrence & Phillips, 2019, p. 24) – including selves, organizations, and institutions. They define social-symbolic work, in turn, as “the purposeful, reflexive efforts of individuals, collective actors, and networks of actors to shape social-symbolic objects” (Lawrence & Phillips, 2019, p. 31).

The evolutionary perspective we are arguing for here supports the social-symbolic work perspective (e.g., Lawrence & Phillips, 2019) by highlighting that the selves, organizations, and institutions are, at least in part, ongoing accomplishments constructed by actors working purposefully. And, more specifically, social-symbolic objects are parts of the cognitive niche. They are constructed by groups of humans as they interact and seek to solve the problems of how to live together in particular environments. While they have material, discursive, and relational dimensions, they are fundamentally symbolic and theories of human evolution explain both what this means and how it came about. Social-symbolic objects are relatively stable at a point in time but evolve and change over time as groups interact through language and innovate new solutions to problems. The social-symbolic work framework, in turn, helps us to understand more about the construction of the cognitive niche and provides broad categories of objects. This does not mean that the cognitive niche is the result of purposeful work only. But it does point to the fact that purposeful work by actors plays an important role in the construction of the cognitive niche in at least some places and times.

Mobilizing Evolutionary Theory in Management Research

To make the potential applications of our theorizing more concrete, in this section we illustrate how two research areas – organizational culture and digital technologies – can be

further theorized using ideas from this perspective, providing examples of how evolutionary theory can be mobilized in management research. We have chosen two very different areas in order to show some of the variety of the potential ways in which evolutionary theory can be applied in management and organization research. First, ideas from evolutionary theory can provide the impetus for re-invigorating research on organizational culture, an important area of research that has lost momentum to some degree. Second, ideas from evolutionary theory provide interesting ways to think about the potential impact of digital technologies on organizations, a new and highly topical phenomenon that receives increasing scholarly attention but would profit from more theoretical perspectives from which to be examined.

Organizational Culture. Research on organizational culture (like research on culture more broadly) is deeply rooted in the idea of the symbolic:

The symbolic concept of culture provides a roof for a broad assortment of views about organizations. However, these varied views all contain the common leitmotif of symbolic, meaningful, evocative, and emotionally charged components in organizations. (Allaire & Firsirotu, 1984, p. 209)

Organizational culture is about the symbolic and the nature of the symbolic. Its roots in the process of human evolution are timely and useful in re-invigorating an important, but rather moribund area of research. From a cultural perspective, organizations should therefore be “understood and analyzed not mainly in economic or material terms, but in terms of their expressive, ideational and symbolic aspects [...] the research agenda stemming from this perspective is to explore the phenomenon of organization as a subjective experience” (Smircich, 1983, pp. 347-348).

Yet, culture research has largely failed to focus on organizations as symbolic constructions. In fact, research turned out to be either highly instrumental and focused on how managers can use culture as an instrument or a mechanism of control; or somewhat superficial and undertheorized in terms of understanding culture as rooted in the symbolic.

And, perhaps worst of all, “what tends to be overlooked is the dynamic and precarious process in which culture is constructed and deconstructed” (Knights & Wilmott, 1987, p. 42). In other words, what culture is, its role in the lived reality of organizations, and how it comes about has not been well addressed and the excitement that accompanied the development of a research stream on organizational culture has largely dissipated as a result. The lack of a sufficiently developed notion of the symbolic undermined the ability of culture research to make the sort of contribution it has the potential to make.

More specifically, an evolutionary view of the symbolic does two things for research on organizational culture. First, it is a useful counter to the reductionist idea that culture is simply a management tool. Indeed, if we accept the underpinnings of evolutionary theory and the cognitive niche, then culture is inherently symbolic and collectively constructed over time, not a tool to be managed. While managers can, of course, have an effect on culture, it is much more than simply a product of the activities of managers. Similarly, while there are shared patterns in how humans developed language, cognition, and sociality, the different ways in which they do this—culminating in different cultures—means that generalizations about culture must be made with caution, if at all.

