

ABSTRACT

TOWARDS EMERGENT SOCIAL COMPLEXITY

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Complexity science often uses generative models to study and explain the emergent behavior of humans, human culture, and human patterns of social organization. In spite of this, little is known about how the lowest levels of human social organization came into being. That is, little is known about how the earliest members of our hominini tribe transitioned from being presumably small-groups of ape-like polygamous/ promiscuous individuals (beginning perhaps as early as *Ardipithecus* or *Australopithecus* after the time of the *Pan-Homo* split in the late Pliocene to early Pleistocene eras) into family units having stable breeding-bonds, extended families, and clans. What were the causal mechanisms (biological, possibly cognitive, social, and environmental, etc.) that were responsible for the conversion? To confound the issue, it is also possible the conversion process itself was a complex system replete with input sensitivities and path dependencies, i.e., a nested complex system. These processes and their distinctive social arrangements may be referred to favorably (as one notable anthropologist has called them) as, “the deep structure of society.” This dissertation describes applied research that used discrete event computer modeling techniques in an attempt to model-then-understand a few of the underlying social, environmental, and biological systems present at the root of human sociality; at the root of social complexity.

What will be revealed here is that even beneath the least levels of complex social organization some degree of true, non-reciprocal, non-kin-based social altruism may be necessary before any of the higher levels can emerge. It may be that such “true” altruism is, perhaps, a necessary foundation to

the social structures and complex social organizations that are typically believed to derive from stable households and reciprocal exogamy. In the end new work will be suggested that could extend the current work. That work might involve adding specific cognitive features for extra-social behaviors common to the highest-primates. Those behaviors might include territoriality and patrilocality. And, it is hoped that in the future someone will be able to extend the results of the current work and realize through it a fuller computational social science, an instance of a richer artificial sociality, and demonstrate a plausible model explaining the proximal and ultimate bases of reciprocal exogamy, collective intelligence, and complex social organization.