Philosophical Questions and Biological Findings

with Marcia Pally, "Philosophical Questions and Biological Findings, Part I: Human Cooperativity, Competition, and Aggression"; and Marcia Pally, "Philosophical Questions and Biological Findings, Part II: Play, Art, Ritual, and Ritual Sacrifice."

PHILOSOPHICAL QUESTIONS AND BIOLOGICAL FINDINGS, PART I: HUMAN COOPERATIVITY, COMPETITION, AND AGGRESSION

by Marcia Pally

Abstract. This first part of a two-part article illustrates how research in evolutionary biology and psychology illuminates questions arising in philosophy—specifically questions about the origins of severe, systemic aggression that arise in the mimetic theory of René Girard. Part I looks at: (i) how old the systemic practice of severe aggression is, (ii) how much results from humanity's mimetic/social and competitive nature and how much from ecological, resource, and cultural conditions, and (iii) if ecological and cultural conditions are important, might we adapt them toward greater cooperativity today? After briefly reviewing mimetic theory, the article looks at evolutionary psychology and biology, including fossil and archeological evidence. Findings suggest that severe, *systemic* aggression might be relatively recent and that its occurrence depends on ecological/resource/socioeconomic conditions additional to our mimetic/social nature. Thus, distinguishing the conditions that prod aggression from those that support pro-social behavior might aid us in structuring society today.

Keywords: archaic societies; cooperativity; René Girard; human aggression; hunter-gatherer society; mimetic theory

Introduction: Just How Aggressive Are We?

When the French philosopher René Girard said that human competitive violence is as old as the biblical Cain, he likely did not mean to launch a new debate about when precisely that moment was. But his views on

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human competition and violence have done something like that and may serve as a prologue for this article, which hopes to illustrate how questions arising in philosophy and theology are enriched by research in evolutionary biology, anthropology, psychology, and archeology. In turn, philosophy and theology also enrich questions in the physical sciences. But this article attends to the contribution these physical sciences make to philosophical and theological propositions in Girard's work. It does not compare Girard's *sociophilosophical* argument with Darwinian or other *biological* descriptions of human aggression to determine which has greater explanatory or predictive power. Rather, given the influence of Girard's work in the humanities and social sciences, it explores how this work may be illuminated by research in the physical sciences.

In Part I of this two-part article, I will briefly sketch the central points of Girard's mimetic theory and then explore how these physical sciences enhance his discussion of the origins of human aggression especially within the primary group. What conditions bring it about? In Part II, I will explore how these sciences illuminate his companion theory of ritual sacrifice. Girard held that ritual sacrifice—especially of human victims—emerged as a steam valve for accumulating aggressions within the primary group. What does biology, archeology, and our understanding of theater and ritual tell us about Girard's approach?

To begin with Girardian theory, which seeks to understand the origins and tenacity of human aggression: Its first premise is humanity's foundational social nature. As we live in groups, we are acculturated by our milieu and internalize its values such that many people in society value similar things, both those needed for physical survival and those that acquire cultural importance. Biologists identify a similar pattern among other primates: "an individual displays a particular behaviour because it is the most frequent the individual witnessed in others" (Perry 2009, 706). Reasons for repeating the behavior we observe include benefitting from reliable, tested information (Claidière and Whiten 2012), reinforcement of social bonds (Whiten et al. 2005), and, if a behavior is socially normative, fear of punishment. To describe the process he called "mimesis," Girard wrote, "Our neighbor is the model for our desire" (Girard 2001, 10). For discourse clarity, this "mimesis" differs from "mimicry" as biologists use it (meaning one species resembling another) and from biological "mimesis" (resembling a background for camouflage purposes, for instance).

Girard further holds that, as we desire what our neighbors desire, we find ourselves in competition with them, in "conflictual mimesis" (Girard 1977, 187). From this comes an antagonistic view of one's neighbors and potentially society-rending tensions. "The principal source of violence between human beings," Girard concludes, "is mimetic rivalry" (2001, 11).

Thus, mimetic theory can be understood as *linking* mimesis, competition, and aggression. The condition of desiring what one's neighbors

desire yields a certain amount of competition and thus strife. As in mimetic theory this mimesis/shared-desire is an unavoidable feature of our societal living, so too is competitive aggression—that is, until we learn not to take from each other but to give. Donation, on Girard's view, is the great teaching of the cross, where Jesus, having given years of his life to aid and teach humanity, gives life itself for humanity's sake. The difference between donation for others and taking from them or killing for one's own benefit is the central lesson of the cross for the human condition.

Girard illustrated his ideas with historical and literary examples dating back to what he called the "archaic," the agrarian societies with tribal clusters and cities beginning roughly 4,000 B.C.E. and ending with the Greco-Roman period. This epoch was indeed one of strife, which we may use as a functional definition of severe, systemic aggression: endemic raiding and warfare, the enslavement of captive populations, and the subjection of domestic populations to severe injury, maiming, torture, capital punishment, harsh imprisonment, continued resource deprivation (impoverishment), forced labor (servitude, enslavement), conspecific killing (within-species), and rituals involving human sacrifice or exile.

Girard's focus on the archaic prods the question of what human life was like before, during the long period of hunter gathering beginning with the first "modern" *H. sapiens* roughly 200,000 B.C.E. until the advent of fully sedentary agriculture around 8,500 B.C.E. in the Mesopotamian basin, Mediterranean lands, and parts of Africa. (A sedentary, agricultural society is distinguished from transition economies with occasional planting that supplements mobile foraging.) This extended hunter-gatherer period included certain forms of aggression, but were they similarly severe and systemic in nature to the later archaic? If so, one might surmise from mimetic theory that these severe aggressions—not the capacity for them but their systemic implementation—are part of what Darcia Narvaez calls our "baseline" (2014, 438). That is, mimesis/shared-desires were sufficient to prod such aggression throughout the hunter-gatherer period. Mimesis, competition, and severe, systemic aggression remain linked. ("Baseline" is meant in the way that aggression is more prominent in the range of chimpanzee behavior—the chimp "baseline"—than in the range of bonobo behavior, the bonobo "baseline.")

But if the answer is some version of no—if hunter-gatherers were not usually or not frequently systemic perpetrators of severe violence—perhaps mimesis, competition, and aggression are not so linked. Hunter-gatherers may have been mimetic, acculturating to group norms and developing shared desires, but may have practiced less severe, systemic aggression than later agriculturalists. On this reading of mimetic theory, mimesis may be foundational to our social species, but not all instances of mimesis are "conflictual" or lead unavoidably to competition and aggression. Indeed, some mimesis may make a positive contribution to humanity's

social living—not "conflictual" but "positive mimesis." In that case, severe, systemic aggression may not emerge inevitably from humanity's mimetic nature.

Mimesis may thus be understood as a content-neutral form of cultural transmission that teaches both prosocial and aggressive norms. Girard, especially in later life, understood the positive potentials of mimesis as it is the way we learn donative, compassionate behavior. Indeed, it is how we learn compassion from Jesus Christ: "Saint Paul says, 'Be imitators of me, as I am of Christ.' [1 Cor 11:1]… Discerning the right model then becomes the crucial factor… To imitate Christ is to identify with the other, to efface oneself before him: 'Truly I tell you, just as you did it to one of the least of these who are members of my family, you did it to me.' [Mt 25:40]" (2010, 133).

Mimesis then is the means by which human beings learn the best and worst of our repertoire. And the systemic practice of severe aggression then depends on additional factors which inform the outcomes of mimetic transfer—prosocial or aggressive. These factors may change over time, and humanity might have some control over which conditions are supported in our societies. This view bodes a bit better for human behavioral plasticity as it does not lock humanity into a mimesis > competition > aggression inevitability.

Research in evolutionary biology, anthropology, psychology, and archeology has much to illuminate Girard's ideas. To begin, resource shortages were a feature of early human living. A range of behaviors is possible in response, from cooperative sharing to episodic intimidation, raiding, and conspecific killing (intra-species killing). "Cooperation," Peter Kappeler writes, refers to "behaviors that are associated with a disadvantage or cost for the actor and a benefit for the recipient" (Kappeler 2019a, 39). Each response along the range from cooperation to killing may be committed by individuals or groups, within a primary group or between groups.

