# The Origins of Social Evolution: Language and Institutional Evolution

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## Prologue

This study hypothesizes the emergence of social evolution in northeast Africa, about 70,000 years ago. In it, I advance a new view of social evolution, a topic that has been long discussed without any decisive advance. I rely on the prior efforts of psychologist Donald T. Campbell, who applied Darwinian insights to social evolution, and John Maynard Smith, who began to set the emergence of language in the long-term context of biological evolution. As I see it, the combined emergence of syntactic language and collaborative groups generated a process of systematic social change. Spoken language itself and its speaking community, as they solidified, became the first social institutions. The main point of the essay is a deductive theory that formalizes the emergence of language in a group of youths, tracing the "institutional evolution" of their community in a model inspired by Darwinian logic. This essay, in a slightly different form, has been submitted to the journal *Anthropos.*

## Essay

This essay hypothesizes the emergence of new levels of human group behavior, some 70,000 years ago in northeast Africa. Syntactic language emerged as young people gathered to play collaboratively in deepening their communication. The results of their conscious innovations brought new types of communication, collaborative acts of representation, and formalization of their collective intentionality through ritual. The discourses and actions of group members created language itself and the community of speakers as the initial cases of social institutions. The same innovations launched processes of institutional replication for the benefit of later generations. Along with this inheritance, a combination of conscious and unconscious procedures yielded social selection of institutions, according to criteria that are best labeled as the level of social welfare.

This theory is proposed as a contribution to the overall study of human evolution—that is, it is to identify the emergent process of social evolution through institutional change and trace the interaction of this process with biological evolution and the newly understood processes of cultural evolution. Formulation of the hypothesis has drawn on the impressive advances of recent decades in research and conceptualization within both of the main camps of researchers on human evolution: that of social-anthropological approaches, focusing on long-term social change, and approaches analyzing the growing 'capacity for culture' of *Homo sapiens* (Antweiler 2012: 218).

Yet because research on human evolution is carried out in multiple disciplines, researchers rely on varying conceptual and analytical assumptions, so that cross-disciplinary discourse is limited by the static of numerous misunderstandings. Three general questions to be resolved in this discourse are the overall pace of evolutionary change, the choice between continuum and disjuncture of group behavior in humans, and the comparability of data on Africa and Eurasia. On the pace of change, the issue is whether human transformations have been consistently gradual, or whether there have been occasional sharp transitions, particularly through language and cognition but also in the size and structure of social groups (Aiello and Dunbar 1993, Allen et al. 2008, Bickerton 2009). Secondly, whatever the pace of change, debate continues as to whether or not group behavior is reducible to individual behavior (Tuomela 2013). Thirdly, research on evolutionary issues has commonly separated empirical study of Africa and Eurasia, so that conventions and data on the two macro-continents differ along numerous axes,

making it more difficult to assess human evolution in its entirety (McBrearty and Brooks 2000, Watts 1999). Scholarly focus on small regions and short time periods tends to elide discussion of these issues. Thus, a focus on European data led to the hypothesis of a sudden 'human revolution' of technological advance some 40,000 years ago. Archaeologists McBrearty and Brooks (2000) not only confirmed that the apparent shift was instead the arrival in Eurasia of African-based *Homo sapiens*; they argued further for a gradual process of cultural and technical change within Africa. Analysts of social evolution, both early and recent, have assumed that the human social order is unprecedented, so that some major innovation must have taken place to launch the social order (Tylor 1871, White 1969, Tattersall 2009, Tattersall 2012). Nevertheless, the balance of social-science research has focused on the data-rich Holocene Epoch and on processes of incremental change rather than the origin of social evolution. Within biological-cultural studies, research has tended to focus on early and mid-Pleistocene times, also identifying and documenting gradual changes (Boyd and Richerson 2005, Allen et al. 2008).

I argue that there is a benefit to posing and testing this hypothesis of rapid social change, in attempt to focus research on the proposed emergence of social institutions. Evidence for the hypothesis is admittedly indirect and circumstantial—in particular, we have no direct evidence on the early days of syntactic language. Yet I argue that the hypothesis is consistent with a great deal of what is known of the human order in the Pleistocene era. The effort of sharpening and testing the hypothesis is likely to elicit both direct and indirect methods of testing it, thus clarifying the overall pattern.

The study begins with concise summaries of recent advances in the two major camps, the framework of social evolution and studies in biological-cultural analysis. Then I summarize my theory at two levels: I hypothesize the practical steps of creating syntactic language and the speaking community; then I formalize the logic of institutional evolution in a logic inspired by Darwinian selection. Thereafter I discuss the expansion and changes in social evolution across the remaining 50 centuries of the Pleistocene era, exploring large and small social institutions, informal social networks, interactions among evolutionary processes, and environmental effects. To summarize the argument analytically, I propose three steps in evaluating the hypothesis: gathering relevant data, modeling social behavior at intimate and aggregate levels, and testing to reconcile theory and data. I conclude with remarks on a research agenda for syntactic language and collective intentionality entangled within the broader context of human evolution.

## 1 Recent Work in Social Evolutionary Studies

The long-term study of human social change addresses a complex set of issues, requiring the analysis of numerous topics at levels from the individual to the species level. In this section I seek to identify the most important new developments in the study of social evolution, especially as they are relevant to the issues of syntactic language and the collective intentionality of human groups. Human group behavior has been explored in several fashions by anthropologists and sociologists, reaching back to Émile Durkheim's view of *conscience collective* (1893), which inspired many subsequent authors, though the vagueness of Durkheim's formulation was propagated by his successors. Following wide approval among biologists for an analysis by evolutionary biologist George Williams (1966), social scientists became wary of any notion of group behavior in humans: Williams argued that selection at the group level was not feasible for animals because of the diversity in animal populations. Social scientists then became very muted in any discussion of group behavior, an approach reaffirmed by the individualistic social thinking and rational-choice academic analysis of the late twentieth century.