Second, cognitive niche theory provides a stronger theoretical underpinning for what some authors have somewhat dismissively called the “black box” of culture (Pinker, 2010, p. 8996). While culture is a core concept in social science, what organizational culture actually is remains a topic of debate (Giorgi, Lockwood, & Glynn, 2015) and generally is not well explained. Take, for example, Geertz’s frequently cited definition of culture:

“Believing, with Max Weber, that man is an animal suspended in webs of significance he himself has spun, I take culture to be those webs, and the analysis of it to be therefore not an experimental science in search of law but an interpretive one in search of meaning.” (Geertz, 1973, p. 5)

As evocative and generative as this definition is, what is a “web of significance?” Why are humans able to spin them and of what are they spun? Theories of human evolution provide the answer to how this unique ability to create cultures developed through evolution by natural selection, and how it is underpinned by the capacity to craft and share symbols. Geertz did, of course, refer to his own theory of culture as a “semiotic theory of culture”. Yet the symbolic underpinnings of culture were left unexplained and untheorized and this problem undermined research on organizational culture.

An evolutionary lens on culture usefully opens this black box by providing an explanation of the underlying biocultural capacities that allow humans to produce culture in the first place. Furthermore, organizational culture is, in fact, the external aspects of the cognitive niche that are drawn on in the act of organizing or parts of the cognitive niche that are unique to the organization in question and constructed through the interaction of organizational members. The theory of the symbolic and the cognitive niche is therefore highly relevant to a new and better theorized theory of organizational culture.

Digital Technology. The second important research area that can profit from this new perspective is research into the effects of digital technology on organizations. Research in this realm has exploded in the past few years, mirroring the exponential development and application of digital technology in an ever-growing number of areas of our lives. The appearance of digital technologies that manipulate symbols – symbolic machines such as generative AI – raises new questions that have not been asked to date yet need to be urgently considered.

This may seem like a hyperbolic statement, but just as the appearance of writing some 5000 years ago completely revolutionized our capacity to share and store knowledge, the appearance of digital technologies that can store and manipulate *symbols* on a scale

unimaginable in their absence has revolutionized the way cognitive niche construction happens. Even more, the appearance of AI systems that can produce unique and original texts (images or written) is hugely significant given the potential of these systems to directly participate in the construction of the cognitive niche.

This raises a number of questions for researchers in management and organization. These questions are crucial to answer as even AI developers have started to worry about the unintended effects of AI on human society:

Are these individuals really worried about a Terminator or Matrix-type scenario where robots literally destroy or enslave the human race? Well, as unlikely as it might seem from where we stand today, it seems that indeed they are. (Marr, 2023)

A first question stems from the observation that symbolic machines create new spaces and new possibilities for the symbolic. This has been written about extensively in discussions of human evolution (e.g., Donald, 1991), including whether the invention of digital technologies heralds a new era in human evolution (Smith, 2019). But little research has been done on the impact of digital technologies on the symbolic in management and organization. While there is a growing stream of literature looking at the impact of digital technologies on organizing (e.g., Balasubramanian, Ye, & Xu, 2020; den Hond & Moser, 2022; Glaser, Pollock, & D'Adderio, 2020; Kellogg, Valentine, & Christin, 2020; Lindebaum, Moser, Ashraf, & Glaser, 2022; Moser, den Hond, & Lindebaum, 2022), we lack a comprehensive theory of the effect of these technologies on the symbolic underpinnings of management and organization. This means that we are at risk of ending up with a fragmented and unintegrated landscape of research, and that a broad understanding of the complex impact of symbolic machines on organizing and the symbolic remains to be developed.