In looking at this range of response, this article distinguishes between episodic aggression and severe, systemic aggression. The difference between the two makes a good deal of difference to the quality of human life. While behavior from cooperation to episodic killing was likely present among early *H. sapiens*, there is debate over the conditions that gave rise to the severe, systemic aggressions recorded from roughly 8,500 B.C.E. onward, with the advent of agriculture in the early settlements of Mesopotamian basin, Mediterranean lands, and parts of Africa. Two points require clarification. First, there is little debate in biology that conditions and changes in conditions influence human behavior. Indeed, this is one tenet of biological research that may illuminate mimetic theory. Second, other areas of the world are beyond the scope of this investigation both because of its focus on illuminating the "archaic" period of mimetic theory and because each migration of *H. sapiens* and their ancestors has its

distinct pre-history and data sets of fossil and archeological evidence from which theories about aggression may be supported or debunked. This article focuses on those pertaining to the Girardian "archaic."

I will look at two directions of research. One sees aggression, from episodic intimidation to war, as dating back to early *H. sapiens* two to three hundred thousand years ago. Metaphorically, this may be called the "Adam" or "earliest human" position. For instance, Marc Kissel and Nam Kim, in their important literature review, find that "emergent warfare" was part of human capacity as much as three hundred thousand years ago (2019, 157; Majolo 2019, 321).

The second research focus sees less continuous development, with a meaningful increase in severe, *systemic* aggression between groups and importantly within them after roughly 8,500 B.C.E. and the development of agriculture. Matthew Zefferman and Sarah Mathew note the "transition from low-risk, small-scale territorial raiding to high-risk, large-scale warfare," which they hold is culturally prodded. Bonaventura Majolo holds that human development was likely spurred by both cultural and genetic adaptations (2019, 323). This study concurs and adds only those ecological and resource conditions that too influenced the practice of aggression.

While the capacity for aggression may be hundreds of thousands of years old, as Kissel, Kim, and Majolo note, evidence of *occurrence* of severe, systemic aggression before the mid-Holocene is rare (Majolo 2019, 322). Several explanations have been proposed: (i) severe, systemic aggression was prevalent before the mid-Holocene but we have not yet found evidence of it; (ii) severe, systemic aggression gradually increased during the hunter-gatherer period but we have not yet found evidence of the increase; (iii) severe, *systemic* aggression did not occur among hunter-gatherers of the Mesopotamian, Mediterranean, and certain African regions at rates similar to those among later agriculturalists. Proposals (i), (ii), and the "Adam" view of aggression rely on a "preservation bias" argument: severe, systemic aggression occurred earlier in time but evidence is scant because evidence degrades the older it is. This is true and calls for continued innovation in our research tools. A few points are worth noting: first, it is not appropriate in biology to make a positive claim for continued severe, systemic aggression or a gradual increase among hunter-gatherers based on a dearth of evidence. At most, one may say we are unsure. Second, such aggression—by its systemic, ongoing, and repetitive nature—might be expected to leave traces especially close in time to the period in which evidence for such aggression is substantial and where there is little difference in degradation. Thus, it is not easy to explain the lack of evidence for severe, systemic aggression in the time periods just before the advent of agriculture, when there is much evidence for it.

Given this, Zefferman and Mathew write, "The archeological record does not provide much evidence of warfare in Pleistocene forager societies.

Outside of the Gebel Sahaba Paleolithic cemetery in Sudan, dated 10,000–12,000 BC,83 there is no strong evidence of inter-group conflict until the Mesolithic period (approximately 10,000 BC) in Europe and the Near East" (2015, 59). The contested Sahaba evidence is discussed below while Lee Clare et al. date inter-group aggression even more recently, "There is presently no conclusive evidence for inter-group fighting in the early Pre-Pottery Neolithic" (10,000 to 8,800 B.C.E). This period lies immediately prior to the high levels of severe, systemic aggression recorded after the advent of agriculture. Again, while an absence of evidence is not the same as the absence of occurrence, based on the evidence currently available, Clare et al. caution against projecting aggression from later periods onto earlier ones (2019, 101).

In short, if the evidence shows more severe, systemic aggression post-agriculture and less even a short while before, the hypothesis that agriculture contributed to conditions that influenced the practice of aggression may account for present data. At least it may account for it more soundly than the hypothesis that the severity and frequency of aggression were fairly consistent for hundreds of thousands of years—or gradually increased with speculative evidence to account for the increase.

Before continuing, a caveat must be noted here. Several sections below are concerned with the time and conditions under which severe, systemic aggression developed in the human repertoire. Yet, it is also true that aggression may be responsive to conditions regardless of when it emerged, be it long before or concurrent with the development of agriculture. The discussion about timing is included here not so much for its own sake but because it may offer insights about the particular *conditions* that affect aggression. If human aggression became increasingly severe and systemic under agricultural conditions, these conditions may warrant looking at for their contribution to aggression. This information may be useful in structuring the conditions of present-day societies. Below, it is not so much the years at which events occur that is most important but rather the ecological, resource, and sociopolitical conditions—or changes in conditions—of human living.

To sum up so far: working with presently available evidence, the second research focus posits that mimesis and shared desires, as old as the species, are not themselves sufficient conditions for the development of systemic, severe aggression. Hunter-gatherers—95 percent of human development—were mimetic but appear to have engaged in severe aggression less systemically. Other conditions are needed for such aggression to take hold and came into play around 8,500 B.C.E. At least some of these conditions accompanied the emergence of agriculture in the Mesopotamian, Mediterranean, and certain African regions. These include changes in the amount, quality, and organization of resources (land, stored food, livestock), their monopolizability, and resulting hierarchies.

What was the mechanism by which the new agrarian conditions contributed to more severe, systemic aggression? This is addressed in the section below, "Severe, Systemic Aggression in the Human Repertoire." But a quick summary will be useful here: While evolutionary pressures pre-agriculture had yielded episodic aggression where advantageous, they also yielded the substantial intra-group cooperativity and egalitarianism associated with hunter-gatherer life, including communal property and child-rearing and robust fairness/sharing norms. Christopher Boehm describes the emergence of hunter-gatherer egalitarianism so that "over time, the apelike, fear-based, ancestral version of personal self-control would have been augmented, as there appeared some kind of a protoconscience that no other animal was likely to evolve" (2012, 161). However, with agrarianism, the radically new presence of stored goods and their monopolizability incentivized small groups of elite monopolizers—in short, hierarchy emerged. Elites had substantial motive to grab what others possessed and to protect their caches by severe force. Those with less had little to lose in trying to grab more also by force.

Said another way, the issue is not whether early *H. sapiens* were cooperative or aggressive—they were both. Human behavior is "plastic, open equally to both altruistic cooperation and deadly conflict" (Ferguson 2013b, 192). Moreover, some forms of aggression—from "ganging up" on someone to raiding and war—require cooperation among certain individuals against others. The issue is rather when and why episodic aggression *amid* high cooperativity became severe, systemic aggression not only between groups but within the primary group. What changes in ecological, resource, and other conditions account for the change in behavior?

Metaphorically, this may be called the "Cain" hypothesis as it dates the systemic practice of severe aggression not to "Adam," the earliest *H. sapien*, but to "Cain," the agriculturalist, a relatively short ten thousand years ago. The biblical Cain narrative mentions both "the fruits of the soil" and "the firstborn of the flock" (Genesis 4:3-4, NIV), indicating that the narrative occurs when both farming and herding are in practice. As God embraces Abel's offering but rejects Cain's, Cain, now jealous, murders his brother. Here, in this agricultural world is when conspecific killing as a response to competition became a mark of human life. On this "Cain" hypothesis, as severe, systemic aggression did not become prevalent earlier but rather at this moment in human development, conditions need to be identified to account for the new prevalence. These new conditions were *additional to* foundational mimesis/shared desires as these are very old in human evolution yet did not yield severe, *systemic* aggression for 95 percent of it. At least some of these new conditions may be associated with agriculture and herding.

