SCIEPublish

Review

Beyond Genetics: Exploring Aspects of Non-Biological Kinship in Prehistoric Times

Sabina Cveček [1,2,3,4,*], Ana Herrero-Corral [5], Katharina Rebay-Salisbury [4,6], Eszter Banffy [4,7], Maxime Brami [8], Raphaëlle Chaix [9], Václav Hrnčíř [10], Kent Johnson [11], David F. Lancy [12], Mélie Le Roy [13], Ruth Mace [14], Peter Schweitzer [15], Rebecca Sear [16], Andaine Seguin-Orlando [17], David Shankland [18], Mehmet Somel [19], Stella Souvatzi [20], Peter Whiteley [3] and Aleksandra Žegarac [21]

[1] Negaunee Integrative Research Center, Field Museum of Natural History, Chicago, IL 60605, USA
[2] Department of Anthropology, University of Illinois at Chicago, Chicago, IL 60607, USA
[3] Division of Anthropology, American Museum of Natural History, New York, NY 10024, USA; whiteley@amnh.org (P.W.)
[4] Austrian Archaeological Institute, Austrian Academy of Sciences, 1019 Vienna, Austria; katharina.rebay-salisbury@univie.ac.at (K.R.-S.); banffy.eszter@abtk.hu (E.B.)
[5] Department of Prehistory, Archaeology, Social Anthropology and Historiographical Science and Techniques, University of Valladolid, 47002 Valladolid, Spain; anamercedes.herrero@uva.es (A.H.-C.)
[6] Department of Prehistoric and Historical Archaeology, University of Vienna, 1010 Vienna, Austria
[7] Institute of Archaeology, Eötvös Loránd University, Research Centre for the Humanities, 1097 Budapest, Hungary
[8] Paleogenetics Group, Johannes Gutenberg University Mainz, 55128 Mainz, Germany; mbrami@uni-mainz.de (M.B.)
[9] UMR7206 Eco-Anthropologie, CNRS, MNHN, Université Paris Cité, 75116 Paris, France; raphaelle.chaix@mnhn.fr (R.C.)
[10] Department of Linguistic and Cultural Evolution, Max Planck Institute for Evolutionary Anthropology, 04103 Leipzig, Germany; vaclav_hrncir@eva.mpg.de (V.H.)
[11] Sociology/Anthropology Department, SUNY Cortland, Cortland, NY 13045, USA; kent.johnson@cortland.edu (K.J.)
[12] Department of Sociology, Anthropology and Criminal Justice, Utah State University, Logan, UT 84322, USA; david.lancy@usu.edu (D.F.L.)
[13] School of Life and Environmental Sciences, Bournemouth University, Poole BH12 5BB, UK; mleroy@bournemouth.ac.uk (M.L.R.)
[14] Department of Anthropology, University College London, London WC1H 0BW, UK; r.mace@ucl.ac.uk (R.M.)
[15] Department of Social and Cultural Anthropology, University of Vienna, 1010 Vienna, Austria; peter.schweitzer@univie.ac.at (P.S.)
[16] Department of Psychology, Brunel University of London, Uxbridge UB8 3PH, UK; rebecca.sear@brunel.ac.uk (R.S.)
[17] Centre for Anthropobiology and Genomics of Toulouse, CNRS UMR 5288, Université de Toulouse, 31000 Toulouse, France; andaine.seguin@utoulouse.fr (A.S.-O.)
[18] Royal Anthropological Institute, London W1T 5BT, UK; david.shankland@therai.org.uk (D.S.)
[19] Department of Biological Sciences, Middle East Technical University, Ankara 06800, Türkiye; msomel@metu.edu.tr (M.S.)
[20] Department of History, Archaeology and Social Anthropology, University of Thessaly, 38221 Volos, Greece; ssouvatzi@uth.gr (S.S.)
[21] BioSense Institute, 21000 Novi Sad, Serbia; aleksandra.zegarac@biosense.rs (A.Ž.)

* Corresponding author. E-mail: scvecek@fieldmuseum.org or sabina.cvecek@oeaw.ac.at (S.C.)

Received: 5 September 2025; Revised: 22 September 2025; Accepted: 9 October 2025; Available online: 22 October 2025

ABSTRACT: This article explores alternative ways of conceptualizing kinship in prehistoric contexts beyond the confines of genetic reductionism. While ancient DNA research has revitalized interest in the archaeology of kinship, it often privileges patrilineal or matrilineal models and risks obscuring forms of relatedness not grounded in biological ties. Drawing on comparative anthropological models and archaeological case studies, the paper highlights the complexity of kinship as manifested in practices of adoption, fosterage, commensality, co-residence, and non-biological affiliation within (non)nuclear households. By integrating socio-cultural, economic, and material dimensions, it demonstrates the diverse methodological and theoretical approaches necessary to move beyond descent-centered reconstructions. The discussion advocates for an interdisciplinary framework that challenges reductionist assumptions and opens new avenues for understanding relatedness in the deep past. Finally, the article emphasizes the village as a unit of analysis within a multi-scalar approach. It presents future directions and archaeological correlates of adoption, child circulation, and fosterage derived from archaeological, genetic, and ethnographic evidence.

https://doi.org/10.70322/natanthropol.2025.10016

Keywords: Ancient DNA; Relatedness; Kinship; Interdisciplinary collaboration; Comparison; European prehistory; Anthropology; Archaeology; Adoption

1. Introduction: Between the Emic, the Etic, and the Genetic Understanding of Making Kin

Sabina Cveček, Ana Herrero Corral, Katharina Rebay-Salisbury

In the last decade, archaeogenetic research has significantly advanced our understanding of genetic relatedness between individuals in archaeological contexts of prehistoric Europe. New results, however, may or may not overlap with kinship, since kinship between humans is in no place in the world defined solely by genetic traits. Several studies have reconstructed the genetic relationships among individuals buried in shared funerary contexts, often reinforcing narratives of patrilineal descent and patrilocal mobility equated with postmarital residence [1–3]. However, these reconstructions based on genetic pedigrees and proximity often overlook individuals who may have been integrated into these communities despite lacking direct genetic ties. Therefore, it remains necessary to adopt a broader understanding of kinship that goes beyond genetic reductionism and considers the social processes involved in forming ancient families and communities as vital for becoming kin.

Genetic reductionism can be best understood through an example. For instance, patrilineal descent, based on tracing ancestry through the male line using the Y-chromosome as a proxy, has been inferred at the Neolithic site of Gurgy in France [3], Hazelton North in England [2] and at the Bronze Age Nepluyevsky in the Southern Urals [4]. However, in socio-cultural anthropology, patrilineal descent is an imaginary and social rather than a biological principle, since persons can be integrated into a descent group through adoption, milk motherhood, alloparenting, and adultery. Moreover, communities of patrilineal descent can vary widely regarding socio-political centralization, household arrangements, and leadership [5]. Therefore, inferring patrilineal descent solely from ancient DNA evidence (1) reduces descent to inheritance of genetic ancestry rather than understanding it as a social process and (2) obscures the variability of practices that may have existed within communities organized along patrilineal lines. Finally, the assumption that "patrilineal descent" can be inferred from high Y-chromosome similarity is untenable, since archaeogenetic data rarely allow us to distinguish patrilineal from bilateral descent [6]. Therefore, the issue remains genetic reductionism—the reduction of kinship practices to patterns observable in ancient DNA, where genetic markers are treated as direct proxies for social organization—and prioritizing one possibility over others in interpretation. This reduces kinship to static models rather than dynamic, messy relations, and represents only one of several troubles with ancient DNA and genomic science [7,8].