Leslie Aiello and Robin Dunbar (1993) found a way to conduct empirical research on group behavior by comparing primate species through observations of their typical group sizes and measuring their average neocortical volume.[1] They found a correlation of these two measurements with the amount of time spent by species in grooming behavior: for species with larger groups, more time was devoted to grooming. The authors found that the size of the human

[1] Aiello and Dunbar, interdisciplinary scholars, are perhaps based more fully in biological than in social studies, but I find it appropriate to present their work on groups in this section on social analysis.

neocortex yielded an expected group size of 150. Yet sustaining this group size would have required an immense allocation of time to grooming. The proposed consequence was that vocalized interaction was able to substitute in part for grooming, but also that large-brained *Homo sapiens* were unable to satisfy their need for social interaction until the rise of syntactic language. This led to the thesis (Dunbar 1996) that female exchange of gossip was key to the rise of language, although this proposal did not seem to resolve the step to syntactic speech. In a later study of modern humans (Dunbar and Sosis, 2018), the number 150 reappeared and persisted as the basic size of human numbers of acquaintances.[2]

In a deductive approach, philosopher Raimo Tuomela (2013) articulated a more explicit theory of human group behavior, relying on game theory to confirm the analysis. The theory identified two basic types of social groups: *I-groups*, in which individuals find themselves in a group, but where the objectives and actions of each individual prevail; and *we-groups*, in which individuals act in a group according to the logic of *collective intentionality*, recognizing their shared objective, their common interest, and agreeing to act for the interest of the group. Both I-groups and we-groups are arguably socially significant: individuals can be members of multiple groups of each type. We-groups are able to form social institutions which can propagate themselves: Tuomela confirmed that decision-making by such groups is not reducible to individual-level decision-making.[3] The definition of 'institution' is central to this logic. Tuomela's vision of institutions (2013: 223–233), drawing on that of John Searle (1995), is parallel to that in the ethnological catalogs of G. P. Murdock (1949), in which kin and other groups are defined by their membership, their structure, and their purpose. This approach—which I adopt here—relies on defining institutions at local levels as groups of people who act endogenously to adopt norms of behavior, as is commonly done in anthropology (Carneiro 2003: 182). That is, I choose not to define institutions at a broad societal level as exogenous norms for behavior, as is commonly done in sociology and economics (North et al. 2009; Turner 2003). On the other hand, I do make use of I-groups, which are eclectically and informally created (Tuomela 2013: 179–182), by analyzing them according to the theory of social networks (McLean 2017, Manning 2020a: 56).

Other fields in social scientific study have provided further contributions. In particular, the fields of historical linguistics and archaeology have recently developed results that are significant for human evolution. Joseph Greenberg's founding studies (2000, 1987, 1965)—on major language phyla and language universals—have been followed up ably by Christopher Ehret (1998, 2001) in phylogenetic analysis and proto-Human vocabulary and by William Croft (2009) in language typology and universals. Archaeological work, especially in Africa, began to fill previous gaps (Henshilwood et al. 2018, Ehret 2015, McBrearty and Brooks 2000). Other areas of advance include analyses of gender (Hrdy 2009), religion (Rossano 2010, Boyer 2018), and the construction of emotions (Barrett 2018). While collective intentionality was perhaps the most outstanding new development, social scientific study of human social change continued to advance not only through major theoretical breakthroughs but through patient and largely individual work along numerous paths. Antweiler (2005: 238–39) in a review essay on human evolution citing over 30 works, found a 'relatively small overlap in the literature cited'; he drew on these works to provide a skillful one-page chart identifying many of the areas and standpoints under debate.

## 2 Recent Work in Biological–Cultural Studies

Biological theory and practice expanded and diversified impressively in the late twentieth century, with three influential advances. The first of these arose rather quietly with W. D. Hamilton's papers (1964) in population genetics, identifying

[2] While the work of Aiello and Dunbar has created valuable projections of average group size for humans, based on neocortical capacity, there exist few historical data on early human groups, their magnitude, or changes in size and spatial distribution. It is to be hoped that archaeological research will be able to provide empirical insights on human group size over time.

[3] This social-evolutionary reasoning escapes the strictures posed by Williams (1966) because the social groups work by a different dynamic than genetic groups. The ability to agree to a common program creates a new situation: see Tuomela (2013: 241) and Preyer and Peter (2017).

what became known as 'inclusive fitness', in that individuals shared much of their genome with siblings as well as with parents and offspring. The implications of this discovery of a path for expanding altruism in humans and animals came only gradually to be understood. More widely heralded were the advances in genetics and epigenetics. Fuller details of genetic mechanisms were traced, while the process of genetic sequencing advanced to the point where whole genomes were sequenced for humans and many other species (Reich 2018). At the same time, the basic nature of epigenetics became clear (Gould 1977; Jacob 1977). In this work, expanded study of genetic mechanisms showed that genes could be regulated by proteins and RNA, opening the door to ontogenic or life-course development and yielding repeated advances in a field that had been in limbo for most of a century.

A burst of theoretical and empirical advances followed from the 1970s, with new work heading in many directions. Initially, Edward O. Wilson sought to unify biological studies with *Sociobiology* (1975), a reductionist general framework relying on biological theory to explain all biological and social phenomena. Soon, however, research turned more eclectically to multiple research projects in fields that came to be labeled cultural evolution, evolutionary psychology, and evolutionary biology (Manning 2020b: 138–147). John Odling-Smee's analysis of niche construction by animals and humans is a leading example of a new analysis in evolutionary biology (Odling-Smee 1988; Odling-Smee et al., 2020). With time, the results throughout the biological sciences were sufficient to enable John Maynard Smith and Eörs Szathmáry (1995) to publish a major overview of transitions in biology from the origin of cells forward—in effect, a practical update on the Modern Synthesis in biology. They concluded with careful attention to the rise of human language, relying on the work of Bickerton (1990).

Studies in evolutionary linguistics expanded significantly from this point. Where Bickerton (1990) emphasized basic communication through vocalization of 'protolanguage', Noam Chomsky (1995) emphasized the internal and unspoken logic of language (i-language) as contrasted with communication and speech (e-language). Bickerton and Szathmáry (2009) edited a volume presenting the contending perspectives on social vs. biological origins of syntax, while Fitch (2010) provided a comprehensive review of debates in evolutionary linguistics. Berwick and Chomsky (2016) expanded their case for the genetic emergence of 'Merge', a hypothesized algorithm for linking elements of logical strings, concluding that it had provided the last necessary element for syntactic speech by about 80,000 years ago.

