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Circumspector 2

Abstract

The ability to not only recognize and name close and distant relatives and to regulate the relationships among them, but also of turning strangers into relatives through marriage, fictive kinship, and other metaphoric extensions is a human universal. Together with the capacity for language, and closely related to it, this is the hallmark of human nature. The sheer complexity of this multi-layered phenomenon that includes not only procreation, but also regulates behaviors among categories of relatives, cannot be reduced either to rules and laws or to biological facts of reproduction. In my review of the recent Avatar debate “Can we talk about kinship without procreation?” (Peneque 2022) I approach these questions by considering the concept of kinship as being a milestone in human cognitive development. I propose that the New Reproductive Technologies and Artificial Intelligence are test cases for further exploration of kinship rooted in human analogical thinking.

Introduction

Sex, love, incest, death, and succession in ancient Greece (Fox 1983), Polynesia (Gell 1993), Cantonese opera (Su 2014), Wagner’s music (Köhler 2004; Oberhoff 2011), and South Korean (Ryu et al. 2020) and American television (Stone 2004; Armstrong 2018-2023), to name only a few examples, are universally captivating topics within the broad category of kinship. Is the conception of human kinship based on purely biological facts or is it an entirely cultural construct?

Are procreation and reproduction one and the same process or two overlapping, but not identical semantic and behavioral domains? This dichotomy has been the subject of many debates in anthropology, including the recent *Anthropology of Kinship - The Avatars Debate*, edited by the Avatar Pietra Peneque and published in 2022 in the online journal *Terrain*. I will specifically review the contributions of three Avatars: Hominidae (2022), Paratio (2022), and Comparator (2022), to propose further possible avenues for the study of human kinship.

The ability to not only recognize and name close and distant relatives and to create rules of behavior among them, but also of turning strangers into relatives through marriage and fictive kinship, is a human universal and, together with the capacity for language and closely related to it, it is the hallmark of human nature. The sheer complexity of this multi-layered phenomenon that includes not only procreation, but also behaviors that determine relationships among relatives, has its foundations in human cognition and as such it should be at the heart of not only anthropology but its related disciplines of human biology, psychology, and sociology. As amply documented in cross-cultural ethnographic data, kinship systems cannot be directly mapped onto biological facts of reproduction, but there is also a limited number of the ways of classifying relatives that largely determine the rules of behavior among them. In reviewing the Avatar debate (2022), I approach these questions regarding human kinship primarily as a milestone in human cognitive development. Henry L. Morgan 1997[1871] perceived kinship terminology as primarily a human cognitive achievement:

A formal arrangement of the more immediate blood kindred into lines of descent, with the adoption of some method to distinguish one relative from another, and to express the value of the relationships would be one of the earliest acts of human intelligence...(1997[1871]:10).

Following Morgan, I will consider the cognitive aspect of kinship as the starting point for examining how and to what extent the Avatars consider this facet of kinship systems and particularly the kinship terminology within kinship systems.

The Avatar debate

The *Avatar Debate* (Peneque 2022) “Can we think about kinship without thinking about procreation?” has brought again to the fore the two long-opposed sides and, at its extremes, the two mutually exclusive theories about the nature of kinship. Adopting the post-modernist procedure of deconstructionism in literature, David Schneider deconstructed the concept of kinship as an entirely cultural phenomenon. The culturalists, dominated by Schneider’s (1968) cultural relativism, reject any continuity between human kinship and the non-human primates’ procreation. The *Avatar Debate* is an attempt to bring together a long-needed confluence of these two widely divergent approaches. The Avatars, Paratio and Hominidae, both critique these two reductionist positions in a similar way. However, Comparator questions kinship as a unified domain due to its variety of non-procreative forms. According to Comparator, without a single basis for diverse systems of transmission of responsibilities, it is necessary to parse kinship between references to procreation and the social context of, for example, foster care and other extensions of kinship behavior.

At one end of the debate, the sociobiologists, and more recently the evolutionary ecologists, widely ignore cultural variations despite the lack of a simple one-to-one correspondence

between cultural concepts of kinship and the procreative models. Assuming that behavior involving kinship relations is solely driven by Darwinian fitness (Hamilton 1964; Trivers 1971), this approach reduces a complex phenomenon of cultural variations into just the universal biology of reproduction. The genetic determinism in the work of the biologist and entomologist E. O. Wilson (1975, 1978) had decisive influence on this school of thought. His elaboration of *kin selection theory* reduces the main behavioral motivation for human action to the concept of inclusive Darwinian fitness achieved through the preference for supporting close kin rather than strangers, and quantified in terms of genetic relatedness.