In light of these considerations, we organized an international workshop "Beyond Genetics: Non-Biological Kinship in Prehistoric Times", held in October 2024 at the Austrian Archaeological Institute at the Austrian Academy of Sciences in Vienna. The objectives of the workshop were twofold. First, to stimulate interdisciplinary dialogue between archaeologists, geneticists, bioanthropologists, and socio-cultural anthropologists. Second, to explore alternative conceptual tools and methods to address kinship in the deep past that go beyond constructing genetic pedigrees, which archaeogeneticists have so far problematically equated with descent [5]. The two-day event provided a forum for interdisciplinary discussion of methodological approaches, conceptual tools, theoretical frameworks, and interpretations for addressing relationships other than biological or genetic ones in the archaeological record.

As an outcome of that workshop, this article provides a case study of how kinship in non-literate societies can be understood beyond genetic pedigrees. Drawing on examples from Neolithic to Bronze Age contexts across Europe and western and central Asia, it integrates archaeological, bioarchaeological, isotopic, and archaeogenetic evidence to assess diverse forms of relatedness expressed in burial practices. These case studies are set against evolutionary perspectives emphasizing the importance of kinship relations extending beyond the nuclear family, followed by socio-cultural anthropological insights that challenge Western-centric notions of kinship as primarily biological or genetic. Together, these perspectives highlight the complexity of kinship in the past and demonstrate the need for frameworks that move beyond descent-based models.

The article demonstrates that kinship in Eurasian prehistory was far more complex than a simple reflection of genetic relatedness. A series of case studies illustrates how burial practices, isotopic evidence, and spatial organization

within funerary sites reveal kin ties articulated through age grades, commensality, and co-residence. The analysis highlights recurring patterns of co-burial among individuals not genetically related, the significance of gendered mobility within specific kinship models, and the integration of non-biological kin through alliance, adoption, and other practices of becoming kin in both ancient and more recent communities. By foregrounding social, economic, and cultural dimensions, the paper advances a framework for reconstructing past kinship systems that moves beyond a narrow focus on genetic proximity. While contributors to this collaborative work may not share a uniform definition of kinship, they converge in recognizing that kinship cannot be equated with biological relatedness alone.

While ancient DNA research may have been crucial for the renewed interest in archaeology of kinship [9–11], the continuous development of new methods to understand genetic and biological relatedness in the past and the innovative combination of those approaches now allows us to pause, see, and strive. Pause and think about what happens when we combine natural science approaches with qualitative, cross-cultural knowledge grounded in ethnographic insights. See what we can give and take from each other. Finally, we must strive for the multiplicity of scientific approaches that not only offer the answers but raise new, important questions.

First, the paper draws on cross-cultural ethnographic examples to demonstrate how kinship practices such as fostering, adoption, name inheritance, and collective childcare highlight the centrality of non-biological ties in the reproduction of communities. Second, it examines archaeological cases in which genetic data alone cannot account for burial practices, household composition, or community organization, showing how the absence of close biological ties can reveal alternative social logics. Third, it identifies material indicators—including isotopic evidence, burial clustering, grave goods, household contexts, skeletal markers, and microbiome research—that provide ways of recognizing practices of adoption and child mobility in the archaeological record. Finally, the paper concludes by synthesizing diverse perspectives and offering specific, actionable directions for future research, emphasizing integrative methodologies, conceptual clarity, and interdisciplinary collaboration to move the study of kinship in prehistory forward.

The vision for this paper is to bring together a diversity of perspectives that invite readers to consider kinship in the past through multiple lenses. While some sections engage directly with genetics, they do so without reducing kinship to genetic ties alone. Others move beyond genetics altogether, offering insights that nonetheless carry important implications for interpreting kinship and kin-making in light of ancient DNA research. These perspectives encourage interdisciplinary reflection, pushing the boundaries of how kinship in prehistory can be conceptualized, analyzed, and understood.

2. It Takes a Village: Ethnographic Perspectives on Making Kin beyond Biology

This section draws on cross-cultural ethnographic examples to show that kinship is not limited to genetic inheritance but is also actively created through social practices. Instances of fostering and adoption reveal how children could be incorporated into households beyond their families of birth. At the same time, name inheritance served as a powerful mechanism for transmitting identity and belonging across generations. Whether organized through extended families, clans, or entire villages, collective childcare further emphasizes the importance of shared responsibility and care in sustaining social life. These practices highlighted the centrality of non-biological ties in the reproduction of communities, underscoring that kinship was as much a product of lived experience and cultural convention as it was of descent.

2.1. Peter Whiteley

Current applications of descent concepts to the European archaeological record suffer from a certain confirmation bias and seem to exist in a discursive vacuum sealed off from kinship studies in social anthropology. Reductive claims of patrilineal descent and patrilocal residence ignore complementary filiation and fail to consider marriage alliance as a systematic intergroup exchange (well-established in comparative ethnology). Cross-culturally, many sedentary societies without herd animals articulate family membership, rights transmission, and post-marital residence through matriliny. While it has often been held that matriliny is inherently unstable, there are clear cases in Native North America of long-term structural durability—for example, in the Southwest from Chaco Canyon to the present Hopi, Zuni, and Keresans, or in the Southeast, from Mississippian chiefdoms or proto-states to the Choctaw, Creek, Chickasaw, and Natchez.

The Hopi town of Orayvi, with a population of ca. 1000 in 1906, was articulated by matrilineal descent via a Crow nomenclature (signaling strengthened matrilineality, as does Omaha for patrilineality) [12]. Marriage was largely endogamous and classically semi-complex, with nine interchanging matriclan-sets. Ownership of immoveable property—houses—was female. Analysis of two generations of residential movements by males and females into and

out of the Spider clan-house indicates: (1) Orayvi social structure operated via matrilineal clans and houses, but (2) these were constitutively intersected by the complementary filiations of semi-complex marriage alliance, and (3) by kiva group and sodality memberships, especially for males.

Marriage alliance involves predictable and reproducible social relationships over time: a social contract. Things may fall apart and people fight, but the ethnographic record is clear that social relationships are always networked and can never be adequately explained as atomistic action groups of male siblings preserving and passing on power within a closed social space. Out-marrying and in-marrying spouses—whether male in a matrilineal-matrilocal case or female in a patrilineal-patrilocal case—significantly structure social systems via exchange, both within and beyond settlement boundaries. Social identities and relationships, whether or not guided by unilineal descent, are complemented by affinal and other ties that create moral and legal structures of mutuality. To see how these operate systemically and processually over time in particular cases that may help explain the archaeological past, requires looking at the "whole village", so to speak, considered as intersecting networks of social relationships and their material correlates.

2.2. Peter Schweitzer

The "inventor" of the anthropological study of kinship, Lewis Henry Morgan, included Inuit kinship terminologies from the eastern Canadian Arctic in his seminal "System of Consanguinity and Affinity" [13]. Despite Morgan's pioneering work, he erred on one decisive point: his statement that Inuit do not distinguish cross from parallel cousins, but do distinguish all cousins from siblings, was wrong. This erroneous assumption would become the cornerstone in later formulating an "Eskimo type" of kinship terminology and social organization.