Yet the problem of syntactical e-language was different, as syntax required complex social interaction that needed to be enabled through invention at the social level (Bickerton 2009: 235–236, Manning 2020a: 37–41; see also Lieberman 2007). Aiello and Dunbar (1993) traced the correlation of primate grooming with preferred group size; but group size reached a limit based on time available for grooming. Thus, Merge and i-language, perhaps linked to each other, may have formed 200,000 years ago and remained internal; a later time and a separate mechanism enabled the external dimensions of group-based syntax, speech, and social evolution.[4] In any case, the issues of group size, Merge, and i-language need to be included in studies of 'cultural evolution' or 'capability for culture', since studies of each issue were central to the various other elements of social learning and dual inheritance that developed in *Homo sapiens.*

The growing range of analysis elicited several valuable overviews (e.g. Corning 2003, Hrdy 2009, Blute 2010, Christakis 2016, Tomasello 2019) and some struggles over academic turf. The defenders of sociobiology carried on their rear-guard action: E.O. Wilson joined others (Nowak, et al., 2010) in treating inclusive fitness as an unnecessary addition to biological theory. A resounding response (Abbott et al. 2011) included a hundred co-authors who relied on inclusive fitness. In a synthetic statement affirming the advances of cultural evolution, Creanza, Kolodny, and Feldman (2017) cast their net broadly, defining 'cultural evolution' as including not only the dual-inheritance school of Boyd and Richerson (Boyd 2018) but also other groups that accepted the notion of inclusive fitness. A confirmation of the centrality of inclusive fitness (Kay, Keller, Lehrmann 2020) strengthened this position. Yet work within the paradigm of cultural evolution set up obstacles as well as advancing research. Creanza et al. did not cast their net widely enough to include evolutionary linguistics, evolutionary psychology, or niche creation in their discussion.[5] The term 'cultural

[4] Thanks to Eugene Anderson on this point. For further research on Merge, see Zaccarella and Frederici (2015).

[5] Not included, for instance, were linguistic analyses including Berwick and Chomsky (2016), the primate behavioral studies by Tomasello (2014), studies of human nature (Degler 1991), or the biological analysis of emotions (see Adolphs and Anderson 2018).

evolution', now widely adopted, propagates confusion by using the term 'culture' for individual-level learning linked to genetic evolution, when 'culture' is used far more widely to refer to creative and group-level exchange of representations, only distantly linked to genetics.[6]

Overall, however, the ensemble of contributions in the two camps of social evolutionary and biological-cultural studies serves to confirm the wide range of innovative analyses and the growth in efforts to keep up with contributions across disciplinary lines. Of the many contributions, those most significant for present purposes are the confirmation of advances in the framework of cultural evolution, the Berwick-Chomsky thesis on emergence of syntactic language, the Tuomela thesis on collective intentionality from the social-science camp, the Dunbar analyses of social groups, and the advancing studies in historical linguistics. Antweiler (2012: 224) argued that researchers should 'distinguish more clearly between describing origins and change, on the one hand, and explanatory mechanisms on the other. Furthermore, a clear analytical distinction between (a) the evolution of culture as an organic *capacity* and need for human beings and (b) the long-term (transgenerational) change of *societal entities* and their material products would be helpful'. Out of this full set of issues, I have selected a focus on theorizing the joint creation of speech and conscious group behavior, arguing that they launched a process of social evolution through institutional change.

## 3 Theory: Origin of Language and Institutional Evolution

Syntactic language is speech with rules for the arrangement of words and phrases; collective intentionality is the formation of social groups by members who agree to share in objectives and in working collaboratively toward them. I argue that syntactic language and collective intentionality arose together through the agency of adolescent children. The young people developed syntax and group behavior, enabling verbal exchange of the i-language-thinking that had long been going on within individuals. The children created institutions during one or two generations of work and play, where institutions consisted of self-conscious groups with agreed objectives, able to achieve transgenerational continuity. The new development was a breakthrough, but it was less a breakthrough in human capacity for conceptualization than it was an advance in the capacity for sharing of concepts.

The need was to surmount at once the obstacles to syntactic language and group behavior. Neither syntactic language nor groups characterized by collective intentionality could have evolved entirely out of incremental processes: creation of syntactic language required social change. This theory, linking spoken language to collaborative groups, sits at the intersection of studies in group-level social evolution and the human capacity for individual-level culture; it follows the reasoning of Chomsky, Tuomela, and Bickerton**.** The hypothesis accounts for humans at various levels, allowing for distinctive dynamics in each grouping: as individuals, as populations of individuals, as *I-group*s or informal networks of individuals, and as *we-groups* linked by collective intentionality. Creating syntactic language required complex structures of speech, inherent specificity, and huge vocabulary; collaborative groups required articulate agreements that were carried out in practice. At some point, a rapid process of reorganization was required to enable the emergence of such a new social order, through broad agreement on numerous decisions in a short period of time. I therefore propose that the path to breaking through the two obstacles was led by adolescent children who, at the most innovative age, initiated the change by creating expanded groups and by sharing the articulation of verbal syntax in a game-like situation (Manning 2020a: 38; Dunbar 1996). These children had substantial knowledge, strong interest in group activities, and few responsibilities to distract them. Following Bickerton, I argue that humans had previously spoken a form of 'protolanguage' without syntax, in which phrases were limited to four or five words (Bickerton 1990, Bickerton 2009).

[6] The excellent volume edited by Dunbar, Knight, and Power (1999: 3, 210) assembled chapters from both sides of this divide, defining one side as behavioral-ecological and the other as using Darwinian models to address problems in symbolic culture. In seeking to link the two approaches, however, the editors chose not to note explicitly the difference between the group-basis of the ecological studies and the individual logic of the Darwinian studies (cf. Manning 2020a: 12).