The downside of the "Cain" view is that, since the development of agriculture, we have apparently been living under conditions of resource

monopolization and hierarchy for which we did not evolve (during the many millennia of hunter gathering) and which are at odds with the episodic aggression *amid* robust cooperativity that did evolve during that long period. Little good can come of transgressing cooperative behavior that emerged through long evolutionary selection.

The upside of the "Cain" view is that since we were for 95 percent of our evolution mimetic but systemically cooperative (with episodic aggression), this long cooperative experience might suggest societal conditions that support such robust cooperativity, which we might look at in structuring present society. Our pre-history of cooperativity may also remain with us as a "resource" so to speak from which to construct less aggressive, more cooperative societies today—at least more so than if humanity had never lived in more cooperative, egalitarian ways. This is the subject of Lydia Denworth's illuminating study of friendship (2020). It is interesting that toddlers do not strike out even at stranger children (Kagan 1994, 96), that eighteen-month-olds readily reach out to assist stranger adults (Warneken 2018), and that children as young as three will disobey instructions likely to lead to harming others (DeScioli and Kurzban 2009). Perhaps cooperativity is with us still in spite of popular "selfish gene" models of biology and economics.

In sum, mimetic theory raises several questions that the physical sciences may illuminate: (i) how old is the systemic practice of severe aggression? (ii) How much results from humanity's social/mimetic nature and how much from ecological, resource, or other conditions? (iii) If much hangs on humanity's foundational mimetic nature, then severe, systemic aggression may also appear to be foundational and unavoidable, as some readings of mimetic theory suggest. But if the occurrence of severe, systemic aggression depends on additional conditions, might we use this information to help us structure societal conditions today?

I do not mean to resolve these questions but rather to illustrate the contributions biology, psychology, anthropology, and archeology make to them. As Richard Wrangham has noted, "By combining primatological, paleontological and behavioral-ecological evidence, anthropologists can provide especially rich tests of evolutionary hypotheses" (1999, 26).

The Role of "Mimesis" in Human Cognition and Cooperativity

The "Adam" argument that pre-agriculture types and frequencies of aggression (i) were similar to post-agriculture types and frequencies or (ii) evolved without significant change in conditions into post-agriculture types and frequencies brings with it substantial evidence. In their important overview of the literature, Kissel and Kim write, "we propose that emergent warfare would have been part of a suite of human

behavioral patterns as early as 200–300 kya" (2019, 157). Other overviews of the research include Majolo (2019), Luke Glowacki, Michael Wilson, and Wrangham (2017), Raymond Kelly (2000), Keith Otterbein (2004, 2009), and Wrangham (1999). Important research arguing specifically for the "Adam" view includes, Mark Allen (2014), Samuel Bowles (2009), Azar Gat (2015), Mark Golitko and Lawrence Keeley (2007), Steven LeBlanc (2014), and Steven Pinker (2011). These investigations note the problem of preservation bias, which makes it more difficult to substantiate older incidences of severe aggression even if they occurred since older evidence degrades and may be unusable. Kissel and Kim also discuss the opposing "file drawer" or "publication bias" issue, where articles finding evidence of early aggression are more likely published than articles that find none (2019, 155).

As the "Adam" view is robust, I will assemble a few arguments for the "Cain" position. They too begin with humanity's social nature, our mimetic acculturation, and shared group values. But they uncouple acculturation/mimesis from aggression. They hold first that much competition and aggression in group living begins not with acculturation/mimesis but with the need for "survival" resources such as food, which is not learned from others and would be present even if *H. sapiens* were not a mimetic species. Second and importantly, they hold that mimesis acculturates people toward aggression not inevitably but rather where aggression is already a social practice that can be learned from others. Should a group have different practices, group members will mimetically acculturate toward them. On this view, mimesis/acculturation is a content-neutral mode of cultural transmission, transmitting both aggressive behaviors ("conflictual mimesis") and prosocial conduct ("positive mimesis").

This uncoupling leaves mimesis/acculturation as a foundational feature of human development with a variety of aggressive and cooperative outcomes. Thus, we may ask: what other factors or conditions influence the outcomes that emerge in a given place and point in time?

Mimesis begins with the playful copying and exchange of gestures and facial expression between human infants with long, dependent childhoods and their kin and nonkin caretakers. This exchange, Shaun Gallagher notes, "brings the infant into a direct relation with another person and starts them on a course of social interaction" (2005, 128; see also, 224–225, 244–245). We do not develop alone but within "the larger system of body-environment-intersubjectivity" (Gallagher 2005, 242–243). This extensive back-and-forth yields a "we-centric" or "unified common intersubjective space" (Gallese 2005, 105, 111) with a wide variety of others that even infants know are different from themselves. To mimic and be mimicked is to participate in the world of different others—not an undifferentiated we-space but an I-You space (Reddy 2008, 19–21; Hobson and Hobson 2012, 120–121). Vasudevi Reddy continues, "Being imitated

seems to establish a powerful and immediate statement of interest, connection, and intentional relation… it is *being* imitated which is crucial for intimacy" (2008, 64–65, emphasis original).

In short, "You have to be addressed as a subject to become one" (Reddy 2008, 32). Human cognitive and emotional growth is grounded in this interaction to arrive at what Sarah Hrdy calls "emotional modernity" (Hrdy 2009, 204–206, 282): the capacities to grasp and coordinate with (i) the attention of others, (ii) the intention of others, and (iii) the emotions of others in order to sustain relationships through which one feels safe and learns about the world. Importantly, learning and relating generalize to strangers, a capacity that became critical for communal childcare, as Hrdy (2016), Kristen Hawkes (2014), and Michael Tomasello (2019) note. However advantageous communal childcare was in increasing fecundity, it also required each child to attract the attention of busy, kin and nonkin caretakers, which furthered social interaction.

Tomasello's work on cognitive development (2019) adds that joint attention and intention created the basis for role reversal and recursive thinking. Role reversal entails the understanding, for instance, that if I touch your arm, you touch not your arm but *my* arm. This allows tasks to be separated from actor—it's touching the arm of the *other* that is the task—and to be distributed to various persons. Recursive thinking involves my understanding that you want me to know that you know that I know, and so on. Together, these allow for complex, collaborative endeavors where actions may be assigned to various persons, each knows the other's role and, importantly, trusts that the other will do it. Even before *H. sapiens*, Robert Bellah notes, the *H. erectus* evolved "an entirely new level of social organization beyond anything seen in nonhuman primates" (2011, Kindle Location 2019). Additionally, role-exchange allows children to internally assume the role of the caretaker and so "self-regulate" toward what they know by age three is not just idiosyncratic behavior but normative group practice (Vygotsky [1930] 1978; Vygotsky and Luria [1930] 1993).

"[T]he key novelties in human evolution were…" Tomasello writes, "adaptations for an especially cooperative, indeed hypercooperative, way of life" (2019, Kindle Locations 5521–5522). Playful copying-exchange, as it develops into mimesis/acculturation, bridges otherness. As our "deep enculturation" (Donald 2001, 264), it emerges from and reinforces our hypercooperativity. "It isn't just," Alison Gopnik concludes, "that without mothering, humans would lack nurturance, warmth, and emotional security. They would also lack culture, history, morality, science, and literature" (2009, 15).

In sum, mimesis/acculturation is a foundational contributor to the cognitive development and "hypercooperative way of life" needed for human survival. It does not seem thus far to necessarily yield aggression. The human behavioral suite is broad, and the types and frequencies of behavior

that occur at any given time, be they prosocial or aggressive, appear to depend on conditions additional to mimesis itself.

Evolutionary Biology and Cooperativity

In addition to the arguments from psychology on bonding, cognition, and collaboration, evolutionary biology too uncouples mimesis/acculturation from aggression and allows a substantial role for positive mimesis. Thus, the behaviors transmitted through content-neutral mimesis/acculturation depend on additional societal conditions. The biological research notes that, though hunter-gatherers learned societal values/practices through acculturation, they evolved substantial hypercooperativity and "reciprocal altruism" (Trivers 1971). "Overall," Wrangham writes, "physical aggression in humans happens at less than 1 percent of the frequency among either of our closest ape relatives… we really are a dramatically peaceful species" (2019, 19). Low aggression rates extend to male-on-female aggression, which, Wrangham continues, while "deplorable" among humans, is "low compared with the incidence among our closest animal relatives" (2019, 21).