As this "Eskimo type" was supposed to be close to Western understandings of kinship, this erroneous formulation led to an underappreciation of Inuit kinship, particularly regarding mechanisms by which relatedness can be created by means other than biological ones. While even Western societies acknowledge marriage and adoption as such possibilities, Inuit societies go beyond these options. The most unusual—from a Western perspective—ways to create Inuit kinship are "spouse exchange" [14] and "name-sake relationships" [15]. While "spouse exchange" seems to have disappeared as a social institution by the early 20th century in most Inuit areas, "name-sake relationships" continue to be relevant in creating social bonds beyond genetics. The historic phenomenon of spouse exchange refers to the use of extra-marital sexual relations in creating kinship ties, typically beyond the residential group, and thereby to building alliances with other such groups. The structural model for spouse exchange seems to have been marriage. The name-sake relationship rests on the Inuit idea of reincarnating named souls. This means that the name soul is being reincarnated in another person; this person not only carries the same name as the deceased but takes over the kinship connections of the dead. Thus, when the name soul of a deceased grandmother reappears in a grandchild, the latter nevertheless would be addressed as grandmother.

The way in which Inuit societies dealt with relatedness, that is, their ingenuity in creating relatedness beyond genetics, is, on the one hand, unique but on the other hand fits the model of "inclusive kinship strategies", geared toward maximizing the number of individuals who can be "made into relatives", if strategically advantageous [16]. Such an inclusive strategy has not only been characteristic of Inuit societies but of many hunter-gatherer and horticultural societies, that is societies in which the recruitment of additional labor power (through relatedness) has been more important than safeguarding property against claims by "relatives".

2.3. Sabina Cveček

Five decades ago, Marshall Sahlins argued that "no system of human kinship relations is organized in accord with the genetic coefficients of relationship as known to sociobiologists" [17]. With the recent use of paleogenetics to reconstruct genetic relations in European archaeology, we might replace "sociobiologists" with "archaeogeneticists" to reflect the present state of research. This is not to downplay the immense opportunities archaeogenetic studies offer to study human genetic relatedness in the deep past. Instead, it is a call to recognize that genetic relatedness does not necessarily equate to kinship [17,18], a distinction well established in socio-cultural anthropology, but still under-acknowledged in archaeogenetic interpretations [5].

If genetic representations of kin, depicted as genetic pedigrees or "kinship diagrams", do not equal kinship, what are they? They are etic models of genetic relatedness rather than emic perceptions of kinship. This emic/etic distinction, crucial in linguistics and socio-cultural anthropology in the 1950s [19], remains relevant for addressing epistemological and methodological issues in archaeology today. What, then, do etic and emic models reveal? An etic model is a model "based on criteria from outside a particular culture" and "held to be universal" [20]. In contrast, an emic model "explains

the ideology or behaviour of members of a culture according to indigenous definitions" that are culture-specific [20]. By measuring and modeling genetic distance between ancient individuals, an external, Western-centric criterion—genetic distance—is applied to archaeological datasets, even though genetic distance may not have played much of a role in the everyday lives of those communities studied. Therefore, such etic or genetic reconstructions of relatedness cannot capture local perceptions of kinship in ancient communities, as kinship does not equal genetic relatedness.

For example, among the Trobriand Islands, the concept of dala—matrilineal reproduction of human beings [21]—shaped not only inheritance and marriage practices but also mortuary distributions, in which women's wealth (skirts and bundles) played a crucial role in disengaging the deceased from the living. Recognizing such emic models of kinship in archaeology is essential to avoid projecting Western assumptions about gender, kinship, and social organization onto the past while recognizing that communities scholars call "matrilineal" or "matrilocal" can be incredibly diverse in terms of gender roles and distribution of socio-political power [22]. Archaeology may never be able to reveal emic understandings of kinship, as this is a particularity of socio-cultural anthropology. However, considering other ways of being related than by blood or shared genes, which include commensality, co-residence, adoption, and milk kinship, among others, remains to be addressed. Archaeogenetics alone cannot do that but requires broadening perspectives beyond Western, Educated, Industrialized, Rich, and Democratic (WEIRD) societies to understand the many ways of kin making, beyond genetic and/or biological relatedness in the past.

2.4. Václav Hrnčíř

Identifying non-biological relatedness in the archaeological record is challenging. One approach that can provide insights is comparative [23]. Unlike simple ethnographic analogies, which can sometimes overemphasize unusual cultural practices—such as the high prevalence of extra-marital relationships among the African Himba [24]—comparative ethnology is more systematic. It analyzes a large sample of ethnographically documented societies to identify the incidence, distribution, and causes of cultural variation. For example, research has shown that among 1,267 societies, the majority have unilineal descent (52% patrilineal and 14% matrilineal), and that descent highly correlates with post-marital residence, although there are many exceptions [25]. Factors such as subsistence, types of inherited resources, and warfare have been proposed as primary drivers of these cultural rules [26].

Social anthropologists and historians have produced many case studies of social kinship, including practices such as adoption, fostering, step-parenthood, and god-parenthood [27–29]. However, global cross-cultural analyses are still lacking [30–32].

Questions remain: How variable are these practices across non-industrial societies? What key cultural factors may explain this variation? How do these relationships link to biology, and how are they reflected in mortuary practices? This knowledge gap presents an opportunity for future research that could advance our understanding of the evolution of human kinship systems and help identify non-biological kinship in past societies.

2.5. Rebecca Sear

Evidence from evolutionary anthropology shows that humans are a social species, characterised by considerable cooperation between individuals, including in the realm of reproduction [33]. Children are not raised by mothers or parents alone; it really does "take a village to raise a child". This contrasts with a popular belief that children are (ideally) raised within an isolated nuclear family, in which fathers have the role of providing for the family while mothers care for children, without help from relatives or others. The popularity of this belief may stem partly from the grains of truth it does contain. Humans are relatively unusual among mammals in forming pair-bonds [34]—though these are not necessarily exclusive or lifelong—and in that men do share food with women and children [35]. There are also typically sexual divisions of labour so that men's and women's roles are not typically identical [36].

However, these roles are not rigid male breadwinner-female homemaker roles. Women typically engage in subsistence activities (as do children) across societies, though what they do varies [37]. There are societies in which women produce most of the calories and others in which men do most of the food production (in such societies, women are involved in food-processing). The role of men in fathering also varies. While women (and children) typically do the bulk of childcare, societies exist where men do substantial amounts [38]. Parents are also never solely responsible for raising children. Other relatives may be involved, particularly older siblings of the children and grandparents (where available) [39–41]. Non-relatives may also help out; sometimes other children provide supervision in "playgroups" [42]; sometimes the "fathering" role may be shared among multiple men [43].

Behavioural flexibility is a hallmark of our species. The flexibility of gender roles and our cooperative reproduction strategy are likely both part of the behavioural adaptability that has led to our success as a species [44]. Archaeological evidence can help expand our knowledge of the forms past families took, but we need to guard against viewing the past through the rigid lens of the present. Many academics may have a distorted view of the "traditional" family, because they are disproportionately likely to be drawn from those few societies in which some version of the male breadwinner family was possible (relatively well-off Western societies of the last few decades) and because dominant voices have recently found it politically expedient to emphasise a rigid view of gender roles [45]. Dropping pre-conceptions about what the "traditional" family looked like, and keeping an open mind about what archaeological evidence can tell us about families of the past, will allow us to interpret such evidence more accurately.