I present the theory of language and institutional evolution through exercises in modeling at two levels. First, I describe the hypothetical emergence of language in a group of youths, tracing the first few generations as the speaking community grew to self-sufficiency. Syntactic language requires agreement on specifics of syntax among the group of speakers: this model shows how the initial group could have met, survived, and passed on its innovation over time. Second, collective intentionality, once applied to language, could be generalized in its application to additional social objectives, creating new institutions. As inspired by Darwinian logic, I formalize these ongoing processes of institutional evolution in a self-replicating model of social selection, for two human generations. In the next section, I add a third set of models, arguing that the expanding social system underwent maturation, in later generations, not only through institutional growth but through the formation of informal networks and through processes of interaction linking social evolution with biological and cultural evolution.[7]

*Modeling a narrative of institutional evolution.* I propose the specific modeling of a set of households and the children within them to generate the initial creation of languages and groups; I follow up with the evolution of these institutions during two generations, a formative period of roughly 45–60 years. The initial conditions for the process of social evolution consist of bands or households of *Homo sapiens* in northeastern Africa, 70,000 years ago. I hypothesize that average households were groups of roughly 20 persons (averaging about 5 of ages 0–9; 2 of ages 10–14; 9 of ages 15–44; and 4 of ages over 45).[8] These groups were somewhat parallel to chimpanzee groups, although humans walked long distances and formed wider networks of friends. Individuals communicated by visual signs, eye contact, and vocalization of syllables in protolanguage; households sustained themselves through foraging and hunting, using fire, stone, bone, and wooden tools.

The model begins as male and female children (ages 10–14), from up to nine neighboring households, gather up to 18 individuals to play as a group. The children leave their households to meet together and play word games for a day at a time.[9] The excitement of the games leads them to meet periodically and build the intricacy of their games. As syntactic language develops within the group, the participants choose at a certain point to tie members formally to the group through an oath of mutual allegiance: the oath, identifying each individual, the group, and the objective of building the game, also serves as a founding example of syntax.[10] As members join this collaborative *we-group*, they thus form an *institution* and organize its activities and norms. Decisions within such institutions are distinctive: they cannot be reduced to the decisions by individuals within the group; group decisions (as in adopting words or syntax) are simpler and more efficiently made than individual decisions (Tuomela 2013).[11]

The youthful group persists and develops details of spoken language. Modeling in terms of 5-year periods (following demographic conventions), I assume that it takes 5 years of work for the first group to create essential elements of syntactic language (and also for an individual to learn the expanding vocabulary and syntax). During the second five-year period, younger children aged 10–14 join the group and the games. In the third period, the next cohort reaching ages 10–14 joins the group; meanwhile, those in the first group, now aged 20–24, assume responsibilities in the household

[7] The term "coevolution," defined by Ehrlich and Raven (1964) as genetic interaction among species, is often extended to interaction among evolutionary processes in a single species, on the initiative of Boyd & Richerson (1985). For clarity in the present study, I do not extend the meaning of "coevolution" and refer simply to "interactions" among biological, cultural, and social evolution.

[8] This age structure is that of zero growth and a life expectation of 22.5 years, as shown in Model South, level 3, in Coale and Demeny (1983).

[9] I believe that that such a scenario was unlikely in the short term yet likely in the long term as a result of human experimentation. For this social situation, I have modeled nine households of 20 persons, each with a habitat of 10 kilometers square. The adolescent gathering thus required participants to walk over 10 kilometers to join it. This model yields a population density of 0.2 persons per square kilometers. Contact the author for more details on this model.

[10] That is, the oath contains subject, verb, and object. In contrast, these same youths might also have formed various informal networks for hunting or play, in which each individual pursued only individual interest.

[11] Issues of kinship might have arisen among group members at this early stage; kinship is noted in section 4 below.

yet still speak the new language with the younger people. After 15 years, there are nearly 50 speaking children and adults; further, an additional 20 children below age 10 are learning to speak, through instruction by the elder children. The community of speaking persons is already much larger than each of the 20-person households from which they come. The speaking community remains dispersed in households but gathers periodically. Institutions of community identity and ritual are established to solidify and sustain the community; these institutions facilitate energetic teaching and spreading of speech, mostly to non-speaking children but also adults.

By the end of the second 15 years, the oldest speakers are 35–39 years of age; the total speaking population is nearly 100, apportioned among nine households for which almost all of those below age 40 are speakers, while those older do not speak. This speaking community is thus a clear majority of the 180 persons in the nine households from which spoken language emerged. By year 45, the oldest speakers are nearly 60; the growth of the speaking community slows except for the arrival of immigrants. Once the population of the initial speaking community grows past 150, it reaches a point where a division into two communities becomes inevitable. That is, while the needs of language arguably set a minimum of 150 on the size of a persistent speaking community, the complexities of logistics and social interaction set a maximum of 150 on social and ritual communities (Dunbar and Sosis 2018).[12] The initial split, as early as years 30–45, was arguably traumatic: it severed social relations and it required a reorganization and strengthening of the institutions of community and ritual. A subsequent split at about year 60, in contrast, could have been seen as an understandable experience, part of the growth of speaking communities. With these divergences, language began to diverge in the now-separate communities.[13]

Yet the expansion of the initial speech community was relatively slow since it was limited by the participation of the initially involved households. An additional mechanism was necessary for spoken language to spread more widely: a process of migration. Capability for this process emerged as early as years 30–45, once there were at least two language communities and significant numbers of adult speakers. Two types of cross-community migration were feasible: in-migrants could join the initial speech community and out-migrants could leave the initial community. I argue that both were necessary, otherwise language would never have spread. In-migration brought in new language-learners, either recruited or volunteering; if they were young enough, they would be able to learn to speak. As speaking communities grew in size and influence, they attracted or seized growing numbers of in-migrants. Perhaps more significantly, out-migration from the initial community provoked gradual development of new communities. Out-migrants could begin teaching speech to youths in areas where they settled, launching processes requiring some 30 years for language to become widespread within each new community. The language of those communities, further, would diverge from the original language.

The processes of the first sixty years, as modeled here, facilitated spread of spoken language through the age structure, through consolidation of individual communities, and through creation of new speaking communities in neighboring regions, initiated by migration. At 60 years, the total speaking population might have reached 800, including four fully developed communities of 150 each and perhaps another four incipient communities of 50 each. The segmentation of a large language community into two smaller groups involved some migration by members of at least one of the new groups. Assuming zero growth in total population, the population of speakers would increase at 3% per year under these conditions. At this rate, the speaking population might reach 10,000 in just over 300 years.