Both positions have been discounted by numerous ethnographic accounts that, on the one hand, show considerable deviation from purely biological models, but, on the other hand, exhibit a limited set of the main organizing principles and rules, including kinship terminologies. E. O. Wilson in *The Origin of Creativity* (2017) criticizes his own contribution to inclusive fitness theory as a viable research tool:

At first thought, this concept of kin selection, *extended beyond nepotism to cooperation and altruism*, appears to have considerable merit.... Yet it is deeply flawed. In spite of the excited attention at first given to it, *no one has ever succeeded in measuring 'inclusive fitness'*, as its core property is called. To succeed, not only would it be necessary to determine pairwise kinship throughout the group, but also to assess reciprocal gains and losses in fitness through time. Beside the *technical difficulty*, the equations offered to conduct an overall analysis have been mathematically incorrect.... Inclusive fitness means how well the individual does in its relation to every groupmate, discounted by the percentage of the shared appropriate genes, through its entire reproductive life. However outwardly attractive, there exist no evidence of such a process, or any need for it to explain the origin of advanced social behavior. (2019: 99, italics added).

Thus, an argument based on flawed quantitative procedures becomes just another thought experiment and yet another Western cultural interpretation. Besides the fundamental technical problems with this theory, Wilson contends that altruism and cooperation are extended beyond the preference for close kin, leaving open the possibility that altruism beyond genetic relatedness is modeled on kinship as a metaphor. I propose here that the use of analogy and metaphor as the main cognitive tool of the human mind is exemplified in the concepts of kinship, kinship terminology, and the behaviors surrounding these concepts.

Primate kinship: Phylogeny and ontogeny

The Avatars agree on the need for putting human kinship into the wider perspective of primate and hominid phylogeny. Following Chapais (1998), Hominidae and Paratio examine the possible behavioral continuity between other higher primates and the genus *Homo*. Hominidae situates human kinship within the broader context of the other great apes and explores the continuity and discontinuity within the Hominid family, thereby pointing out the difference between reproduction and procreation as a “complex interface of sexuality, procreation, inter-individual ties, social relations, conceptual categorizations.” Human kinship is like a meta-principle that brings together individual physiology and psychology. As an organizing system, it transfers these aspects of individual human life onto the wider plane of social life.

Although kinship recognition and behavior occurs to some extent among non-human higher primates, the uniquely human *bundle of traits* exemplified in the “exogamy configuration” includes stable kin groups, enduring breeding bonds, a dual system of residence (pre-mari-

tal and post-marital), incest avoidance among co-resident close kin based on the recognition of both matrilineal and patrilineal kin, wider kinship networks that exceed local groups, opposite-sex sibling bonds, and recognition of affinal relationships (Chapais 2008:26).

The Avatar Comparator uses the cross-cultural perspective to suggest that kinship might be a special kind of system different from other systems of relationships. In addition to a bundle of traits unique to humans, the patterns of lumping and splitting in kinship terminologies, the denial of biological procreation, and the invention of fictive kinship are elaborations of the concept of kinship based on extensions that is uniquely human (Shapiro 1982; 2028). These arrangements and concepts could only be fully realized after the appearance of syntactic language (Milicic 2013).

Prior to Chapais (2008), Robin Fox (2004) argued that:

...descent and alliance, the two crucial elements of human kinship, already existed in our 'primate cousins' systems of kinship, but no other primate combines these elements in the way humans do. The elements are common, the combination is unique.... Descent and alliance must be present. Human kinship combines those two, so that the mode of descent decides the allocation of mates. Thus, human kinship lays at the interface of deeply inherited biological tendencies and in the logic of human imagination embedded in the natural process of relatedness or sharing common genes. It is their elaboration that depends on the classificatory propensity and the evolution of true language. (2004:423-37).