2.6. David F. Lancy

The overriding concern in contemporary Western views of the child, especially if adopted, is to provide a supportive, indulgent and, above all, permanent home for each child. The cornerstone of society as viewed through the lens of kinship in the nuclear family. But what happens to kinship when the ideal is the circulation of children for many good reasons? Here follows a brief survey.

In antiquity, infants were often separated from their families at birth. Infants are "on probation" and may not have a "birth right" to a permanent place [46]. In Roman society, outright infanticide or abandonment, with the possibility of the infant being taken up to be reared as a slave, was commonplace unless or until-the baby had been formally accepted into the family [47]. From the early Middle Ages, an infant would be placed with a "wet nurse" and social ties overrode biological. A newly weaned infant was often placed with its grandmother in village societies.

A number of societies value adoption for improving child outcomes. "Crisis adoption" is widely practiced in the event of a mother's death, or her unavailability—by marrying a man who's not the child's father. Adoption is also common where a woman is barren but has fertile sisters or other female kin. Fosterage is surprisingly common and in a significant minority of societies in Oceania and Africa, upwards of 50% of children are fostered. Fostering usually occurs at an age, say 5 or 6, when the child can be useful to their foster family.

The removal of children from their natal families, is so commonplace and so varied it has been labelled "child circulation" in contemporary anthropological studies, implying multiple moves during childhood [48]. Obviously, the biological parents are in no way held up as the "only" or "best" caretakers for the young child. The Baatombu share "the idea that children are better off raised by [adoptive] parents than biological parents because the latter are "too lenient with them" [49]. Children are often treated as commodities or workers who can be moved from place to place to fulfil someone else's needs. Children are given to others as collateral on a debt, cement alliances, and right a perceived imbalance in human resources and kin ties. After the founding of the Christian church, children as young as five might be donated to monasteries as "oblates" [50]. The range of positive outcomes for the family, society at large and the child that can be realized through child circulation is legion.

2.7. Ruth Mace

Gender inequalities are intricately related to kinship and residence systems, and in particular dispersal at marriage. One sex dispersing at marriage avoids the costs of inbreeding. Dispersal influences how related you are to all those around you. Viewed through the lens of evolutionary anthropology, relatedness is a key driver of who helps whom. If women disperse at marriage, they are unrelated to all those around them when first married. This could put them in a weak bargaining position. Chen, Ge, Zhou, DuMace [51] examine the relationship between relatedness to the household and workload in the Tibetan borderlands area of western China. This area is ideal to test this as there is a huge diversity of kinship and residence patterns, including households which are patrilocal (women disperse at marriage), matrilocal (men disperse at marriage), neolocal (both husband and wife disperse so do not live with either family), or duolocal (a rare matrilineal system where neither sex disperses from their natal home and therefore husband and wife life apart [52]. By using accelerometer data from men and women from all four kinds of households, Chen et al show how the 'step count' (a proxy for workload) varied by sex and by dispersal status: being female was bad for workload, and also dispersing was bad for workload (whether the disperser was male or female). It is perhaps not surprising that males do not often disperse. Furthermore, the sex ratio is also bad for bargaining power for the over-represented sex. In this area, many men go to the monastery as Tibetan Buddhist monks [53,54] and Chen, Ge, Zhou, DuMace [55] show that where this has generated a female-biased sex ratio, women's workloads are even higher. Hence, ecology, mediated by kinship and marriage systems, drives gender inequality in workload.

2.8. Maxime Brami and David Shankland

The relationship between archaeology and social anthropology has long been debated [56,57]. The recent emergence of ancient DNA has brought this relationship into renewed focus, recalling old debates surrounding kinship, and whether kinship is biologically or socially based. These could often become lively, but they are useful today.

A prime example is the interaction between Gellner and Needham. This debate started suddenly when Needham [58] published a discussion paper in 1960 in response to an earlier article by Gellner in 1957 [59] on 'Ideal Language and Kinship Structure', implying that he knew nothing about anthropology. Gellner wrote a famously robust rejoinder. The resulting acrimonious debate continued until editors declined to publish further articles about it.

The issue at hand was, ultimately, rather simple. Gellner claimed that, however rooted in society a kinship structure may be, those who are part of its discourse imply something more than just social relationships, but also are aware of a possible biological link. His detractors, unable to accept this, insisted on regarding kinship as interpreted by social anthropology as only being about social relationships and any biological relationship purely incidental.

To us, Gellner's claim is justified. There is the obvious point that we can employ many words when we wish to imply a link without a biological basis, such as 'friend', 'companion' or 'colleague'. 'Brother', however, implies in its very usage a possible biological tie, even if it may also be used as an extended term. Over and above this, as seen repeatedly in the ancient DNA record, when societies bury their dead, they do so very frequently in a certain order in which we can now discern a genetic pattern. If there was no relationship between biological and social classification, we would not see this pattern but a random distribution of bodies.

This ordered distribution pattern occurs very early. Neanderthals buried close relatives next to each other [60]. The Bronze Age site of Nepluyevsky enables us to see this point again. Three generations of the same family were buried together under one large mound, including six brothers, their partners, children, and grandchildren [4]. Out of 32 individuals sampled, only 7 show no biological relation whatsoever. Unrelated individuals are important of course—they could have been slaves, mercenary guards, guests, traders, incoming partners without known biological relatives. These exceptions, though equally relevant for our exploration of the way a society lived, nevertheless do not alter the fact of the underlying pattern.

3. The Absence of Biological Ties *Is* Telling: Archaeology, Genetics, and Biological Anthropology

While exceptions may not overturn dominant patterns, they remain equally revealing for understanding social organization of communities archaeologists study. What follows is a closer look at a few telling cases. Here, we examine instances where kinship cannot be reduced to descent alone, drawing on case studies from Neolithic southeastern Europe, Anatolia, and central Europe, as well as Bronze Age central and western Europe. Some examples highlight social realities where descent does not appear patrilineal, and closely buried individuals may not necessarily be genetically related. By integrating insights from household archaeology, mortuary archaeology, biological anthropology, and ancient DNA studies, this part underscores the value of multiple perspectives in debates on kinship, showing how the absence of close biological ties can itself illuminate alternative social logics behind burial practices, household composition, and community organization.

3.1. Stella Souvatzi

As a most significant organising principle of human grouping and as closely intertwined with the entire history of humankind, kinship has material, spatial, and temporal dimensions that make the archaeological contribution essential to the wider social research. Anthropology can provide important insights, but ethnographic knowledge cannot be projected into the past. The recent fascination with bioarchaeological data provides "only a partial window on complex patterns of behavior" [61] or even misconstrues kinship as solely biological relatedness. However, kinship is a major mode of structuring habitation space, time, history, and memory, and a cornerstone of the moral economy over a broad range of societies. It is therefore imperative to employ more holistic approaches that will, ideally, integrate the many data sets, methodologies, and disciplinary experiences available to archaeology, including settlement or architectural data and material culture. We also need appropriate, intermediate analytical units that provide fields for interaction between shorter-term actions and longer-term social structures and institutions. In my own research, a focus on the household as a dynamic socio-economic and ritual group [62] enabled me to identify how social units in Neolithic Greece and Turkey were interconnected with each other and depended on wider social institutions, how relatedness was constructed through the shared experience of lived space and the day-to-day interaction in a wide range of activities over long periods, and generally to address numerous kinship-related issues [63–65]. Overall, I suggest that a more

holistic archaeological approach can discern and demonstrate the analytical potential of materiality, spatiality, and temporality as intimately bound with kinship practices, as well as provide insights into the historical variations of kinship.