The evidence for human cooperativity discussed in the sections below is taken mostly from the Pleistocene and Holocene periods rather than from present-day foragers. Where evidence from present-day groups is cited, its limited applicability to human pre-history is noted owing to the caution needed in extrapolating from one to the other (Otterbein 2004; Gat 2015). No foragers today have escaped the influence of the modern world (Ferguson 2006; Haas and Piscitelli 2013) and no group, Kissel and Kim note, is "devoid of direct or indirect impacts of state-level societies" and so "it is difficult to ascertain the effects of globalization and colonialism on these datasets" (Kissel and Kim 2019, 146; see also Whitehead and Fergusson 2000; Majolo 2019, 323).

In the Pleistocene and Holocene, the benefits of cooperativity included improved food gathering, protection from animal predators, and other collaborative projects as well as more equitable resource distribution yielding greater longevity for more people and thus greater chance at reproduction. "Cooperative hunting" Majolo notes, "likely appeared 200,000–400,000 years BP and potentially much earlier, well before the first conclusive evidence of warfare in Homo" (2019, 326). Peter Kappeler et al. add that cooperativity also became an advantage in mating:

> individuals characterised by above-average frequencies of affinity, affiliation and mutual support, which are said to have strong social bonds, enjoy greater reproductive success, higher infant survival and greater longevity, and these effects are independent of dominance rank. (Kappeler et al. 2019; see also, Silk 2007; Schulke and Ostner 2012; Silk, Alberts, and Altmann 2003; Silk et al. 2009)

"Natural selection," Robert Seyfarth and Dorothy Cheney similarly note, "therefore appears to have favored individuals who are motivated to form long-term bonds *per se* not just bonds with kin" (2012, 170). Frans de Waal in turn writes, "We owe our sense of fairness to a long history of mutualistic cooperation" again not just with kin (2014, 71; see also, Bowles and Gintis 2013; Churchland 2012; Brosnan and de Waal 2014; and Silk and House 2011). Good overviews of this material may be found in work by Donald Pfaff (2014), Edward Wilson (2012), de Waal (2014), and Bellah (2011). Interestingly, the hunter-gatherer development toward cooperativity follows John Maynard Smith and Eörs Szathmáry's overall pattern for evolutionary shifts (1995), from the emergence of chromosomes to the emergence of human culture. They find that each entailed a new form of cooperation, interdependence, and communication among individuals, be they cells or animals.

When Pfaff writes that we are "wired for goodwill" (2014, 5), he is not suggesting an absence of competition or episodic aggression among pre-agrarian *H. sapiens*. Rather, he recognizes the evolutionary pressures toward a "sensibility" of cooperativity (Hodge 2019) because cooperativity was in many contexts advantageous especially within primary groups. It's worth recalling that the "Cain/Adam" question is not whether pre-agrarians had the capacity for aggression or whether it ever or episodically occurred. It asks how, from episodic aggression amid robust cooperativity, human aggression came to the severe types and systemic application recorded over the last ten thousand years in the Mesopotamian, Mediterranean, and African regions.

Objections to the "Cain" Argument within the Primary Group

One objection to the "Cain" hypothesis of an increase in severe, systemic aggression under the "new" conditions of agrarianism is that violations of earlier, hunter-gatherer cooperativity necessitated sanctions, such as temporary shaming and earning a "bad reputation" (Alexander 1979). These violations would have been occasional given the predominance of hyper-cooperativity. Yet, throughout the Pleistocene, they could have developed into more severe, systemic aggression requiring the more severe sanctions of imprisonment, torture, exile, or killing—the activities associated with the agrarian "archaic." This argument raises important considerations as it seeks to explain aggression where cooperativity was high, within the primary group. Indeed, the targeting and eviction of individuals under shortage conditions are found also in nonhuman primates (Sterck et al. 1997, 300; de Waal 2005, 167–170). The usual caution, however, should be taken in arguing across species as even closely related species, including those with an ancestor-descendent relationship, evince different types,

severities, and frequencies of aggression dependent on ecological conditions (Thierry et al. 2000).

Another caution in considering the "sanction" argument is that shaming and later, post-agriculture "archaic" sanctions have important differences. Shaming is a sanction targeting a specific offender when that offender has committed a societal wrong. By contrast, the systemic impoverishment, enslavement, beating, maiming, imprisonment, and so on of large sectors of "archaic" domestic populations were not necessarily targeted or linked to wrongdoing but were a normative feature of steeply hierarchical, archaic society. It is not clear that the earlier societal practice developed into the later one without the influence of additional factors. Similarly, shaming and ritual human sacrifice, another practice of the later "archaic," serve opposing ends so here too it is not straightforward to argue that the former developed into the latter. On mimetic theory, scapegoating ritual sacrifice seeks to kill or eject a victim who is innocent and unfairly targeted as the steam-valve for problems it did not cause. Shaming occurs when a group member is not innocent but violates long-standing cooperativity. It seeks both to reinforce cooperation and *re-integrate* the outlier into the community. "The evolutionary advantages of reconciliation," de Waal writes, "are obvious for animals that survive through mutual aid" (2000, 589).

This is not scapegoating but rehabilitation. Importantly, the sanction objection to the "Cain" argument invites the question: under what conditions would occasional violations of hunter-gatherer hypercooperativity develop into severe, frequent violations requiring severe, *systemic* (nontargeted) sanctions? Even if one were to hold that cooperativity violations emerge unavoidably from humanity's mimetic nature as it leads to competition, as may be argued from mimetic theory, this would account for some hunter-gatherer level of cooperativity-violation consistent with their overall hypercooperativity. But it would not account for a *shift* from hypercooperativity with occasional violations to severe, frequent violations requiring severe, systemic sanctions. And it would not account for the brutalization of much of the domestic population that had committed no violations whatsoever, as is found in post-agriculture, "archaic" societies. Such a shift in behavior suggests a change in ecological, resource, or other conditions.

Girard proposed a spontaneous escalation of mimetic competition throughout human development, leading to societal tensions that needed to be dispelled by such means as ritual scapegoating sacrifice, where societal tensions are released through the steam-valve ritual (see, Part II of this article: "Play, Art, Ritual, and Ritual Sacrifice"). This provocative idea invites the question: how would such an escalation emerge in a society whose hypercooperativity and egalitarianism had been evolutionarily selected, successful, and *internalized* by society members for hundreds of thousands of years? Cooperativity violations by one or a few may be

proposed. But we cannot assume that, in a hypercooperative society, these violations did not remain the exception but spontaneously escalated and took over the very nature of society. Moreover, fossil and other archeological evidence of spontaneous escalation is scant, as we'll see below. While this does not prove lack of occurrence, neither can it lend support to an escalation theory.

So we are left with the question: on the escalation argument, what changes in conditions made severe cooperativity violations suddenly worthwhile for individuals to do often enough to require *systemic*, severe sanctions? The question is important as the norm and practice of "mutual aid," de Waal's term, was not a "thin" feature of hunter-gatherer life. It did not consist merely of a "gentlemen's handshake" or "reverse dominance," where each male agreed to not take the other men's food and women as long as they did not take his. Hypercooperativity is foundational to the species and a condition for our cognitive and social development. Thus, to argue that cooperativity violations escalated to severe, systemic agrarian levels, one must identify conditions influential enough to prod the escalation *in the face of* "evolutionarily advantageous" hypercooperativity (de Waal 2000, 589).

Wrangham makes a thoughtful case similar to the "sanction" argument above. He holds that humans indeed evolved for cooperativity and reduced "reactive aggression," emotional outbursts of anger in response to danger or fear (2019, 25). But, Wrangham continues, a key mechanism in such "self-domestication" was the severe sanction of capital punishment for cooperativity violations. This led, he holds, not to reintegrating the violator (as shaming aims to do) but to tyrannical rule by the gang willing and able to execute the extreme sanction (2019, 68–72, 102, 116–121). It's is an important hypothesis because, like the sanction and escalation arguments, it attempts to account for aggression where cooperativity and fairness/sharing norms are high: within the primary group.