A second question relates to the fact that these symbolic machines are beginning to participate directly in processes of symbolic production and dissemination. This happens in

two ways. First, machines participate indirectly through their role in organizing and sharing information within and between large groups of people. For example, the Facebook or LinkedIn algorithms that decide which posts you see are engaged in the symbolic by shaping the information you are exposed to. Second, symbolic machines are beginning to be much more directly involved in social construction. Rather than simply storing and disseminating symbolic material created by humans, they now include ‘artificially intelligent’ algorithms that use machine learning and deep neural networks to produce new and unique texts (both images and written texts); here, the non-human construction of the symbolic is beginning to shape the understandings of, and define consequences for, recipients (Moser et al., 2022; O’Neil, 2017). In addition, recent developments in generative AI now allow for fake videos, pictures, and voice recordings that are increasingly difficult to recognize as such—symbolic machines now contributing to the symbolic in ways that are indistinguishable from human contributions. But what are the implications of this active involvement in social construction for management and organizations?

This latter point also raises a third important question. How do we think about what happens when symbolic machines participate in our lives? Do we need a new Turing Test^{xi} that will distinguish when a symbolic machine is actively engaged in cognitive niche construction (Kennedy & Phillips, 2023)? For example, “Big Tech” firms struggle to develop algorithms that can successfully detect deep fake technology (Finger, 2022)—which can be abused in a myriad of creative and damaging ways. Many people struggle to part with their smartphone even for a day, preferring to submit to the generative power of symbolic machine. In organizations, symbolic machines are everywhere, from systems that rate our performance, software that organizes our days, generative AI that writes texts and produces Powerpoint presentations, and recommendations and nudges that steer us towards particular

choices and away from others. In short, symbolic machines change the very way that we live and work, both of which are inseparably linked with the symbolic. It is time for management and organization scholars to address this phenomenon directly and engage with these profound changes in the symbolic. We believe the perspective we have discussed in this essay can help scholars think about the brave new world we are entering.

Conclusions

In this first essay of the Organizations, Institutions and Symbols Point/Counterpoint, we have argued for the value of moving away from a metaphorical application of theories of evolution by natural selection to engaging directly with these ideas and their implications. We have identified four main implications of doing this. First, taking the co-evolution of language, sociality, and cognition seriously provides a rich theoretical frame for further research and theorizing and a new window on symbolic behavior in *Homo sapiens*. The demand for conceptual consistency between theories of management and organization and theories of human evolution also provides a much-needed opportunity for a deeper reflection on the assumptions about human behavior generally, and symbolic behavior more narrowly, that underpin theories of management and organization.

Second, understanding how the human capacity to create and share symbols has evolved provides a powerful tool for integrating across different areas of management and organization, and also between levels of analysis. This is because theories of cognitive niche construction explain the biological basis of the social construction of reality. Indeed, future management and organization research should be consistent with our understanding of the evolution of the symbolic and a much stronger social constructivist epistemology is needed to reflect what we know of the evolution and modern role of the symbolic in *Homo sapiens*.

Third, an evolutionary perspective on management and organizational theory helps us see how *Homo sapiens* have developed a unique form of “ultra-sociality” as a result of the evolution of the biological capability to create symbols. Such a view sheds new light on how we should understand and investigate organizations and institutions and highlights the incredible feats of organization that *Homo sapiens* are capable of and the many questions that remain about how, exactly, we do so. In addition, we have argued that social-symbolic objects are parts of the cognitive niche and that the social-symbolic work framework helps us to understand more about the construction of the cognitive niche and provides broad categories of objects.

And finally, understanding the evolutionary basis for the symbolic provides a new perspective on important research areas in management and organization theory. First, we have proposed a new area of management and organization research – evolutionary organization theory – that would focus on working through the connections between management and theories of human evolution. Second, we have discussed two examples of streams of research – organizational culture and digital technology – that can greatly profit from taking seriously the ideas from evolutionary theory. But clearly there are many more topics and phenomena that could and should be studied from this perspective.