3.2. Andaine Seguin-Orlando

When did humans develop a binary gendered worldview in prehistory, and how did this normative conception shape past societies? We aim to explore these key questions by integrating molecular data into archaeology and anthropology (ERC StG anthropYXX). Kinship systems and residential rules significantly impact gender discrimination. Patrilocality, in particular, is associated with worse outcomes for women, due to lower parental investment, lack of social support upon marriage, and higher workloads [51]. Trying to disentangle how families were organized in the past is crucial to our project. Palaeogenomics provides insights into reproductive behaviors by determining degrees of relatedness [66–68] and inbreeding [69], making it a valuable tool for reconstructing past kinship systems.

However, using DNA sequencing data to study kinship presents two major challenges. First, terms like "kinship" have distinct meanings across disciplines. In genetics, kinship coefficients quantify genetic sharing between two individuals, while in anthropology, "biological kinship" may hold little to no significance. Productive interdisciplinary collaboration requires acknowledging this polysemy and continuous efforts to use precise terminology—e.g., distinguishing "pedigree" from "family".

Second, genomics alone cannot capture the full complexity and diversity of families, including the sense of belonging and responsibility and the sharing of resources and residence. Over-reliance on molecular data risks overlooking these aspects. The main question would be: Can biological data inform us of a non-biological concept? Molecular data can still provide indirect insights, by underlying outliers: individuals with no genetic ties to others at a site might represent cases of non-biological kinship, akin to a photographic negative revealing unseen details.

We also investigate whether DNA can directly inform us about non-biological kinship. Interestingly, dental calculus samples entrap oral microbes throughout life. Modern studies show that the oral microbiome experiences extensive person-to-person transmission and that cohabiting individuals feature 10 times higher oral strain-sharing rates than non-cohabitants [70]. Our pilot study, sequencing DNA from prehistoric dental calculus, aims to determine if microbes sharing can serve as a marker of past cohabitation, offering a new dimension to family group reconstruction.

Palaeogenomics provides crucial insights into family structures by enabling the reconstruction of pedigrees and determining inbreeding levels. Still, it also holds great potential to explore kinship beyond biological relatedness, especially when integrating a broader interdisciplinary approach.

3.3. Mehmet Somel

The social organisation of the Neolithic settlements in Southwest Asia and whether their communities were organized along biological family lines has been a long-standing question. We have been studying this by inferring genetic relatedness among burials within buildings, which we term house co-burials, using ancient genomes.

Our first observation involves house co-burials in Aceramic Neolithic communities of sedentary foragers: Aşıklı Höyük and Boncuklu in Central Anatolia [71], and Çayönü in North Mesopotamia [72], dating to the 9th-8th millennia BCE. In all cases studied, burials in the same domestic structure were frequently (although not always) close genetic kin, with parent-offspring, avuncular, and first cousin relationships identified. Assuming the burials were household members, this suggested that households were largely nuclear or extended families.

A second observation stems from work on Çatalhöyük, a relatively large 7th-millennium BCE settlement in Central Anatolia. In recent work [73], we genetically studied over 130 individuals buried inside 23 buildings. In Early Çatalhöyük, house co-burials were frequently close genetic relatives, similar to the pattern observed in PPN sites. However, in the Middle and Late periods, house co-burials were less frequently genetically related, sometimes representing multiple biological families, and sometimes genetically unrelated clusters of individuals (Figure 1). Using dietary isotope data from neonates buried in Late Çatalhöyük buildings, we found that house co-burials had similar diets even when not genetically related, suggesting that the pregnant mothers shared similar food. A possible explanation for this is that kinship rules governing household composition changed during Çatalhöyük's occupation.

A third observation also derives from Çatalhöyük. In all periods, whenever genetic ties could be identified among house co-burials, they ran mainly through the maternal line. This pattern could be explained by females being associated with buildings and this association being transmitted over generations. We further discovered a preponderance of burial adornments bequeathed to female subadults. Together, these results suggest a female-centered organisation of

Çatalhöyük society, which contrasts strongly with the male-centered organisation inferred for many later-coming Neolithic and Bronze Age groups in Europe.

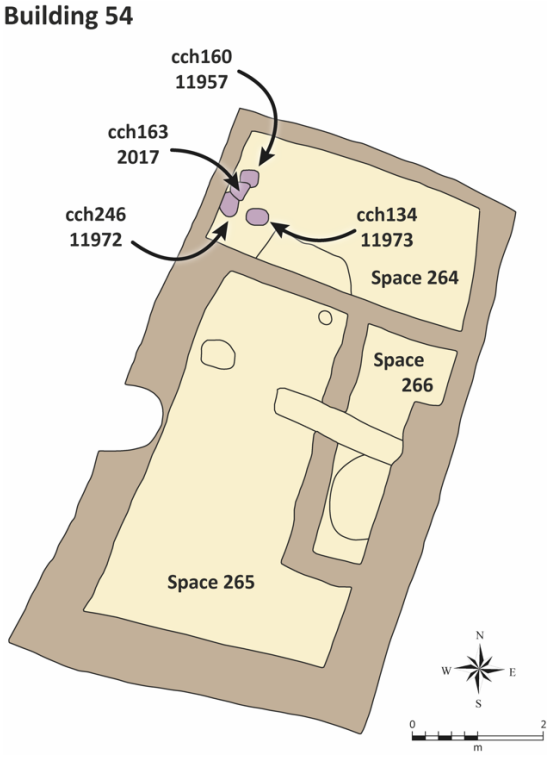

Figure 1. Plan of Building 54 at Neolithic Çatalhöyük with four infants buried close to each other without identified close genetic relatedness. Figure modified from Yüncü et al. [73].

3.4. Aleksandra Žegarac

Kinship studies offer valuable insights into social organization and burial practices of prehistoric populations. To compare regional and temporal variability in family organization and social structure among past populations, we conducted kinship analysis on skeletal remains from present day Serbia, dated to periods of major social changes, the Mesolithic-Neolithic transition, and the Early Bronze Age. Notably, our research included children, often neglected in archaeological studies due to poor preservation, which allowed for a deeper understanding of their roles in prehistoric societies.

We sequenced genomes from two neonates buried beneath a trapezoidal building floor and an infant buried with a woman from the Mesolithic-Neolithic transformation period of the famous Lepenski Vir site (6200–5900 cal. BC). This study aimed to uncover genetic relationships, explore neonates' identities, reasons for unique burial practices and the function of trapezoidal buildings. Findings indicated no close biological ties among the analysed individuals. Kinship analysis and symbolism of the buildings suggest these structures more likely served as communal spaces for social activities than residences for nuclear families. For instance, they could facilitate childbirth or various aspects of the community's social and ritual life, reflecting a deep connection with the surrounding environment [74].

In a separate study of the Early Bronze Age Mokrin necropolis (2100–1800 BC), we examined inheritance patterns, social inequality, and social organization [75]. The study included individuals from multiple burials, which were unusual for the Maros culture. Among these were a young boy and a woman from a triple burial (Figure 2). Despite the assumption that relatives were often buried together, individuals from the triple burial at Mokrin necropolis did not share biological ties. In fact, a sibling relationship was detected between the boy and an individual buried in a neighboring grave. The results suggest that multiple burials were not exclusively arranged around biological relationships, challenging the universal notion that relatives were buried together. Instead, multiple burials may have resulted from special or accidental circumstances, or other close non-biological relationships.