To recap Wrangham's argument: "Reduced reactive aggression must feature alongside intelligence, cooperation, and social learning as a key contributor to the emergence and success of our species" (2019, 124, 188). Like Kappeler et al. (2019), he notes that more aggressive persons would have less reproductive success in a society prizing cooperativity, thus slowly breeding aggression out to yield even more cooperative societies: "Ostracized by their group, these [uncooperative] nonconformists would have passed on fewer genes than those with the good reputations" (2019, 137). Yet, Wrangham continues, maintenance of this very cooperativity required sanctioning cooperativity violators. The most effective sanction was capital punishment (2019, chap. 8), made possible by the development of human cognition and language (2019, 242–43). With language, a few could conspire to take the cooperativity-violator down (though in other primates, language is not needed for many-on-one aggression or for more

powerful group against less powerful group aggression). In Wrangham's final step, the conspiring few became a ruling gang policing all with the threat of murder. "Any kind of noncompliance with the interests of the killing coalition could in theory provoke an intimidating threat" (2019, 213).

Thus, capital punishment to preserve cooperativity ironically contributed to a radical shift from cooperativity and egalitarianism to hierarchy sustained by force. Wrangham's thesis invites the question: given that cooperativity was foundational for human cognitive and social development, evolutionarily advantageous, and internalized for two hundred thousand or more years, what conditions account for the emergence of cooperativity violations so egregious that they could not be addressed by the traditional sanctions that had served hunter-gatherers for millennia? What conditions account for the collapse of millennia-old cooperativity in favor of a new "killing coalition" that overhauled longstanding egalitarianism?

One difficulty is why cooperativity violations would in the first place emerge at severities sufficient to require death as sanction. Assuming episodic occurrence amid hypercooperativity, severe norm violators were bred out. This argues, on Wrangham's calculus, for a *decrease* in societal aggression and so a decrease in the need for severe penalties. Second, as a cooperative species triages sanctions—starting with the more integrative (like shaming) and only ending with the more aggressive—capital punishment would be indeed rare: the sanction of last resort for an unusual type of violation that over time was bred down in hunter-gatherer societies.

In sum, the question raised by the sanction/shaming, escalation, and capital punishment arguments is not whether killing has ever been used by hunter-gatherers to control recidivist cooperativity violators; evidence of it is found among present-day foragers (Wrangham 2019, 198; Boehm 1999, 2012). Rather, these arguments ask: First, what conditions would account for the shift from episodic violations amid longstanding hypercooperativity to severe, frequent violations uncontainable through sanctions that had been evolutionarily selected and effective for many millennia? Second, why did killing, sanction of last resort in an increasingly cooperative society, not remain an outlier reserved for the rare severe breach of cooperativity. How did it overwhelm millennia old, evolutionarily advantageous egalitarianism to establish a new regime of hierarchy backed by force and the brutalization of the (non-violator) population?

Inter-group Coalitional Aggression/War

The sections above reviewed arguments from psychology and biology regarding episodic aggression within groups of hunter-gatherers. The next section looks at aggression between groups, which arguably might be more frequent owing to reduced need for cooperativity and thus a lower bar to

aggression. Debates about inter-group aggression are somewhat tangential to the concerns of mimetic theory, which focuses on the mimesis, acculturation, and shared values that develop within societal groups. But exploration of between-group aggression may deepen our understanding of how episodic and systemic aggression developed among *H. sapiens* and the influence of resource, ecological, and cultural conditions. Inter-group aggression ranges from one-on-one intimidation and combat to raiding (without physical contact between groups) to war. Certain forms of inter-group aggression require cooperation among some individuals against others. All may occur at varying frequencies, from episodic to systemic.

To begin, inter-group aggression has been found among present-day foragers (Zefferman and Mathew 2015, 58; Fry 2006) including among those who show low intra-group aggression (Napoleon Chagnon 1988, 1997; Michael Gurven, Kim Hill and Ana Magdalena Hurtado 2000). A number of issues arise: first, the above-mentioned difficulties of extrapolating from present-day societies to the Pleistocene and Holocene, and second, the oral histories collected to document inter-group aggression among present-day foragers are unreliable as evidence of actual past aggression. Though agression among present-day foragers has limited applicability to the Pleistocene, it raises the question of whether intra-group preference, "parochial altruism" (Bowles 2008, 326; Palaver 2015) is a sufficient condition for severe, systemic inter-group aggression. Marean (2015), for instance, suggests that better food procurement along the southern African coast increased population size during the Pleistocene, which led to inter-group food competition, which led to war—that is, the preference for procuring food for the in-group prodded killing between groups.

This is possible, though it's worth recalling that we have little evidence of inter-group fighting in the pre-pottery Neolithic just prior to the development of agriculture in the Mesopotamian, Mediterranean, and certain African regions (Clare et al. 2019, 101). As Douglas Fry notes, "Violence tends to grab the headline, but violence constitutes only a minute part of social life" (2006. 1). Again, while lack of evidence does not prove lack of occurrence, it offers little support for the idea that war developed over food competition many millennia before the pre-pottery Neolithic and that warfare continued as a systemic feature of hunter-gatherer life.

It is not clear that hunter-gatherers, living in the low-density conditions prior to the mid-Holocene, crossed paths frequently enough for such aggression to have become systemic (Fry 2006; Ferguson 2013a). Even Fry's large-scale study on present-day foragers (2006) found that an additional factor, societal hierarchy, is needed to account for warlike activity. In his investigation, complex, *non*egalitarian (hierarchical) societies engaged in warlike activity while the majority of (egalitarian) mobile foragers did not. (Exceptions to this finding are found in Zefferman and Mathew 2015, 52). Fry thus posits that the accumulation of stored goods and the

development of hierarchies and substantial economic inequality meaningfully increase the likelihood of raiding and warfare.

Indeed, among egalitarian Pleistocene hunter-gatherers, food shortages may have led to cooperation when paths crossed. If, in a simple example, hunter-gatherer bands battle each other to be the only ones to hunt a certain animal, the winner may end with more food. But many will be downed in the fight, the capacity to overpower the animal will be diminished, and chances increase of becoming the animal's meal rather than making it one's own. Cooperation may be the better survival strategy as more people live (and may later reproduce) and chances of succeeding in the hunt rise. Similarly, if one group raids the food cache of another, chances of retaliation are not trivial—not only with the motive of hunger but with added anger at the initial attack. Yet, Wrangham notes of hunter-gatherer raiding, "proactive aggression is successful when it involved attacking at low risk of being hurt" (2019, 262). Majolo also finds that, "humans are likely to be aggressive toward outgroup individuals under some specific ecological conditions but display lethal violence only when the risk of such violence is low" (2019, 327). Cooperation or at least nonengagement may be the more productive approach.

In both examples, parochial (in-group) altruism leads to *non*aggressive strategies between groups. To be sure, low-risk, inter-group raiding opportunities presented themselves pre-agriculture. But among hunter-gatherers, where the amount of stored goods was negligible, one cannot assume that the risk-benefit analysis came out in favor of raiding consistently enough for raids to become a systemic (not episodic) practice. While Clare et al. warn against ignoring inter-group aggression where it did occur, they conclude, "caution should nevertheless be exercised if we wish to avoid a situation which sees the 'bellicosification' of prehistory" (2019, 101).

Other issues important in our thinking about inter-group aggression include the caution required in arguing from nonhuman aggression to claim high aggression among humans. We've seen that even closely related, ancestor-descendent species evince different types, severities, and frequencies of aggression depending on local ecological and other factors (Thierry et al. 2000). Even if one were tempted by the cross-species argument, one might note that in his research overview, Augustín Fuentes found conspecific killing among primates to be unusual. A focus on it, he notes, risks both giving it an unwarranted role in evolution and underestimating far more frequent prosocial activities (2012, 124). "Even if we were to accept the hypothesis," Kissel and Kim explain, "that our earliest ancestors participated in analogous [to other species] forms of inter-group aggression (particularly among males), it is still difficult to make inferences about frequencies and thus the potential for coalitionary violence to have been a major driver of evolutionary change" (2019, 149).