*Formalizing the logic of social selection.* This is the part of the analysis with the most explicit parallels to the natural selection of Darwin (1859). Speaking communities and groups unified by collective intentionality provide the basis for what I propose to call 'institutional evolution', in which existing institutions survived and new institutions formed,

[12] Groups smaller than 150 could sustain language if members had been socialized into speaking as infants. Populations well under 150, after some generations, would lose parts of their lexicon and eventually their syntax.

[13] One could argue that it would be difficult for syntactic language to develop as rapidly as I have proposed here. I maintain this model, however, assuming that it was necessary for syntactic language to generate important advances in communication within fifteen years, or the project would have collapsed for lack of social interest. That is, a different demographic-social model would be necessary to fit with a hypothesis of slower development in syntactic speech.

creating a growing diversity of institutional forms within the human social order. Institutional change was governed by three social-evolutionary processes. I have chosen the speaking community as the unit of evolutionary study, where Darwin (1859: 145) chose the individual organism: the structure of the social institution (generally within the community but coterminous with it in the case of language) is the object and agent of evolutionary change, thus parallel to the genome in Darwinian analysis.

Within this structure, I propose parallels to the Darwinian triad of variation, inheritance, and natural selection, and I propose a measure of the fitness of the community as it is influenced by each social institution—I thus draw as well on Donald T. Campbell's notion of 'blind variation and systematic selective retention' (Campbell 1975: 1104; Manning 2020b: 118–122). Treating each of the triad in turn, I begin with *variation* through representation: here, spoken language allows detailed communication both in speaking and hearing, bringing representation of innovative ideas to each individual and more ideas through collaboration. Such representation led to ideas for new social institutions and their objectives. Institutions then formed through the assembly of relevant groups. On reproduction and *inheritance*, once institutions were created (with their members, objectives, and tasks), they would need to be reproduced at least once a generation to replace departed original members. The steps in reproduction, relying on participants in the institution, were the creation of a memory-archive with details of the institution; a process for sustaining the memory-archive over time; and a process for reproducing the institution itself.

The process of *social selection* poses a test that each institution must survive. Social selection is a mix of feedback processes—at three levels—providing feedback at multiple scales to the archive, thus determining whether the institution will survive.[14] The three levels of feedback are: (a) exogenous environmental factors, bringing benefit or harm to the human social order as they interact with each social innovation; (b) at an endogenous and unconscious level, innovations that are inconsistent with the prevailing structures of the social order are not selected; (c) the conscious contribution to social selection by human agents. Where Darwin chose the numbers of an organism's offspring as the criterion for the *fitness* of a phenotypical change, I propose the criterion for the *social fitness* of an institution to be the change in social welfare it brings to a beneficiary population and the overall community.[15] Nevertheless, the latter entails a core ambiguity: there may be debate over the nature of social welfare or debate over who should benefit from each institution. Such ideological debates must be resolved for an institution to be selected, as with regulation by consensus.

After perhaps 10 generations or 300 years of existence, speaking communities would have spread widely. From the first, this system of social evolution depended centrally on incorporating new members—first by recruitment and only later by birth. Networks were therefore central to the success of the system, as they linked those within the community but also opened ties to those outside the community.

## 4 The Pleistocene Epoch: Institutions and Societal Change

The processes of institutional evolution fueled human expansion across Africa and Asia for the remaining 50 or more centuries of the Pleistocene, creating a growing diversity of institutional forms, in many different habitats, encompassed by networks of communication. This section reviews the institutions of the Pleistocene, then identifies the effects of networked connection, evolutionary interaction, niche formation, and environmental impact on the expanding human

[14] Natural selection, similarly, is a multi-layered process: an innovation may fail to be selected if it is dysfunctional at the molecular level, unsuccessful at the phenotypical level, or rendered valueless by exogenous environmental changes.

[15] While the demographic expansion of a community (through birth or migration) is a central measure of community success, other factors are also central, so that I choose the broader term 'social welfare' as the measure of community fitness with regard to a given social institution. Individuals within the community may have contending perspectives on the social priorities of an institution, for instance if its benefits are reserved for some and not others (Manning 2020a, 46–48).

order (Manning 20201: 62  06). These additional types of processes accompanied the rise of syntactic language and collective intentionality, with implications at varying scales.

*Institutions.* These collaborative groups—with specific tasks—were both large and small. They varied according to the specifics of their task and membership, but all followed the general rules of institutional evolution. Those rules included the innovative acts of representation, in which individuals and groups modeled and labeled the social, natural, and supernatural worlds; then the formation and reproduction of institutions to carry out tasks deemed necessary; and the experience of social selection, including modification or elimination of institutions that were deemed through social discourse to no longer be of value. While I identify a general logic of institutional evolution, I also emphasize that each institution had its own dynamics, including a process for its reproduction and a characteristic timeframe.

Languages and the communities and community rituals of speakers were the largest and most persistent early institutions. I assume that they maintained an average of about 150 members per language community until late in the Pleistocene, although there may have been 'confederations' of two or three communities (Manning 2020a: 91) that formed during and after the Glacial Maximum, as sharp ecological change drove people to seek more productive habitat and mutual support. The dynamics of syntactic language required years of learning as a condition for entry. The changes in syntax and vocabulary resulted from the inherent character of language exchange, by unconscious change and consensus rather than by explicit decision. Community identity was sustained by oaths of allegiance and by custom; the institution of ritual required leaders or choreographers to design the practices.

In addition, small institutions formed once multiple language communities had become established. Cross-community migration, marriage agreements, and workshops were such small institutions; many persisted only for a single generation though they could be renewed. Cross-community migration (Manning 2006) required collective intentionality of small numbers of individuals for the dispatch of out-migrants to other communities and for the integration of in-migrants into the home community. The formalization of marriage to link households together in the mating of spouses required agreement by authoritative figures in each household on responsibilities that would last for the duration of the marriage. Kin groups could also form: Since spoken language allowed the classification of individuals and familial groups, there was a logical option of creating various types of family organization, in addition to bilateral kinship.[16]

Both cross-community migration and marriage agreements increased the social and genetic diversity of communities, spreading knowledge as well as limiting genetic drift. These exchanges of people among communities were types of migration at least as important as the colonization of empty lands. Incorporating new members and teaching them to speak may have been peaceful but may also have been hierarchical. In addition, long-distance migrations took place in Africa, in Eurasia, and to the Americas, including both maritime and terrestrial migration: they may be documented through genomic, linguistic, and archaeological data.