Although these populations were chronologically and culturally distinct, individuals without genetic relatives were buried together, suggesting that family organization was not solely based on biological ties. Social ties played a significant role in shaping burial practices and appear to have been more important factors throughout human prehistory, enabling communities to raise children, gather for activities, exchange knowledge and resources, practice exogamy, or make alliances [76].

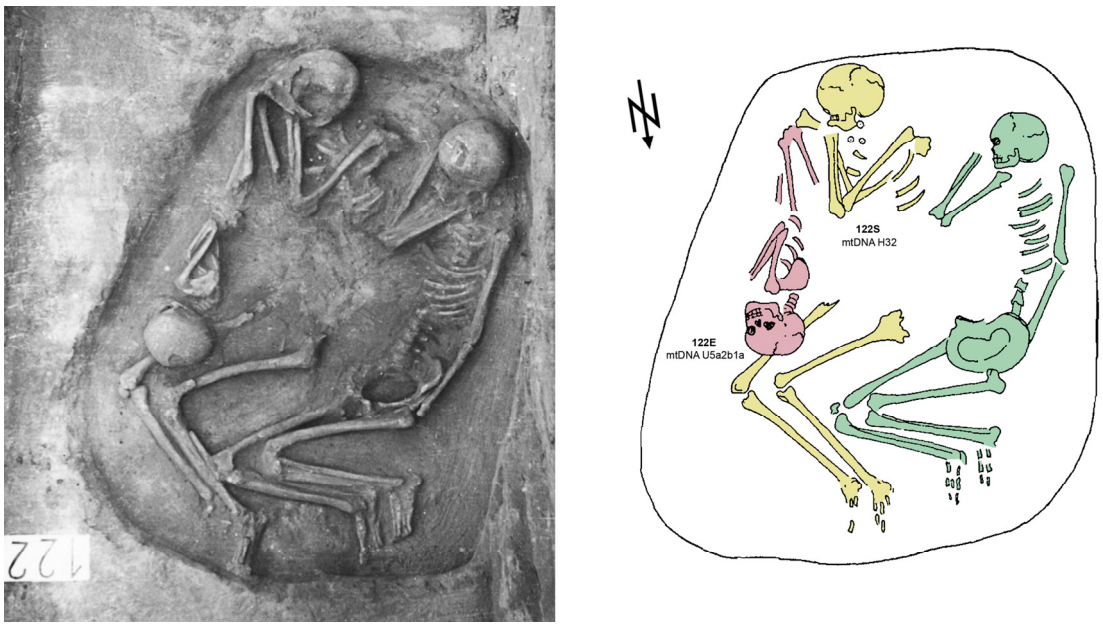

Figure 2. Grave 122 at the Mokrin necropolis contained three skeletons in flexed position: two adults (122S and 122W) and a child (122E). Genetic analysis showed that the child was male and adult individual 122S was female, but they were not closely related. Skeleton 122W was not analyzed due to poor preservation of the petrous bone. Figure modified from Žegarac et al. [75].

3.5. Katharina Rebay-Salisbury

The seminal archaeogenetic study, combined with isotope analysis of 104 individuals that lived in farmsteads in the Bavarian Lech Valley between c. 2500 and 1700 BC [1,77] set the tone for interpreting the social configurations of early Bronze Age central Europe. Unlike the female, the male genetic line can be traced through multiple generations at the Lech valley, but offspring from rich foreign women, who presumably married into the communities, were elusive. Since this study, patrilocality and female exogamy have become the dominant models to view the European Bronze Age.

In general, we are often too quick to assume burial communities are the direct mirror images of communities that lived together in the past. In the Bronze Age specifically, burial practices were complex and expressed social concerns in unfamiliar ways. For example, strict gendered burial practices express a concern with differentiating men and women in some parts of Central Europe, but not others; gender is made on the burial ground [78]. Similarly, how kinship is practiced and enacted in the burial context may give us insights into kinship systems in the past. Emotional and social relationships are expressed in how bodies are placed in relation to each other, for example, in embracing or facing each other. Genetic pedigrees, combined with age-at-death, position within the burial plot, observations about grave re-opening and moving bodies after death, allow us to explore the logic of how burial communities were composed, and thus how kinship was made.

Our studies at sites in Lower Austria [79,80] combined archaeogenetic with context analysis and focused specifically on the role of mothers. At Ulrichskirchen, the genetic mother of two adult sons occupied a central position in the cemetery plot and was one of the best equipped graves of the group. At Unterhautzenthal, a mother was buried in close physical contact with her two children (Figure 3). She was not the biological mother of the children; the biological parents were found in parallel graves about 5 m to the north of the triple grave. At Drasenhofen, we identified two genetic pedigrees; one included two daughters of an adult male who both had offspring buried at the cemetery. One adult male shared a grave with his mother.

In the small cemeteries of the Únětice culture, relatives are buried closer together, but the sequence of deaths seems to be the decisive logic of spatial organization. Mothers—both biological and social—occupy central positions in the cemeteries. Adult daughters remain in the community and reproduce, but they may have lived elsewhere and were brought back after death to be buried.

Our results underline an underexplored variability in the organisation of cemeteries in Early Bronze Age Europe, which may coincide with other aspects of cultural difference. Since biological relatedness does not equate to kinship, and archaeological context provides as much evidence for social kinship as ancient DNA analysis, the juxtaposition and interpretation of context and aDNA analysis together that can provide interesting insights into family structures.

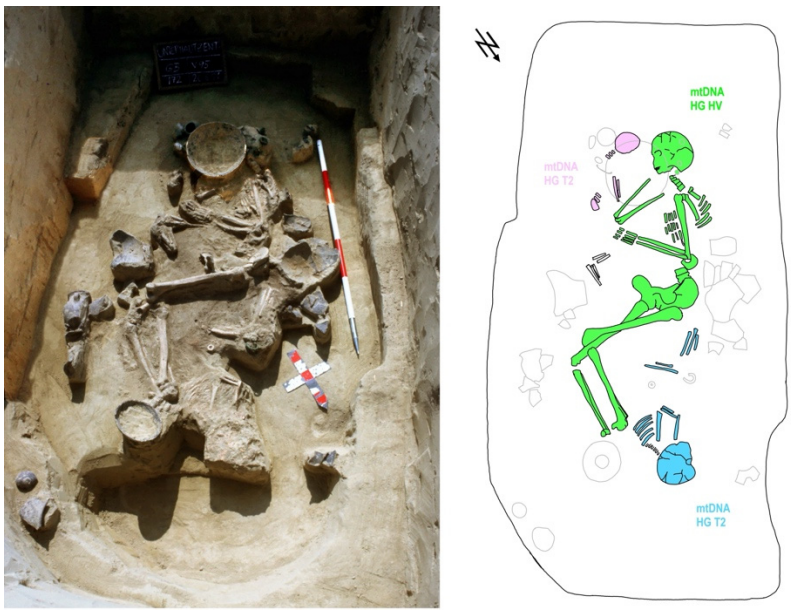

Figure 3. Grave 95 from Unterhautzenthal, Austria, with the bodies of a 35–45-year-old woman buried with a 3–4-year-old girl and a 4–5-year-old Boy. Genetic analysis indicates that the children have a mitochondrial haplogroup distinct from that of the woman. Reprinted/adapted with permission from Rebay-Salisbury et al. [80,81].