Mentioned *in passim* by the three Avatars, the cognitive aspect of kinship is the least elaborate aspect of kinship in this debate. Paratio begins with the phylogenetic level and proceeds to the cognitive:

During hominin evolution leading to *Homo sapiens*, and subsequent to hominin cognitive capacities having evolved the ability to formulate abstract concepts as a way to conceptually represent observable behavior patterns, there was a transformation of what had previously been categorization based on the recognition of behavior differences such as the difference between the behavior of a female directed to her offspring versus her behavior directed to the offspring of other females, into the concept of a mother-child relation....The latter then became part of the cognitive repertoire of our hominin ancestors. (2022:16)

In Tomasello's comparative account of the great apes' phylogeny and ontogeny, the main underlying principle of human social behavior can be detected in the three developmental phases of human intentionality and cooperation: the 'nine-month revolution' of triangulating intentionality to the three-year old's' collective intentionality and cooperation. With these cognitive milestones human infants by far exceed our primate 'cousins' (Tomasello 2019). The question remains what is so special about human cognition that makes these transitions from other great apes to human kinship possible. While chimpanzees and bonobos can reason using analogical thinking there are two main differences between humans and our great ape 'cousins' – a metaphor of a kinship term so often used by anthropologists.

Myth and metaphor: Motherless, virginal, childless

Many of the most striking mythological narratives are constructed around the universal human experience of kinship and its cultural interpretations. Athena, the goddess of wisdom, weaving, warfare, and olive tree cultivation, sprung fully grown out of Zeus's head (Homer 1951). She was probably grafted on to the Hellenic pantheon after the arrival of the Indo-European-speaking patrilineal tribes in Attica. An indigenous goddess of the home, hearth, and agriculture, Athena

was perhaps restructured (Barber and Barber 2003) as Zeus' bright-eyed favorite daughter, the asexual, militaristic, motherless, childless, virginal, primarily urban patroness to whose temples and wise council Athenians flocked and appealed to. According to the myth, Zeus swallowed the pregnant Metes to prevent his child Athena becoming more powerful than he, thus turning her into an obedient daughter. Of course, this is a cultural interpretation in the patriarchal and strongly patrilineal Greece of Indo-European speaking arrivals, with their denial of the biological fact that a child can be born only of a woman.

The Avatar Comparator compares legal definitions of kinship relations with what is supposed to be "natural." The tragic tale of Sophocles' *Antigone* (1949) plays out around kinship, death, politics, and the conflict between an ancient system of patrilineal descent vs. the laws of state. According to R. Fox (1993), the play carried a particular message to the 5th C. B.C. Athenians as citizens of the nascent state. It was Antigone's divine duty as a loyal kinswoman to bury her rebel brother, while her other brother, killed fighting for the other side of the conflict, did not deserve her self-sacrifice. Her act of divine kinship duty justified disobeying the state laws of Creon's Thebes. Antigone, the last survivor of Cadmo's royal lineage whose descent could be traced back to gods, speaks to her reluctant sister Ismene (Fox's translation): "O kinsperson, self-same sister, Ismene's head [springing from the same source]..." (1993:159). Caught between the divine law and civic duty, with her brothers dead, she laments that if she ever marries, her children will belong to her husband's patrilineage, not hers. Hence, as the last in the line of Cadmo and Oedipus, she defies the law of the state, which is punishable by death. The tragedy is rooted in the cultural interpretation of descent, not in the biology of procreation.

Skin and kin

Variability in the incest prohibition is just one of the examples showing that there is no perfect overlap between biology and culture. The Avatars take up the incest prohibition and review the well-known arguments, from Lévi-Strauss' claim that the incest prohibition is an outcome of the requirement for exogamy as a strategy to gain alliances, to the lack of sexual attraction in siblings and those who were raised together during early childhood regardless of genealogical relationships, known as the *Westermarck effect*. Contrary to these two arguments, Paratio explains the incest prohibition as the means to prevent violation of the logic of a kinship terminology, while Comparator points out that incest prohibitions not only vary across cultures, but for example in France, carry different connotations of the incest legal definition and the moral judgment that is involved. Cross-cultural ethnographic accounts show not only variability in the sexual relationships that are defined as incestuous, but there is also variation within the same culture among different social strata. Anthropologists often forget that marriage and sexuality overlap, but they are not always identical. Sexuality exists outside of marriage and vice versa, as Comparator notices. Related to this is the prohibition of marriage between various categories of kin, yet sexual intercourse or flirting maybe allowed between close kin, such as the 'kissing cousins' in the Victorian period, cousin marriages in England, and among the moneyed American East Coast elites or wealthy industrialist families of northern France (Bittles 2009). The House of Windsor has had multiple marriages of close kin.