Additionally, while oxytocin and vasopressin stimulate caring behavior toward family and friends and hostility to those who threaten them, this hormonal prod to ward off danger requires, first, a danger. If attacks between groups (constituting danger) were episodic, responses triggered by oxytocin and vasopressin would be episodic as well. If attacks and responses increase, the conditions that account for the increase need to be identified. Inter-group aggression might be expectable in sedentary, agricultural societies, where tribes in close proximity were often in resource competition and where their stored goods were ever-present temptations. And indeed, there is ample archeological and fossil evidence of it. But systemic inter-group aggression requires explanation and documentation among roving hunter-gatherer bands, where contact with outsiders was rare, where goods were not accumulated, and where even *parochial* altruism often tends to *non* aggressive strategies between groups.

David Barash finds that inter-group war is not genetically hard-wired but rather "historically recent," "erratic in worldwide distribution" and "a capacity" (2013). Capacities are "derivative traits that are unlikely to have been directly selected for but have developed through cultural processes… capacities are neither universal nor mandatory" (see also Ferguson 2018). Zefferman and Mathew's argument echoes Barash: "although warfare is practiced by numerous societies, it is not universal" (2015, 53), noting that variation among those who do wage war is substantial: in mode of combat (e.g., surprise attack, ambush), with and without centralized government and hierarchical militaries, in treatment of the defeated, in percentage of able-bodied men who participate, and so on. They conclude,

> There is stunning variation across human societies in the prevalence, mode, and scale of warfare… Norms for war and peace vary within and across societies; they change in response to internal cultural dynamics, strategic action by neighboring groups, resource availability, unification of warring groups, and random factors… . If primordial propensities for war or peace exist, they seem to be quite readily overwhelmed by local cultural norms. (2015, 53)

Though their study is based on present-day societies (both forager and modern developed economies) and is thus limited in applicability to the Pleistocene and Holocene, they make an argument similar to the one proposed here: that the types, frequency, and systemic nature of inter-group aggression is substantially influenced by ecological, resource, and cultural factors.

R. Brian Ferguson (2006, 2013a, 2013b), Douglas Fry, Gary Schober, and Kai Bjorkqvist (2010), and Fry and Patrik Soderberg (2013), among others, make a similar case that systemic raiding and war were not biologically mandatory but rather a response to specific ecologies and other conditions, such as those that emerged with sedentarism and agriculture,

as Fry (2007) and Bellah (2011) argue. "War does seem to be correlated with economic intensification and to emerge in relatively recent prehistoric times… organized warfare oriented to territorial conquest does seem to appear only where rich economic resources are locally concentrated" (Bellah 2011, Kindle Locations 3041–3043).

This does not suggest that concentration or monopolization of resources, substantial inequality, and hierarchies are necessary or sufficient conditions for war in all times and locations. Rather it notes that these features appeared concurrent with severe, systemic aggression not only between groups but within them in the mid-Holocene as the Mesopotamian, Mediterranean, and certain African regions moved to agrarian living. Thus, monopolization, inequality, and hierarchy might be among the conditions that contributed to such aggression. If other conditions contributed as well, they also may be identified and documented.

Kissel and Kim make a sophisticated argument in uncoupling the genetic from the cultural, as do Zefferman and Mathew (2015, 59). Kissel and Kim hold that inter-group, coalitional aggression (raiding, war) did not work itself into the *H. sapien* genome and thus is not a driver of evolutionary development, Rather, such aggression is the result of earlier developments in cognition and social organization that enabled Pleistocene *H. sapiens* to engage in complex activities, both prosocial and aggressive:

> we suspect that the biological developments in our species that permitted highly complex cognitive abilities also permitted very sophisticated ways to socialize, cooperate and communicate. These abilities allowed for complex forms of intra- and intergroup behavior to develop, and the range of interactions could have included violent practices… (2019, 155–156)

Kissel and Kim invite the question of whether the two to three hundred thousand-year-old *capacity* for war (2019, 157) establishes *occurrence* at the frequencies and severity recorded post-agriculture. The question is pertinent especially as Kissel and Kim, agreeing with Keeley (2014, 30) and Fry, Schober and Bjorkqvist (2010), do not find evidence for systermic occurence. Periods of the Holocene, they write, show "virtually no signs of violent conflict" (Kissel and Kim 2019, 155). As above, "no signs" does not establish the absence of inter-group aggression in the period just prior to agriculture but it makes a weak case for its presence at the frequencies and severity recorded post-agriculture, where there is an abundance of "signs" of it. Capacity for war may have been present for many millennia with low incidence of occurrence, making it an episodic rather than systemic practice. Additionally, Kissel and Kim note that evidence of pre-agrarian coalitional aggression, such as that cited by Steven Pinker (2011),

> overlooks much of the evolutionary pressures that affected our ancestors. Evidence from Nataruk, Jebel Sahaba, and other cemetery burials demonstrate violence, and perhaps collective violence. However, anthropologists

> need to be clear that this represents only a tiny portion of the human evolutionary record. (2019, 151)

Kissel and Kim make two points: first, that Pinker's selection of pre-agrarian aggression is but a "tiny portion" of the human experience that occurred amid hypercooperativity and should not be given undue weight. Second, that "tiny portion" is not an amount sufficient to make inter-group coalitional aggression *systemic* in pre-agrarian human culture.

In sum, substantial evidence exists for inter-group aggression pre-agrarianism. But as it occurred when (i) rewards were sufficient to justify the risks, (ii) chances of success were high, and (iii) risk of harm to oneself was low (Wrangham 2019, 262; Majolo 2019, 327), such forays appear to have been episodic compared to the systemic patterns recorded after the advent of agriculture in the Mesopotamian, Mediterranean, and certain African regions. The increase in endemic warfare post-agriculture needs to be accounted for by the surrounding conditions.

As Majolo concludes his review article, "The socio-ecological and technological changes that occurred in the last 15,000 years of our history (e.g., agriculture and population growth), with the associated cultural diversification of human societies, likely resulted in a greater frequency of war and lethal violence" (2019, 329). If these changes in conditions do not fully account for the evidence, others may be uncovered. Even if we were to risk borrowing such evidence from other species, Fry and Anna Szala's meta-analysis of mammals (2013) agrees with Fuentes's primatology research (2012) and concludes that, "When it comes down to contact agonism between conspecifics, restrained, nonlethal aggression, in contrast to more risky escalated combat, has evolved as the predominant pattern in mammals and many other species" (Fry and Szala 2013, 468).

Fossil Evidence and Its Discontents

Fossil and archeological findings from sites such as Nataruk and Jebel Sahaba offer some of the strongest evidence of pre-agrarian aggression, including trauma to the body and head, cut marks, and arrowheads embedded in the skull. There is little, however, that can be said to be evidence of *systemic* inter-group aggression comparable to the later "archaic" type. Kissel and Kim note, "such signatures alone are insufficient to indicate violence, much less organized violence between groups" (2019, 151). Majolo adds that, "weapons or skeletal traumas could indicate war or be due to other factors, including hunting of game or intragroup violence" (2019, 322; see also Ferguson 2013a; Lahr et al. 2016). A conservative approach would be to note that the fossil evidence is often unreliable and difficult to parse (Majolo 2019, 322). Below I'll summarize some of the interpretive issues that fossil findings raise.

Xiujie Wu et al. (2011), for instance, assembled a list of traumatic lesions found on hunter-gatherer fossils 13,000 or more years old. In their study, seventy-eight of seventy-nine were nonlethal, showing healing. In a similar collection by Nohemi Sala et al. (2015), only three of sixty-nine injuries were identified as fatal. Both collections are consistent with findings by Fuentes (2012) and Fry and Szala (2013) that intra-species lethal aggression is rare in available evidence.

Importantly, determining the cause of even nonlethal aggression leaves a field of choices: one-on-one aggression, raiding, accident, friendly fire in hunts, "play" aggression (as in today's football), arduous initiation rites, war, and so on. Adding to these interpretive difficulties is the recognition that mass graves are not necessarily evidence of mass killing but possibly the accumulation of bodies (deaths from a range of causes), including those placed in temporary graves until time and conditions were found to dig permanent burial sites. Christopher Stojanowski et al. note that the deaths at Nataruk, Kenya (roughly 10,000 years ago, the beginnings of sedentarism) "are not contemporaneous and that most of the observed cranial damage is inconsistent with blunt force. For example, data that Lahr et al. argue indicate interpersonal trauma may be more consistent with postdepositional warping and cracking" (2016, E8).