But it is important to be clear that while *Homo sapiens* are the only animals that inhabit the cognitive niche, our unique abilities do not make us “better” than other animals. Evolution is not teleological and more highly evolved animals are not “better”. Evolutionary theory only compares animals in terms of how well they “fit” into a particular environment when facing competition for the same resources from other animals in that environment. And while we humans use the unique symbolic capacity to adapt to different ecological niches, it also lets us kill each other on a grand scale and damage the planet beyond repair, threatening the

long-term survival of our species. It is exactly that difference between ‘fitness’ in an evolutionary sense versus a moral or ethical sense that requires careful yet urgent attention from management and organization scholars as they apply these ideas.

Finally, revolutions in science often occur when scientists abandon “folk theories” about the empirical phenomena they study. By moving beyond taken-for-granted assumptions about the phenomenon under study, researchers are able to make fundamental progress in understanding its nature. Whether it is quantum physics, the structure of DNA, or the nature of the human mind, it is only by moving beyond everyday assumptions about the world that real progress is made in science. Management and organization research is currently constrained by a dependence on a variety of folk theories about individuals, organizations, and societies that constrain our research and limit our impact. Integrating ideas from human evolution can help us to move beyond these taken-for-granted assumptions about the things we study, and come up with real solutions for the very real challenges that we face. We hope you will join us in developing evolutionary organizational theory as a new area of research and a new way of understanding management and organizations.

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- ⁱ Sociality refers to the degree to which individuals of a species form and maintain social groups. In many cases, sociality is thought to have evolved as a way to improve individual fitness through cooperation, division of labor, or mutual defense. Overall, sociality has played a major role in the evolution of many species allowing them to adapt to and thrive in a wide range of environments.
- ⁱⁱ Anatomically modern humans is a term to refer to early humans who were physically indistinguishable from modern humans but for which there is no evidence of the sort of symbolic behaviour that would indicate the development of the modern human capability to use symbols.
- ⁱⁱⁱ At some point the so called “Baldwin Effect” began and the brain began to evolve both due to the physical environment but also due to the interaction between the brain and culture. The Baldwin Effect highlights that particular mutations may be selected on because of their usefulness in interaction with the culture in which the mutation occurs.
- ^{iv} Symbolic behavior as used here would include things as wearing beads and pendants to communicate information about status and affiliation, complex funeral rituals, and cave paintings (Godfrey-Smith, 2014). Symbolic behavior is therefore only a part of human behavior as much human behavior is practical and not meant to produce interpretable symbols and do not involve interpreting symbols.
- ^v By success here we refer to the fact that *Homo sapiens* are the most numerous primate and have a range that extends across all climate conditions and geographies.
- ^{vi} By material here we mean any sort of inscription in the material world including ink on a page, vibrations in the air, magnetic traces on a hard drive, or pulses of light in an optical cable. What is important is that there is some material trace that can be sensed and then made sense of either directly through the human senses or with the intermediation of some sort of technology.
- ^{vii} Formal names are an exception to this of course. These special symbols function as pointers to particular things in the world. While this is important for language, it is the more general nature of symbols that is important for our discussions here.
- ^{viii} Fitness refers to an individual's ability to survive and reproduce in its environment. Fitness is typically measured in terms of an individual's reproductive success, which includes both the number and quality of offspring that survive to reproduce.
- ^{ix} The term “hominins” refers to humans and all of our extinct bipedal ancestors.
- ^x Biocultural is a term from evolutionary theory that highlights this combination of biology and culture in humans. For example, spontaneous laughter is a biological phenomenon that is common to all humans. But what is funny is determined by culture and if we are going to understand laughter we need to understand both the biology and the cultural context of an instance of spontaneous laughter.
- ^{xi} The Turing Test was a test proposed by Alan Turing in 1950. He proposed that if a computer could fool a human into thinking it was another human under particular conditions, then it would be correct to say that it was intelligent. Turing’s discussion of machine intelligence and the Turing Test has had a significant impact on discussions of artificial intelligence in computer science and philosophy.