Incest prohibitions and its violations show the overlapping, but not identical spheres of potential procreation and its social context in stratified societies. Brother-sister marriage was practiced among the Inca, Hawaiian, and Egyptian royalty, but it is questionable whether these marriages were consummated among the polygynous elites. In Polynesian cultures, the practice of hypergamous marriages represented a structural challenge whereby the most elite women may not have an appropriate marriage partner. They then had a choice between staying celibate, like the sacred virgins of the Pukapuka atoll, or could practice the ethnic exogamy within the Tongan Empire that consolidated the Tongan dominance over Samoa and Fiji through trade and exchange of women in marriage (Hage and Harary 1991; Hage et al. 1996).

Kinship is cross-culturally perceived as shared substance. Mary Douglas in *Purity and Danger* (1966) analyzes the human body as a universal template for symbols and metaphors of human society. She points out that skin is the last barrier between one's person and the person of others. In the metaphorical use of skin as kin, the Indigenous Australian kinship terminology classifies relatives using the broad social category of 'skins': moieties, sections, subsections and other similar categories (McConvell et al. 2018).

In the Marquesan myth of Kena and Tefio, the star-crossed lovers' marriage is doomed from the start (Gell 1993). Not only are they incompatible because of their part-human and part-underworld origin, but they are also matrilineal parallel cousins, deemed an incestuous relationship in this Polynesian culture. This relationship turns them terminologically into siblings and makes the consummation of marriage impossible, leading to their tragic end (1993:186-7). The Marquesan story and its unsuccessful solution is etched through tattooing into the skin under the watchful eyes of ancestors 'secondary faces' in the zoning style of Lapita pottery (Kirch 1997). The Marquesan "wrapping in images" of the entire body in tattoo patterns is the most salient function of tattooing in Polynesian cultures, thereby creating a protective layer of 'second skin'. The patterns, the process, and the designs, together with layers of cloth and fat, are explicitly and linguistically connected as a metaphorical form of enveloping individuals in the protective layer of one's matrikin (Gell 1993:177-9).

The theme of twins, though a relatively rare occurrence in our mostly single-birth species, often appears in mythology. While in Wagner's *Die Walküre*, (Köhler 2004; Oberhoff 2011) the theme of incest is dramatized as the doomed love of the twins Siegfried and Sieglinde, their Marquesan tragic counterparts Kena and Tefio are matrilineal parallel cousins terminologically equated as siblings that prevents them from consummating their incestuous relationship.

In the Samoan myth about the origin of tattooing, the ambiguous androgynous conjoint twins, Titi and Titi, later self-renamed Taema and Tilafaega are joined by the skin of their backs as evidence of their supernatural origin (Gell 1993). It enables them to have a 360-degree vision, a supreme form of protection. Eventually, their fused backs are severed by the phallic spar of a canoe. One becomes a war chief, the other a famous tattoo artist (Gell 1993). In addition, a cross-sibling relationship has been described as the central axis of the Polynesian concept of kinship. In both the myth of the twins Siegfried and Sieglinde and in the myth of Titi and Titi, their relationship is amplified by doubles. While the kinship terminology merges the parallel cousins Kena and Tefio into siblings, in the Titi and Titi myth it is amplified by the supernatural conjoint

twins' androgyny and their shared skin providing a protective double layer through tattooing. It is the cultural elaboration of biological facts.

The reluctant genetrix

The Avatar Comparator suggests that it is crucial to put sexuality at the heart of kinship studies, or at least to stop ignoring it. The biological anthropologist Helen Fisher (2004) argues that sexuality played a major role in the evolution of human pair-bonding and the subsequent, prolonged care for human infants. According to Fisher, the universal experience of romantic love accompanied by sexual desire is one of the most powerful brain systems humans have evolved.

New Reproductive Technologies (NRT) involve procreation without sexuality and often without marriage. They present a challenge and provide important test cases for both biological determinism and cultural relativism. Comparator points out the difficulties raised by NRT related to the need to re-examine the older cultural categories deemed "natural" in the Victorian period. NRT carry with them moral judgments, as well as preferences for the resemblance to at least one biological parent in the case of sperm or egg donation. Nevertheless, NRT is still based in kinship as is evident in kinship terminology and its extensions.