Workshops took form as small institutions headed by an expert master with apprentices in support, performing the labor of creating material goods, artistic representations, and developing philosophical or religious ideas. Work in material culture included stone tools, containers, clothing (requiring needles and awls), bow and arrow (Africa), atlatl (Asia), and watercraft. Technical changes of the era included expanded creation of permanent shelters and an expansion in artisanal and artistic production. Workshops in expressive and reflective culture included visual art, personal decoration, and classification of the social, natural, and supernatural worlds.[17]

*Networks. Informal networks* are I-groups of speaking humans that spring up among friends or through exchanges or encounters within or across communities (Christakis 2019: 241–244; McLean 2017: 65–83). As communities and their institutions became more widespread, informal networks of various scales arose at their interstices. These informal

[16] For instance, on birth classes, tetradic and matrilineal kinship, see the contributions in Allen et al. (2008).

[17] For a cave painting of 40,000 years ago in Borneo, created most likely by a workshop, see Aubert et al. (2018).

groups, while not decision-making units, facilitated exchange, linking institutions and communities to each other. A network might also reach across community lines in the case of those exploring possible marriage links but not yet in formal collaboration. Further, through linkage by individual movements, there came to be networks of communities. As these instances suggest, the patterns of network or I-group activity, while informal, need to be characterized at multiple levels in a way that is parallel to the study of institutions.

This reasoning permits conceptualization of the Human System as a network or field of interactions at multiple scales. It was not simply the sum of the networks at the largest scale: it included all the levels of networks and institutions. The Human System relied on links—expressed in syntactic language—among individuals, I-groups, and we-groups, exchanging information and exchanging material goods (Manning 2020a: 52–57). In addition, networks provided a basis for contact with non-speaking humans. The result yielded the exchange of ideas, material goods, and migrants, resulting in broad transmission of material culture and an awareness of human commonality.

*Evolutionary interaction.* Interactions among the evolutionary processes of biological, cultural, and social evolution unfolded recurrently. For social-cultural evolution, such interaction took place right away. Households, which had developed through biological evolution and which were reshaped by the rise of cultural evolution, came into interaction with the newly formed speaking communities.[18] Specifically, the teaching of speech moved from its initial locus in adolescent sharing to the household, so that the process of learning language moved from play among adolescent groups to socialization of infants within households. In the opposite direction, the expanding speaking community drew some of its norms from the existing norms of households. For social-biological interactions, changes took place more slowly. One well-known change in human biology that can be identified as the result of social-biological interaction is lactose tolerance. As Holocene-era humans made the social change to milking domestic animals and adult consumption of milk, adult lactose tolerance developed among some humans through natural selection.

*Environmental influences*. Environmental change brought variation in human bodies through natural selection. Most clearly documented is the issue of skin color. As migrating humans experienced regional variations in insolation, the eventual result was change in melanin levels, a natural-selection result of the variations in B-vitamins and folate production, which affected the fertility of both males and females (Jablonski 2017). In a second example, malaria expanded among humans as a result of population growth in regions infested by the malaria vector; in response, natural selection brought expanded incidence of cycle-cells in hemoglobin, protecting many from the disease. Height and other aspects of human physiques were also affected by environmental differences encountered by migrants; the precise mechanisms are still under study.

## 5 Evaluating the Theory of Origin and Expansion

The theory introduced here, more deductive rather than inductive, must ultimately be validated or refuted with empirical data and broader theory. I propose three types of steps in evaluation: gathering empirical data that may be relevant to implications of the theory; modeling the social dynamics at both intimate scales and macro scales, detail; and testing to reconcile available data with specific implications of the models. It is unlikely that there will be one master model of the whole process of institutional evolution; there will need to be analyses of various sub-issues plus a process for overall assessment. A general review should determine the confirmation and rejection of various theses, perhaps supporting the overall vision of institutional evolution through spoken language, perhaps proposing revised hypotheses., and assessing the results through relevant tests.

*Gathering empirical data.* Data collection will rely on a cross-disciplinary survey of available data, focusing on possible implications of the theory. Of course, limits on resources may slow or even prevent the collection of comprehensive data, but a careful research design will yield priorities on the data to be collected in each discipline. I believe that data

[18] The field of cultural evolution, while it has emphasized the general expansion of collaboration under dual-inheritance analysis, has scarcely analyzed how the new dynamic changed household patterns in *H. sapiens.*

collection should take place with attention to three spatio-temporal arenas: 1) the period before 70,000 years ago in Africa, the era of cultural evolution for *Homo sapiens*; 2) 70,000–60,000 years ago in northeast Africa, the proposed time and place of the emergence of speaking communities; and 3) 60,000–10,000 years ago throughout Africa, Eurasia, Sahul, and the Americas, the expanded habitat of speaking *Homo sapiens*. Data can be gathered and analyzed for each discipline listed here, to give direct and indirect information on the size, location, migration, and structure of human communities.

- Environmental studies. Climatic evidence, on temperature and humidity by time and place for all of the regions in which humans lived, to clarify levels of habitability.
- Genetics. Evidence on human genomes (mtDNA, Y Chromosome, somatic, whole-genome), with sampling and analysis designed to give the clearest possible results on the period 70,000–10,000 years ago, and with attention to techniques for determining genetic characteristics and migration by time and place.
- Archaeology. Selecting sites to give maximal attention to northeast Africa, 100,000 to 50,000 years ago, and also along paths of migration in Africa and beyond, seeking evidence on group sizes, technical change, and representation. Analysis of *Homo sapiens* populations throughout Africa as well as Neanderthal and Denisovan populations.
- Linguistics. While many historical linguists are reluctant to interpret the history of language groups before 10,000 years ago, the theory of institutional evolution sets a priority on developing interpretations of earlier times. At best, information on the distribution of language groups gives information on the trajectory of migrants well before 10,000 years ago.[19] Valuable data may be located and created through language classification, a search for proto-Human vocabulary, and linkage to genetic data on migration. New efforts at glottochronology may be pressed back to times earlier than 10,000 years ago.
- Cultural anthropology. Study of material remains, including visual art (Clottes 2016), clothing, and skin decoration. Study of expressive and reflective culture through analysis of religion (Boyer 2018, Rossano 2010), transmission of myths (Witzel 2012), philosophy and rhetoric.