In addition to the problem of distinguishing warping, cracking, and other results of decomposition from evidence of human violence, Ferguson finds that the "arrowheads" supposedly showing warfare at the pre-agrarian Jebel Sahaba site (14,000-12,000 years ago)—where 45 percent of the sixty-one bodies indeed show trauma—might have been microliths attached to shafts, evincing injury from the wide range of possible reasons listed above. Similarly, many weapon-like artifacts are found inside skulls showing no entry wounds, suggesting that the artifacts fell into/were placed at the burial site after death for presently unclear reasons (Ferguson 2013a). As only four of the twenty-four persons showing trauma also show embedded tool fragments, the trauma rate may be 10 percent, Robert Jurmain writes (2001), and not the 50 percent held by those who see the site as evidence of mass coalitional aggression. Finally, if evidence emerged showing this site to be one of war or other mass aggression, one would not be justified in extrapolating to endemic war and systemic practice without evidence from other locations and other pre-agriculture periods.

Severe, Systemic Aggression in the Human Repertoire

The argument for a post-agrarian shift in living conditions that contributed to severe, systemic aggression, as proposed by Carel van Schaik and Kai Michel (2016), Bellah, Barash, Ferguson, Fry, and others, may account for present evidence better than do claims of earlier severe, systemic aggression that either remained steady or spontaneously increased through

human development, for which evidence is speculative. Their proposition begins with the recognition that resource grabbing, intentional injury, and killing occurred opportunistically pre-agriculture. Yet, it holds that the lack of (pre-agriculture) evidence for severe, systemic aggression is meaningful. With sedentarism and agrarianism, ecological and resource conditions underwent one of the most substantial shifts in human pre-history and contributed to manifold changes in human socio-economic and political behavior. In turn, these changes influenced the severity and systemic nature of intra- and inter-group aggression. Indeed, from a biological perspective, it would be odd if such a foundational change in human living was not accompanied by adaptations in behavior.

How did those adaptations occur? Wrangham, Majolo, and others note that hunter-gatherers undertook aggression when (i) rewards were greater than risks, (ii) chances of success were high, and (iii) risk of harm to oneself was low (Wrangham 2019, 262; Majolo 2019, 327). With the new agrarian surpluses nearby and ever ready for plunder, the potential rewards of aggression may have outweighed the risks far more often than they did under hunter-gatherer surplus-less mobility. Resource grabbing allows for resource monopolizability and sociopolitical hierarchies (the last of which had diminished in the human evolution to egalitarianism, Boehm 1999. By contrast, in hunter-gatherer societies, equitable sharing of minimal, perishable resources had the evolutionary advantage of keeping more people alive with greater chances to reproduce. "Hunters and gatherers," Kappeler explains, "forage cooperatively, share what they hunt/collect, and consume it on the spot. Agriculturalists don't rely on cooperation; they produce surplus stock for themselves which can be taken by force" (2019b). With monopolizable surpluses and sedentarism, the human capacities for aggression and raiding became far more frequent *occurrences* (not mere capacity), resulting in societies with severe, systemic aggression both inter- and intra-group.

On this account, the two to three hundred-thousand-year-old capacity for aggression, heretofore largely episodic in occurrence, became increasingly severe and systemic in occurrence under changing conditions. To this point, Robert Sussman asks, "Are war, crimes, and violence the genetic, unalterable norm, or are they specific to stresses that occur when too many people want too few resources, or to social inequality, or environmental perturbations, or a plethora of other causes…?" (2013, 107).

"Variation in economic and political organization," Zefferman and Mathew note, "can indirectly drive group-structured cultural selection" for warfare and through the practice of warfare (2015, 55). This understanding lends support to the "Cain" view that humanity's acculturating/mimetic nature alone is not sufficient for severe, systemic aggression since hunter-gatherers acculturated to shared values (positive mimesis) yet committed aggression less systemically than later

agriculturalists in the Mesopotamian, Mediterranean, and certain African regions. Thus, some additional conditions were needed to account for the severe, systemic aggression recorded post-agriculture. While death rates from inter-group conflict are at best moderately reliable, records from twelve hunter-gatherer societies show a median rate of 164 deaths per 100,000 per year. The median for twenty small-scale farming societies is 595 deaths per 100,000 per year (Wrangham 2019, 238; Wrangham et al. 2006). Though preservation bias may obscure evidence of aggression among early *H. sapien* societies, severe, systemic aggression among hunter-gatherers (including maiming, torture, killing, and enslavement; Price, Wahl, and Bentley 2006; Martin, Harrod, and Fields 2010; Osterholtz 2013) would over time leave traces.

As Zefferman and Mathew and Clare et al., among others, note, not many such traces have as of yet been found even for the period immediately prior to agrarianism, the pre-pottery Neolithic, neither for inter-group nor for intra-group aggression. In short, while both hunter-gatherer and agrarian societies had mixes of cooperativity and aggression, it makes a difference to the kind and quality of human living if that mix is one of high cooperativity with episodic violence or modest cooperation amid severe, systemic violence.

As Bellah explains, the desire to grab what others had and the need to constrain those wanting one's own cache was a first prod both to endemic aggression against outside groups and to systemic policing within groups. "A tiny ruling group that used coercive powers to augment its authority," he writes, "was sustained by agricultural surpluses and labor systematically appropriated from a much larger number of agricultural producers" (Bellah 2011, Kindle Locations 3279–3281). Zefferman and Mathew describe the advantages of inter-group aggression for sedentary agriculturalists this way: "Nonmobile people with land will benefit most from acquiring additional territory adjacent to their own; captured women from culturally similar groups may be preferred as wives; and captives who know the local ecology and subsistence mode might make more productive slaves." (2015, 59).

A second prod to aggression by societal have-nots, van Schaik and Michel (2016) note, was resentment, which mimetic theory too recognizes as a motive for violence. As coercive, monopolizing hierarches violated longstanding, evolution-bred cooperativity, resistance against them may well have added another layer of societal aggression to the monopolization of resources.

Joel Hodge (2019) adds a third prod in noting, ironically, the new conditions of greater safety. While the pre-agriculture fear of animal predation tended hunter-gatherers toward cooperation, the relative security of population-clusters surrounded by farmland decreased this worry and increased concern about neighbors, who had motive to steal and to protect

their gains with force. Elisabeth Sterck et al. find that among primates, reductions in predators may allow for larger groups, which in turn may increase intra-group competition and "can turn animals that would normally be Dispersing-Egalitarian into more despotic ones" (1997, 299).

Though one cannot argue from aggression in other primates to humans, Bernard Thierry et al. describe a process of covariance in evolutionary factors, which may occur in *H. sapiens* as in nonhuman species. As one factor in an environment varies, others shift in adaptation to the first variation. Thierry writes,

> there are many characters that co-vary in evolutionary time…Therefore, a softer version of the ecological hypothesis would identify factors, such as predation risk and distribution of food resources, as being central in shaping key adaptations, such as levels of competition and co-operation among macaques. (2000, 725)

Among humans living in new agrarian conditions, increased surpluses stored in one location, reduced animal predation, and larger group size may have prodded a co-variation or adaptation of increased competition and aggression.

Bellah describes a fourth prod to aggression in the temptation to take not only goods but political/military power. This is similar to Wrangham's "gang-rule" argument moved forward in time to after the advent of agriculture and its systemic inequalities. Wrangham posits a tyrannical class emerging among egalitarian, hypercooperative hunter-gatherers, raising the questions of what changes in conditions were substantial enough to prompt (i) cooperativity violations requiring capital punishment, especially in a species where aggression was selected or bred *out*; (ii) the collapse of millennia-old sanctions, such as shaming, to contain occasional aggression; and (iii) the collapse of egalitarianism, selected for its evolutionary effectiveness. Bellah's discussion avoids these questions as he posits power-gangs emerging in societies already systemically unequal and hierarchical and governed far less by fairness/sharing norms. The changes in conditions that prodded the shift from hypercooperativity to severe inequalities and hierarchies had already occurred.