In *Reproduction and Succession* (Fox 1993), one of the first works in anthropology that examined the New Reproductive Strategies and their social and psychological implications, Fox explores the conflict between the state and 'the laws' of kinship. In the highly publicized "Baby M. Case, the emerging medical technologies of artificial insemination and maternal surrogacy resulted in legal hurdles and absurdities (1993: 53-128). Fox's "reluctant genetrix" Mary Beth Whitehead, the working-class surrogate mother from New Jersey, refused to honor the contract that obliged her to surrender her newborn daughter to the upper middle-class couple who financed her artificial insemination, pregnancy, and childbirth. Fox treats this case as a conflict between the state laws exemplified in the contract and the strength of the mother-child bond. He points out that many societies recognize the distinction between a biological parent and a social parent. Roman law defined as *genitor/genetrix* and *pater/mater* respectively as elaborations of the biological facts.

The book, *Kinship and Family* (Parkin and Stone 2004), among other topics, further explores the impact of New Reproductive Strategies on American kinship (Kahn 2004:321-399). Despite the new forms of families, ranging from single parent, two-mother, and two-father families to blended families, kinship terminology shows its resilience, but, as Comparator points out, in the LGBT community it is often denied or contested. This, however, is not necessarily unique to these communities and can be found in other cultural contexts of kinship. Blurring the boundaries of the meaning of procreation and social parenthood in the "Baby M. Case," both women, the genetrix and the adoptive mother, were contesting each other's claim on motherhood. Even the legal aspect of this case was not entirely clear. But this does not mean that such a case could exist independently from kinship and kinship terminology.

Transgender individuals, whether in Western or non-Western cultures, provide another set of examples enabling us to study different uses of kinship terminology. Generally, in this context, kinship terminology seems to be based on culturally appropriate kinship terms where the assumed, not the biological, gender is the basis. Hijras in India, inspired by the Hindu pantheon of

gender-fluid and therianthropic gods (Nanda 1994) live in communities under the leadership of the “mother.” The sworn virgins of Kosovo, in northern Montenegro and Albania (Young 2016; montenegrina.net), involved parents’ consent and were codified in the *Laws of Leke*. Creating a third gender category (Herdt 1996) served as a niche for a wide range of those of liminal gender or transgender who fall within the category “men plus women” in India or “manly women” in the Balkan peninsula. In both cases these individuals are incorporated through kinship terminologies into their appropriate kinship categories.

The current case of the four couples from Croatia who attempted to adopt children from the Congo (Tesija 2023) illustrates not only the question of adoption, but also the perception of transgender individuals and the culturally variable legal systems’ definitions of who is an appropriate adoptive parent. One of the adoptive fathers in the Congo case is a transgender woman. In Zambia, where the case was tried at court, transgender individuals cannot adopt children. Nevertheless, the transgendered woman who is now a married man and a prospective father uses kinship concepts and terms and is fully supported by his family and his affines. Whether families deny or support transgender or LGBT individuals and their actions is a part of the behavioral aspect and often involves moral judgement, but appropriate kinship terminology with its functions and expectations is utilized. Thus, Comparator’s parsing of kinship into separate domains is unwarranted.

Centrality, markedness, and focality are universal cognitive tools that humans use for classification purposes (Greenberg 1966; Kronenfeld 1996; Shapiro 1982:283; Milicic 2013). Like entoptic images, they are endogenously created and found in many semantic domains such as the classification of basic color terms (Berlin and Key 1969), folk taxonomy (Berlin et al. 1973) and kinship terminology (Hage 200; Kronenfeld 1996; Lakoff and Johnson 2003). For example, in the semantic domain of kinship the focal term ‘mother’, also an unmarked term and a central term, adds extended meanings through marking: ‘*biological* mother’, ‘*foster* mother,’ ‘*adoptive* mother’, ‘*mother-in-law*’, ‘*grandmother*’, ‘*godmother*’, ‘*stepmother*’, ‘*mother superior*’ etc. With the flexibility and the adaptive value of focality/centrality/markedness, new terms are coined when necessary for the NRT such as ‘*surrogate* mother’ and ‘*legal* mother-to-be’. Kinship metaphors are found in many Western domains such as church, where all members are ‘brothers and sisters’ and Catholic priests are ‘fathers’. But this is not limited to our Western idiom. The Tewa of New Mexico apply metaphorical kinship in their political organization where Winter chief is the father and the mother to Tewa, while Summer chief is referred to as their mother (Ortiz 1978). Shapiro (1983) describes very similar kinship metaphors in the Walbiri ritual. Though a strong proponent of biological determinism in his earlier writing, Wilson (2017) now admits there are extensions of behavior *beyond* genetic relatedness and basic biology. It is the human analogical thinking underlying metaphors that makes these extensions possible.