*Modeling dynamics at intimate scales.* Models of social dynamics are required at the intimate scales of household, informal and formal groups, and communities. To construct such models and analyze their behavior, one must specify the environment, structure, and dynamics of the situations under analysis, as well as the perspective of the analyst. While Darwin's initial formulation of natural selection in biology (1859) involved a very informal sort of modeling, scholars in cultural evolution relied on detailed and formal modeling in their early work (Boyd and Richerson 1985; Cavalli-Sforza and Feldman 1981); the success of the latter ventures suggests that detailed modeling is appropriate for social evolution as well. Some of this modeling will lead to testable assertions.

- Creation of articulate speech. Explore the demographic, social, and geographic feasibility of the model of the children's language game, the modeling of human family distribution, and rise of language groups.
- Teaching speech. Model the processes of teaching speech, including the age of teachers and students, the social situation, and the limits on individual learning. Varying parameters would yield different rates of expansion of speaking populations.
- Group behavior and group size for formal institutions and informal networks. Since language communities are assumed to have been dispersed over a region of several hundred square kilometers rather than concentrated at localized sites, it is difficult to seek archaeological remains of such groups. One might hope to find sites of recurring gatherings of whole communities. One may seek archaeological implications in the theorization of groups by Aiello and Dunbar (1993) and Dunbar and Sosis (2018).
- Cross-community migration. Early migration of speaking humans is assumed to have taken place through migration among speaking communities, absorption of non-speakers, and settlement in unoccupied lands:

[19] Such is the case especially for Amerind and Na-Dene languages and for Australian. At worst, successive migrations have overlaid earlier languages, confusing the earlier picture: the regions of the Caucasus, western Asia, South Asia, Sunda, and Europe are examples. In between, substantial portions of very early language groups appear to survive for the four African language phyla (Khoisan, Nilo-Saharan, Afroasiatic, and Niger-Congo) and for Indo-Pacific, Trans-Himalayan, and Eurasiatic (Manning 2020c).

each process should be modeled in detail. Models should match data on the rapidity of human spread and on interbreeding with other populations (Manning 2006).

- Representation. Model the choices of individuals and groups of early speakers as they created representations of social structure, the natural world, the supernatural world, and the priorities of their society. These may include practices in representation of material culture (technology); of expressive culture (dance, song, dress, rhetoric); and reflective culture (religion, philosophy).

*Modeling at macro scales.* At the levels of multi-community or species-level dynamics, one can propose structures and patterns that can be linked to data, perhaps yielding macro-level patterns in human behavior.

- Long-distance migration. Model demographic and ecological processes of migratory streams: tropical migration within Africa; migration by land and sea from Africa to Sahul; migration from tropical to temperate environments; and earlier emigration from Africa to the Levant, c. 100,000 years ago.
- Diffusion of technology. Model patterns of movement, within and among niches, of weapons (bow and arrow, atlatl), watercraft, sewing and weaving, shelter construction, and adoption of dogs.
- Language patterns and distribution. Available data on language classification can be modeled to project homelands of ancestral languages and trajectories of language-group migration, though this process yields only relative not absolute dates (Manning 2020c).
- Cultural and biological evolution. For the period after the emergence of social evolution, the processes of cultural and biological evolution should be modeled for their autonomous changes and for their interaction with social evolution (Henrich 2015).

*Testing and evaluation of research results.* Because the problem at hand is complex and with little direct evidence, the development of a detailed evaluation scheme will probably have to wait until empirical and analytical research have progressed from the present level. Still, the above categories of investigation have substantial independence from one another, which minimizes the possibility of a spurious uniformity of results. For an overall assessment, if results of these analyses were to show contemporaneous population movements outward from northeast Africa, technical changes and exchanges accompanying these migrations, linguistic evidence pointing toward a single origin of language, evidence for expanded size of human groups, and changes in aspects of cultural evolution that fit these processes – then one would tend to give support to the hypothesis of rapid rise of syntactic language and collective intentionality. If the evidence on each of these points were weak, the most obvious alternative would be a null hypothesis of gradual rather than rapid change in language and social groups. Such a result would not be satisfying if it remained at this vague level: it would put strong pressure on analysts to develop a detailed mechanism showing how syntax could emerge gradually. Alternatively, it is conceivable that the evidence might support rapid change in the social order through some different process.

## 6 Conclusion

Analysis of human evolution has advanced impressively in recent decades. These advances are reflected in individual research reports and in research overviews, both in the biological-cultural and social-evolution camps of human evolutionary studies. But there is not yet an overall evolutionary discourse linked to research projects. In particular, while syntactic language and group behavior are commonly referenced as important elements in the rise of the human social order, both are commonly taken for granted in practice

It is argued here that the combination of language and group behavior formed a central nexus in the rise of the human social order—they were central to the expansion of *Homo sapiens* worldwide, to human technical and representational innovations of the late Pleistocene, and to the social networks that spread new practices worldwide. It is proposed that the devotion of substantial energy to the theory and research design proposed here would clarify the roles of syntactic language and collective intentionality in human evolution and would lead to broader linkage of research efforts addressing human evolution through these studies. Still, it is noteworthy that, in exploring the changes in language and group behavior, researchers do not have access to a treasure-trove of new data, as was the case when genomic

evidence became available from the 1980s. Instead, it will be necessary to assemble small bits of information from many disciplines on wide-ranging issues to permit the articulation and testing of a theory linking local and global change. To link the bits of information, an active program of communication among scholars would seem essential.

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**INSPIRATION FOR THIS ESSAY:**

## Donald Campbell, "Blind Variation and Selective Retention"

Donald T. Campbell, "On the Conflicts Between Biological and Social Evolution and Between Psychology and Moral Tradition," *American Psychologist* (December 1975): 1103–1126.