To distill Bellah's argument: in early agrarianism, the first monopolizer takes resources (possibly by force), but the next monopolizer has two things to grab: resources and the elite position in the hierarchy that the first monopolizer now has. In short, political power. On Girard's view, elite status, like valued items, is a precious object of shared desire and a motive for competition and aggression. As agrarian societies were more populous than hunter-gatherer bands, challengers to the regnant hierarchy or strong-man might attract discontented others to form rival gangs. Bellah writes, "Large, prosperous societies are almost always in danger from the havenots at their fringe, or from other prosperous groups who would

like to become even more prosperous. In a situation of endemic warfare, the successful warrior emanates a sense of mana or charisma, and can use it to establish a following" to take as much power as possible (Bellah 2011, Kindle Locations 3974–3976).

To be sure, this violated long-evolved cooperativity, inviting the question of what factors were powerful enough to overthrow it with all its durability and effectiveness. Yet, the manifold, radical changes that agrarianism entailed may have been sufficient to violate it—to turn capacity for aggression and episodic occurrence into systemic practice and to meaningfully alter the mix of cooperativity and aggression in society. In Thierry et al.'s terms, with the new, unequal conditions of resource distribution, aggressive behaviors that had among hunter-gatherers been disadvantageous (or only episodically advantageous) became covariantly adaptive and systemic.

In sum, on this "Cain" view, shared desires and humanity's mimetic/acculturating nature did not alone prod severe, systemic aggression in the mid-Holocene. Rather, humanity's social nature and capacities for both pro-social and aggressive behavior covariantly adapted to new conditions of substantial inequality and hierarchy. The biblical Fall from Adam to Cain may be understood, van Schaik and Michel suggest (2016, chs. 1–2), as a metaphor for the shift from relatively equitable resource distribution to the harsher conditions of inequalities, hierarchies, and severe, systemic aggression.

Implications for Girard

What do the physical sciences tell us about mimetic theory? Its description of mimesis/acculturation as foundational to human living is consistent with findings on humanity's earliest cognitive and social development. Its description of the competition and severe, systemic aggression of the (agrarian) "archaic" is consistent with the research on early agricultural communities in the Mesopotamian basin, Mediterranean lands, and parts of Africa. Between the two periods lie hundreds of thousands of years of mimetic hunter-gatherers practicing episodic aggression where it was advantageous amid substantial hypercooperativity and egalitarianism. This suggests that the mimetic nature of humanity is not sufficient for the practice of aggression. Other factors are needed to bring humanity to prosocial or aggressive behaviors, which are then transmitted through content-neutral mimesis.

There is little present evidence in the physical sciences for an "Adam" reading of mimetic theory, where the occurrence of (not capacity for) severe, *systemic* aggression is dated to early *H. sapiens* or to a spontaneous escalation among early *H. sapiens* absent an undergirding change in conditions. As the fossil and archeological evidence is scarce, often unreliable, and difficult to interpret, this is an area in need of both additional findings

and further analysis. Moreover, while a range of episodic aggressions was present among early *H. sapiens*, there is little archeological or biological means to determine if any instances were the result of resource competition or of Girardian scapegoating–attacks against an *innocent* party as a steam valve for conflictual, competitive mimesis. That is, if a person or group of persons has food they do not share with others and other persons go after it, that's resource competition. If, by contrast, a person or group of persons does *not* have wanted resources but is nonetheless blamed for societal hardship and then attacked, that is scapegoating. Present research has not found reliable evidence of the latter among hunter-gatherers. Prior to sedentarism/agriculture with its surpluses and storage facilities, determining whether a person or group of persons in mobile foraging societies possessed unshared resources is difficult, as is distinguishing the markers of a wide range of violence (including accident) from those of scapegoating.

Importantly, a mimetic theory that encompasses both conflictual and positive mimesis is consistent with the following findings in biology, archeology, and psychology: (i) the contribution of positive mimesis to human cognitive, emotional, and social development; (ii) the long, hypercooperative hunter-gatherer period, in which both hypercooperativity and episodic aggression were transmitted through humanity's content-neutral mimetic capacities; and (iii) later agrarianism, in which aggression became sufficiently severe and systemic so that practices such as scapegoating sacrifice may have been used to cope with it.

Girard's account of such sacrifice will be taken up in Part II of this article.

Concluding Thoughts

The prime aim of this article, Part I of a two-part piece, has been to illustrate how explorations in philosophy and theology are enriched by evolutionary biology, anthropology, psychology, and archeology. The issues in this first part are: (i) how old is the systemic practice of severe aggression? (ii) How much results from humanity's social/mimetic nature *per se* and how much from other ecological and resource conditions? (iii) If other conditions were important, might they be adapted toward greater cooperativity today? and (iv) What is the role of positive mimesis in human development?

These questions were prodded by the work of René Girard, whose mimetic theory has influenced not only his original fields of philosophy, sociology, and literature but, over the last half century, theology, neuroscience, political science, media studies, and more. Girard is often thought to be an "Adam" man, one who sees mimesis as foundational to humanity's earliest development (metaphorically, as old as "Adam"), resulting in

competition and aggression. Mimesis *per se*, on this reading, is sufficient for competitive aggression.

Yet, Girard said that human violence was as old as Cain, not Adam. He understood mimesis as foundational to human development but saw also the possibilities for positive mimesis in human evolution. Indeed, since Girard's initial writings in the 1970s, we have learned that human cognitive, emotional, and social capacities depend on it. Mimesis, on this view, is a content-neutral mode of cultural transmission, advancing both aggressive and cooperative capacities, both of which are quite old in the human repertoire.

The mix of these capacities and their practical expression in any given time and location is thus dependent on ecological, resource, and cultural conditions other than mimesis. A substantial change in these conditions would expectably contribute to a change—or coadaptation (Thierry et al. 2000)—in human behavior. Inversely, a change in behavior from episodic aggression amid hypercooperativity to severe, systemic aggression would expectably be prodded by shifts in conditions additional to mimesis. These additional factors might include the surpluses, their monopolizability, and hierarchies that emerged with agrarianism and herding. As these are present in the biblical story of Cain, one may call this the "Cain" view. Something in human cultural memory that fed into biblical writings, van Schaik and Michel suggest, retained the knowledge that agriculture bought with it much good and much violence (2016, chs. 1–2).

One question raised by this view is whether present societies might consider resource distributions and status structures that might promote greater cooperativity today.

Evolutionary biology, anthropology, psychology, and archeology have enriched and deepened our understanding of many aspects of mimetic theory, beginning with the role of positive mimesis in human cognitive, emotional, and social development. They have set out the variety of types of aggression, ranging from episodic one-on-one intimidation to raiding and war. They provided the evidence we have to date of when and why each occurred. They have clarified when fossil and archeological evidence is strong or ambiguous. Importantly, they are exploring the changes in human living that came about with sedentarism/agriculture and the effects of these shifts on the types, severity, and frequency of violence intra- and inter-group.

I would like to close with the somewhat optimistic view that evolutionary pressures over the many millennia of hunter-gatherer living were indeed toward "hypercooperativity," fairness, and sharing as prime mechanisms of social organization. Though opportunistic and episodic aggression occurred pre-agriculture where it was advantageous, severe, systemic aggression, on this view, is a relative newcomer. "We really are, Richard Wrangham writes, "a dramatically peaceful species" (2019, 19). Moreover,

where aggression is present in human life—even if it were rooted in human biology—we are not helpless to reduce it. "We try," Wrangham continues, "to stop diseases even though they are clearly biological in nature" (2019, 252).

Across the globe and cultures, children and adults with varying races, religions, genders, and ethnicities are statistically and spontaneously more generous in experimental trials than would be predicted by theories of self-benefit maximization (Gintis et al. 2015; Henrich 2016). Cooperativity may be with us still in spite of the current popularity of "selfish gene" theories. I'll borrow from Fry, Schober, and Bjorkqvist to note, "In any case, the existence of peaceful societies demonstrates that humans, both female and male, can construct social worlds that are virtually free of lethal violence" (2010, 123).

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