Fictive kinship is also based on the notion of shared substance. It is the product of perceived transformation whether of physical or spiritual substance. Suckling provides such a transformative substance that can turn an unrelated person into a kin with appropriate kinship terms and incest prohibitions (El Guindi 2013). Fox (1996) points out that suckling was a threshold in the mammal phylogeny, creating the mother-child bond, the strongest bond of all:

Hence suckling does not just feed milk to a mother's baby; Suckling has a transformative function in kinship relations, constructs new links, creates new relations, transforms existing ones, constructs kin terms, intensifies and inter-locks kin relations, creates incest taboo, prohibits some relations and creates others. It categorizes and re-categorizes consanguinity and affinity. Suckling is kinship and a transformative mechanism for kinship. (1996:184)

El Guindi's (2013) and El Guindi and Wesman's (2022) extensive analysis of suckling further elaborates on the transformational power of milk.

Ritual sponsorship, another form of fictive kinship, is practiced at baptism in the Mediterranean and Latin American cultures influenced by Spanish and Portuguese colonialism, but also occurs among indigenous South American societies in the first hair-cutting ritual. The ritual first cutting of a toddler's tuft of hair, or church baptism in the Christian tradition, brings together previously unrelated families and turns them into kin through the extension of kinship terms with the addition of a marking prefix: godparents, godchild, godmother, godfather (du Boulay 1984; Just 2000; Milicic 2018). It is also an important means to gain political support. Fictive kinship does not involve procreation, yet the extensions of kinship terms through marking shows clearly that kinship and procreation cannot belong to entirely separate domains.

Beyond human: Liminal categories

Lévi-Strauss (1971) has approached totemism in ethnographic cultures as essentially a mode of classification based on metaphorical kin relationships among and between humans and animals. The question of who is, and what is necessary for the definition of, a human being can be traced back at least to the symbolic representations in the Upper Paleolithic art. Leaf and Read (2011) hypothesize that the cave paintings in the Chauvet, Lascaux, and other Upper Paleolithic sites speak of the human capacity to hierarchically classify animals and humans into categories and subcategories of herbivores/carnivores, and humans as women/men, and to further sub-sub-categories such as pregnant women, as well as individual animals and portraits of individual people.

The most intriguing images in the world-wide sample of prehistoric art are those of therianthropes, creatures with both animal and human features. They could represent masked humans in a ritual performance or shamanistic hallucinations where the borders of categories of species become blurred in a trance state (Lewis-Williams 2002). Thus, not only clear-cut categories, but liminal exceptions, seem to be universally recognized from at least the Upper Paleolithic.

The definition of who is and who can become kin is not only limited to humans, gods, or totemic animals. What in human imagination makes this transfer of turning not only other humans, but also non-humans into family members? The answer is the distinctly human cognitive capacity to create metaphors based on analogical thinking. Many of Walt Disney's characters are therianthropes, such as the anthropomorphic mice Minnie and Mickey who fall in love, but it is not clear whether they are married or not, thus still being outside the common American 1950's social expectations. Goofy, a humanized dog, has his own pet dog Bluto. These characters are obviously based on the similarity of relationships within and between the two semantic domains of "humans" and "animals." This analogy is also extended to machines. In Pixar's *Cars* (Fogelman 2006), various anthropomorphized cars have distinct personalities and are cooperating, as well as competing, for love and victory.

Technological transformation of machines into humans has captured human imagination since Olympia/Clara, the automaton who becomes the love interest of the main character in E. T.

A. Hoffman's *Sandman* (2020[1816-17]). Karel Čapek in his novel *R.U.R.* (1920) introduced the character of 'robot' (from Russian *robotnik*, forced labor). Artificial Intelligence followed, with Kubrick's Hal in *2001: A Space Odyssey* (1968). In the South Korean television drama, *My Holo Love* (Ryu et al. 2020), Holo, a form of AI, becomes humanized as a member of the family and incorporated into the traditional Confucian ethos through Korean kinship terminology and its extensions. In Kazuo Ishiguro's novel *Klara and the Sun*, E. T. A. Hoffmann's Olympia/Clara becomes Klara, an anthropomorphized form of AI. She is the trusted 'sister' of the main human character and the source of her salvation through self-sacrifice. All these transformations are made possible by analogical thinking and many involve kinship.