My own fascination with evolutionary theory is centered around the general model for adaptive processes illustrated in natural selection. I date this fascination to my reading Ashby's *Design for a Brain* in 1952 (Campbell, 1956a) in which the formal analogy between natural selection and trial-and-error learning is made clear. Since then I've traced this point back to Baldwin (1900) and many others, and indeed have discovered it very clearly states in my notes from Egon Brunswik's lectures of 1939, attributed to Karl Bühler. I have come to the conclusion that this model—which I summarize as "blind-variation-and-selective-retention"—is the only and all-purpose explanation for the achievement of fit between systems and for the achievement and maintenance of counterentropic form and order. . . .

When we look at the three basic requirements (variation, selection, and retention), the first, *variation*, seems unproblematic in the case of social evolution. There has no doubt always been a sufficient raw dross of both haphazard and "intelligent" variations on the social tradition to provide the "mutations" or "trials" the process requires, imperfect transmissions of the tradition being only one source. *Selective* systems are another matter. The social-evolutionary sequences in human tool and weapon development probably provide the most convincing evidence of continual progress in social evolution. For such developmental sequences, the selective systems involved in individual learning may be adequate without invoking any social or group-level selective process. . . .

The third essential, *retention and duplication*, is also more problematic for social evolution than for biological. What are required are mechanisms for loyally reproducing the selected variations. . . . No such exquisitely rigid conservation machinery [as the genetic code] is recognizable for social evolution. Yet, through social mechanisms of child socialization, reward and punishment, socially restricted learning opportunities, identification imitation, emulation, indoctrination into tribal ideologies, language and linguistic meaning systems, and the like, it seems reasonable to me that sufficient retention machinery exists for a social evolution of adaptive social belief systems and organizational principles to have taken place . . . .

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**INSPIRATION FOR THIS ESSAY:**

# Maynard Smith and Szathmáry, "Origin of Language"

John Maynard Smith and Eörs Szathmáry, *The Major Transitions in Evolution* (Oxford: Oxford University Press, 1995), 303–306, 308–309.

**Protolanguage**

Language does not fossilize. There are, nevertheless, four sources that may indicate what primitive language was like: ape languages, early child language, language of 'Caspar Hauser' children[20] and pidgin languages. We discuss them in turn.

Consider the following utterances, from two different sources:

> Big train; Red book.
> Adam checker; Mommy lunch.
> Walk street; Go store.
> Adam put; Eve read.
> Put book; Hit ball.
>
> Drink red; Comb black.
> Clothes Mrs G; You hat.
> Go in; Look out.
> Roger ticket; You drink.
> Tickle Washoe; Open blanket.

Although remarkably similar, [the first] is from children at the two-word stage, and [the second] is from the chimpanzee Washoe (Gardner & Gardner, 1973). They illustrate the following types of utterance: the attribution of qualities to objects; the possession of non-living objects by living beings; the location of actions; the relation of agents and patients to actions. The two sets are formally identical.

In both apes and in children under two, one-word utterances dominate. There are no grammatical items and no trace of structure. The only real difference between [the two] is that children seem to categorize for categorization's sake, whereas apes talk only about objects they want or actions they want to perform or have performed: children have a greater curiosity about the environment. . . .

The crucial differences between the various forms of protolanguage and true language are as follows:

- Word order in protolanguage has nothing to do with syntax.
- In ordinary language, null elements indicate the points in sentences where we can infer that some constituent is notionally present. In protolanguage, any element may be missing from any position in an unpredictable way.
- Phrase structure is almost completely absent. The few apparent exceptions may have been rote-learned, such as lexical items and idioms.
- There are few, if any, grammatical items.

[20] Editor's note: Caspar Hauser, a young German person of the 1820s, was believed to have been isolated from speech as a child.

**From Protolanguage to Language**

Before discussing the evolutionary transition from protolanguage to language, we will describe a comparable transition that can occur in a single generation. This is the transition from pidgin to creole (Bickerton, 1983). The latter is a transformed pidgin, created by children when learning pidgin from adults. Children from Hawaiian pidgin-speaking parents utter sentences such as:

> Then wen go up there early in the morning—go plant

('They went up there early in the morning to plant (crops).') . . .

Creole languages arose when children of immigrants were not exposed to any normal natural language, but to pidgin only. . . . Whereas almost everyone speaks his or her own pidgin, the rules of Creole are uniform from speaker to speaker. One might expect that the grammar comes either overwhelmingly from one source language, or that it is a mixture derived from all the available source languages, but that is not so. Hawaiian Creole differs from Chinese, Hawaiian, Korean, Portuguese, Spanish, or the Philippine languages. . . .

Creole languages have arisen repeatedly in various parts of the world, with widely different vocabularies, but with a surprisingly similar grammatical structure. One characteristic feature of Creoles (and, as it happens, Hungarian) is that they permit the double negative, 'I don't want no cabbage'. A second common feature (also shared by Hungarian) is to distinguish statements and questions by intonation alone. . . .

**Conclusions**

The timing of the origin of language is more difficult to determine. However, the dramatic increase in technical inventiveness during the past 40 000 years, discussed in the last chapter, is most readily explained if the final stages in linguistic competence emerged at that time. Humans differ from apes not only in grammatical competence . . . but also in the ability to produce and perceive sounds. One difficulty in teaching apes to talk arises because they cannot make all the sounds used in human speech. Human evolution required both anatomical changes, and improvements in the brain mechanisms concerned with sound production and perception (Lieberman, 1989). Anatomically, the descent of the larynx in humans has increased the range of sounds we can make, at the cost of increasing the chance of choking when we eat or drink. It would be helpful if we could date this change from the fossil record, but anatomists are divided as to how far this is possible: unfortunately, the hyoid cartilage, which would provide the information, rarely fossilizes.

The changes in brain mechanisms are equally important. Although input is in principle a continuous variable, we unconsciously classify incoming speech sounds into discrete categories: in other words, we treat the input as digital. We are able to produce and to perceive sound 'segments' (roughly equivalent to the letters of the alphabet) at the astonishingly high rate of 25 per second. This rapid transmission is necessary: without, we would forget the beginning of a sentence before reaching the end.

The emergence of human language, then, required changes in anatomy, in motor control, in sound perception, an in grammatical competence. These changes could not have been instantaneous but may well have been rapid. They must have predated the dispersal of *Homo sapiens* throughout the world, most probably from Africa, because all existing human populations are alike in these respects Subject to this constraint, the events may have been fairly recent.