3.6. Ana Herrero Corral

Graves containing both adults and children are commonly assumed to reflect biological parent-child relationships, a view grounded in the nuclear family model that overlooks the potential significance of social kinship. In contrast to this biological assumption, an increasing body of research across disciplines suggests that kinship, especially the concept of social kinship, extends beyond genetic relationships [82–84]. The concept of social kinship, or non-biological kinship, emphasizes the fluidity and adaptability of familial bonds, acknowledging that social and emotional ties—formed through caregiving practices—can also create kinship ties.

This broader understanding of kinship is central to the SKIN (Social Kinship and Cooperative Care) project, which examines the diverse relationships between children and adults buried together in tombs from the 3rd and 2nd millennia BCE in Iberia. By integrating archaeological, genetic, and cross-cultural perspectives, the project aims to explore how caregiving practices, particularly allomaternal care, may have played a fundamental role in shaping kinship ties in prehistoric communities. Allomaternal care refers to the involvement of individuals beyond the biological parents in the care and upbringing of children, a practice found across various human societies. It plays a central role in the survival and development of children, particularly in contexts where the nuclear family model is not the sole caregiving structure. This cooperative form of parenting is particularly significant in societies with high dependency demands, such as those with long childhoods or relatively short birth intervals. Ethnographic examples, such as the Efé community in the Democratic Republic of Congo, demonstrate that a wide range of individuals—both related and unrelated—can be involved in child-rearing, contributing to the child's well-being and the social cohesion of the community [85]. Such practices suggest that caregiving relationships may have been central to kinship structures in the past, even in the absence of clear genetic connections.

In prehistoric Iberia, the burial contexts studied in the SKIN project provide valuable insights into how non-biological kinship structures may have existed. While the lack of genetic evidence complicates definitive conclusions, archaeological variables such as body positioning, grave goods, and burial practices offer opportunities to interpret social bonds that transcend biological ties. These findings suggest that, even without biological kinship, caregiving relationships could have formed the foundation of social structure and cultural transmission in prehistoric communities.

3.7. Melie Le Roy

Family and kinship are lifelong processes, starting from birth. Childhood, often overlooked due to the perception that sub-adults are not fully part of society [86], plays a vital role in some cultures where children actively engage in economic and social activities. Therefore, understanding children’s roles can provide insights into the social structure of past societies.

Recent studies have used funerary practices to explore how societies viewed children, offering a promising cultural marker for French Neolithic societies [87]. These studies also highlight how children's roles were defined through social age classes, including their treatment in life and death, such as their diet [88]. This broadens our understanding of children's involvement in the community and the social organisation of the time.

Children's participation in economic activities is another underexplored area. Archaeological records often identify artefacts made by unskilled individuals or smaller items, interpreted as training tools or toys. However, little research has focused on biological anthropology in this context. For instance, Neolithic human remains from the Ardèche department (Southern France) show tooth wear linked to basket-making [89]. Some decidual teeth show similar marks, suggesting that children aged 4 to 9 participated in this practice [90].

These findings raise questions about how children learned these skills. Three main models exist [91]: imitation (children mimic adults), peer learning (older children teach younger ones), and apprenticeship (adults train children). This aspect is an entirely unexplored area as far as kinship is concerned, and goes beyond genetics to involve a process of knowledge transmission and social interactions among individuals.

3.8. Kent Johnson

Archaeogenetic analyses are powerful tools for investigating kinship in archaeological contexts. However, archaeogenetic data provide limited and potentially misleading insights about ancient kinship because kinship is a social relationship constrained by but not reducible to biological relatedness [92]. Archaeogenetic analyses fail to detect kin relationships based on social relatedness that are formally recognized within kinship systems. They incorrectly identify as kin those individuals who share close genetic relatedness who were not socially recognized as kin during life. Investigating biosocial relatedness using skeletal and dental data from archaeological contexts is one way to move beyond these limitations of archaeogenetic kinship studies.

Instead of assuming that genetic relatedness makes people kin, we can investigate how people used discourses of relatedness to create kinship in archaeological contexts. Social kin can share similar phenotypes through patterned interactions and shared experiences such as commensality, collective labor, and co-residence [84]. These patterns of kin relationships can be embodied—incorporated into and imprinted on human bodies via cellular responses to social and physical environmental stimuli [93,94]. For example, a study of linear defects in tooth enamel (LEH) in individuals of known genealogy found that LEH expression was influenced by shared household environments as well as genetic effects [95].

Other skeletal indicators of stress or disease may reflect shared family health experiences. Musculoskeletal stress markers could indicate collective kin labor. Isotopic evidence of paleomobility could reflect kin-based migration and mobility patterns. Cultural modification of the body could signal family-based identities. Individually, none of these may be sufficient to identify social kin, but analysis of multiple skeletal and dental traits can facilitate inferences about biosocial relatedness and kinship behaviors in the past that complement inferences from archaeogenetic analyses.

3.9. Raphaëlle Chaix

I summarise here some of the knowledge gained through the interdisciplinary sampling of over 2000 individuals from different Asian populations having different kinship systems (notably matrilineal, patrilineal, and bilateral descent rules). We have collected genetic as well as ethno-demographic information for each individual (birth and residence place, mother tongue, descent group affiliation, reproduction history).

Firstly, we observed that there are different ways to be patrilineal: pastoralists from Central Asia have a much stricter and segmentary patrilineal system than patrilineal horticulturalists in Southeast Asia. In the former, individuals from the same lineage have high Y chromosome kinship. In the studied horticulturalists, no such significant Y chromosome kinship was observed within patrilineal groups [96,97]. Why is this the case? Ethnographic data [98] show that in the studied horticulturalists, a ritual allows integrating the newcomers into a local lineage if a house moves to another village. In addition, there is little control on pre-marital sex in these horticulturalists, meaning that a child born from pre-marital sex may be integrated in the patrilineal group of his mother, which further reduces the Y chromosome kinship within these groups. We hypothesize that such a looser descent system in the horticulturalists compared to the pastoralists relates to the lower level of economic cooperation within their patrilineal groups.

We believe such variation in the degree of observance of the patrilineal descent rule depending on the populations has implications for archeogenetic studies. People not sharing the same Y chromosome haplogroups may actually belong to the same patrilineage or clan. Simulations have confirmed this: when descent or residence is loose, the

influence of such a kinship system on uniparental genetic markers and estimators of male and female relatedness can be very limited, so that such estimators do not allow inferring the descent or residence rule of the population [6].

Our simulations also shows that it is often not possible to distinguish a bilateral descent system from a patrilineal descent system from archeogenetic data: under patrilocal residence, both are expected to yield similar genetic patterns at local levels. Only when the patrilineal descent is strict and estimates are computed at larger scales (e.g., a whole village) can we distinguish a patrilineal system from a bilateral patrilocal system: the former but not the latter is expected to lead to a great reduction in Y chromosome diversity. Such reduction has been observed in patrilineal pastoralists from Central Asia [99,100] and in many human populations 3000 to 5000 years ago [101]. This may be the signature of a social transition towards a higher proportion of strict patrilineal descent systems in those times [102].