Discussion

The Avatars Paratio, Hominidae, and Comparator take as their starting point the comparative approach to kinship as a cultural adaptation within the context of the great apes' phylogeny, looking for the decisive trajectory of *Homo sapiens* towards human kinship that regulates procreation. When and what exactly has made this change possible? The Avatars enumerate the bundle of modern human traits and cite human-specific components of kinship (Chapais 1998). Some of these traits are found among the other great apes, but only humans have all of them. Thus bilaterality, residence, and marriage alliance result in acquisition of affines and finally, kinship terminology connects all these aspects in a finely meshed pattern through an act of human intelligence as Morgan put it.

What are the requirements for such a cognitive leap? What makes possible the elaborations of purely biological facts of procreation? Extensions from biology to cultural interpretations are based on metaphorical thinking and fully syntactic language. They require uniquely human cognitive features such as symbolic reference and recursiveness, which in turn require a cognitive capacity beyond that of non-human primates. Authors from diverse fields such as linguistics (Pinker 2003; Lakoff and Johnson 2003), humor (Geary 2018), and artificial intelligence (Mitchell 2019a; 2019b) independently concur on the importance of metaphor in human cognition. Melanie Mitchell (2019a; 2019b) argues that the AI has a long way to go to reach the complexity of human thinking based on bodily life experience, common sense, and, most importantly on the ability to produce metaphors. The question is how, why, and when did this capacity for connecting two semantic domains, each based on similarity of relations, take place in the deep history of our species, and when and how did the cognitive leap take place that made this evolutionary change possible? The conceptualization of kinship types was crucial in the transition from non-human primate to human social organization and the 'invention' of kinship terms facilitated, and perhaps was crucial, for this transition. Kin classification might have been the impetus to introduce the essential tools for organizing and expanding social relationships and increasing chances for survival.

Thus, a kinship terminology based on recursion could have been the original nucleus of human syntactic language (Milicic 2013). It is this aspect of human kinship where the patterns of lumping and splitting in kinship terminologies show that there is no simple one-to-one mapping between human conceptualization of kin categories and genealogical relationships, not to men-

tion the denial of existing biological ties and the invention of so-called fictive kinship where biological ties are nonexistent (for example, El Guindi 2013; Milicic 2018).

The long-standing debate on the nature of human kinship from the contrasting and opposing perspectives of biological reductionism and cultural relativism has brought new questions to this fundamental area of anthropology. Even the most influential proponent of biological reductionism, E. O. Wilson (2017), contends that altruism and cooperation are extended beyond the preference for close kin, leaving open the possibility that altruism beyond genetic relatedness is modeled on kinship as metaphor.

All three Avatars agree that it is impossible to think about kinship without referring to procreation. They concur that the mammals and the great apes' phylogeny represent the necessary background for finding the continuity and discontinuity of great apes/human kinship behavior. Human biology – facts of procreation, but also anatomy and physiology in general, skin, the flow of humors -- milk, blood, and sperm – is a template that serves as a canvas for creating multilayered meanings in our species, hard-wired for explanation and interpretation of the world around us. All of this is made possible using analogical thinking that underlies metaphors.

Conclusion

The Avatars converge in the conclusion that human kinship cannot be reduced to either biology or perceived as purely cultural construct. Three important interrelated themes emerge from this debate that need to be further explored. The first is a deeper understanding of the transition from the great apes limited recognition of kin to humans' conception of kinship and particularly their extensions; the second is the need to further investigate how humans respond to challenges of NRT; the third direction is the need for a dialogue between anthropological cognitive analysts and the fast developing Artificial Intelligence researchers, many of whom realize they need to turn towards linguistics in order to produce human-thinking machines (Mitchell 2019). This collaboration could yield a better understanding of the cognitive leap that enabled human social organization to take up a separate trajectory from the other great apes. This is a leap that certainly included syntactic language and perhaps is based on the organizational need for recognition and naming of kin. Furthermore, the deeper exploration of the impact of New Reproductive Technologies and transgender procedures on kinship organization and kinship terminology will provide the test case for the proposed hypothesis that kinship is rooted in the human cognitive capacity for analogical thinking and the production of metaphors.

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