4. Look into the Future: Identifying Adoption and Circulation of Children in the Archaeological Record

Sabina Cveček, Ana Herrero Corral, Katharina Rebay-Salisbury

Regardless of matrilineal, patrilineal, or bilateral descent, this article foregrounds an important anthropological insight that it takes a village not only to raise a child but also to map and understand kin networks. Cases from Africa, Asia, Europe, North America, and the Pacific highlight the incredible diversity of kinship practices on a global scale that do not conform to biological or genetic proximity. These include matrilineal systems of descent, patterns of marriage alliances, the inheritance of names to transmit identity, and the widespread circulation of children through adoption and fostering. Moreover, the archaeological studies from the Neolithic in southeastern Europe and Anatolia as well as the Bronze Age in central and western Europe, point toward a similar trend: burying non-related individuals close to each other might be less frequent but significant. Taken together, such examples underscore that kinship networks were frequently constructed through non-biological ties, with social relations of care, obligation, and affiliation playing a central role alongside, or even in place of, genetic relatedness.

This article emphasizes the importance of considering the village as a unit of analysis and the importance of mobility of children for care and support networks. Therefore, we outline several potential archaeological correlates through which versions of adoption and circulation of children might be identified in an archaeological context. We propose different possibilities based on multiple lines of evidence, including archaeological contexts, genetic and isotope evidence, biological anthropological insights, and ethnographic evidence. Even though many of the practices of care and mobility of children are invisible in the archaeological record, some practices, with careful consideration of the isotopic evidence and the lack of genetic ties between co-buried individuals, could be telling.

List of potential archaeological correlates of the circulation of children, fostering, adoption, and co-residence beyond the nuclear family, based on archaeological, genetic, and ethnographic evidence:

- Isotopic evidence of non-local origins: Strontium ($^{87}Sr/^{86}Sr$) and oxygen isotope ($\delta^{18}O$) analyses of children's teeth may indicate geographic mobility inconsistent with their burial placement.
- Burial clustering without genetic ties: Children and infants interred alongside adults or peers to whom they show no biological relation may signal incorporation through fosterage, adoption, or milk kinship.
- Grave goods and status markers: Distinctive or high-status goods accompanying non-biologically related children may reflect their social integration or special roles.
- Household composition: Domestic contexts containing infants or children of diverse genetic backgrounds but with similar nitrogen ratios ($\delta^{15}N$) reflecting a shared diet may suggest mobility of children between households.
- Skeletal and phenotypic indicators: Divergent dietary or stress markers in childhood, later converging with local patterns, may point to incorporation into new communities.
- Microbiome research: Oral microbiomes preserved in ancient dental calculus may provide evidence of co-residence and shared living environments.
- Ethnographic parallels: Models of adoption and fostering as alliance-building, labor redistribution, or care provision can open up new possibilities for interpreting individual archaeological cases.

Future research on prehistoric kinship has the potential to move the field forward by embracing integrative methodologies that combine ancient DNA with isotopic, osteological, and archaeological evidence at household and community scales without assuming that biological proximity equals kinship or that the absence of biological ties means persons were not related. Such an approach highlights kinship as more than biological inheritance, revealing how co-residence, subsistence, and shared practices shaped meaningful social lives.

New avenues, such as the study of child mobility through isotopic and microbiome analyses, can shed light on fostering, adoption, and the circulation of children as constitutive elements of past communities. These methods promise to expand our capacity to see social processes otherwise invisible in the genetic record. Here, ethnographic knowledge provides a rich comparative framework—whether matrilineal systems, bilateral practices, or forms of fosterage—that can inspire new questions without relying on direct analogies. Drawing from ethnographic knowledge to think about archaeological contexts helps us recognize the contributions and the limits of genetic data while ensuring that broader social variability remains visible.

The future, therefore, lies in collaboration and innovation. Teams that bring together archaeologists, geneticists, and anthropologists can frame shared research questions, ensuring balanced interpretations. Tools, such as social network analyses that integrate biological and material evidence, will further help visualize the complexity of kinship in new ways and highlight the diversity of kinship as a dynamic process. Taken together, these directions not only respond to current challenges but also open new possibilities for a more holistic and ambitious science of past human relations.

5. Concluding Thoughts: Looking Back, Moving Forward *Eszter Bánffy*

The 2024 conference held in Vienna, which served as the impetus for the recent collection of ideas and presented in this paper, is a significant indicator of a major transformation within and at the crossing of the disciplines of archaeogenetics, archaeology, and (biological, cultural, and social) anthropology. This impending shift signals a fundamental re-evaluation of our understanding of archaeological phenomena like cemeteries, grave assemblages, kinship structures, and their broader social implications—in general, our understanding of patterns in past societies.

Historically, archaeological and anthropological interpretations of ancient communities, including their manifestations in burial contexts, have often proceeded in parallel, with limited interdisciplinary engagement or mutual consideration. This phenomenon might go back to their partly diverse roots in colonialism, the Age of Enlightenment, and romanticism [103], but makes it nonetheless necessary to enhance inter- (or by including osteology and molecular bioarchaeology), multi-disciplinary approaches. From an archaeological perspective (which is my angle), burial grounds have traditionally been interpreted as representative of a single community, while grave assemblages were seen as reflecting kinship ties within extended families; moreover, the presence of multiple individuals within a single grave was often assumed to indicate nuclear family relationships.

The findings from ancient DNA analysis have challenged all these assumptions. The lack of genetic relatedness in multiple burials has served as a crucial catalyst, compelling experts who previously assumed kinship structures analogous to modern Western traditions to reconsider their interpretations. No nuclear family ties, no “mother and child”, or “parents with their children” burials can be taken for granted anymore! Biological distance draws attention to other kinds of emotional ties, like foster children, blood brotherhood, milk siblings, and many more variations of understanding kinship in anthropology; now these can be tracked in genetic ancestry among human remains of past communities. These results have prompted renewed discussions within and between both archaeology and cultural anthropology regarding the fundamental nature of kinship, family structures, and social organisation in the past. Notably, it seems that archaeogenetics helps archaeology and anthropology cooperate closely.

The current dialogue on various aspects highlights yet another interesting inference. The new insights on kinship and gender roles in given social structures of past communities necessarily expand most traditional views. While societies across the globe have been the focus of anthropology since the beginning, the initial condition of its birth in Europe seems to have determined archaeology more extensively: it became caught by the post-medieval mindset of Western societies. A tradition about research questions in Europe taken as ubiquitous, while questions from other continents are considered barely relevant to Europe, needs to be consistently re-examined, as increasing cross-cultural studies shed light on both ubiquitous and incidental phenomena.

If there is still something to be missed in the row of the three approaches to the theme, it might be the archaeological context analysis in its broadest sense. Acknowledging that biological parentage does not exclusively determine kinship, but it is a more complex social and cultural construction, mortuary practice offers itself to be more involved; what is more, the ancestral powers of earlier burials, e.g., in longer occupied settlements with a diachronic history of local burials. Similar composition, quality, and quantity of grave goods could also be seen as signifying two deceased members considered during their lives as akin—all are possible avenues to pursue for thanato-archaeologists.

Consequently, the paper addresses the three disciplinary perspectives of ancient DNA investigations, as well as findings of archaeology and anthropology through distinct segments. While these sections may appear somewhat disparate and their foci not fully convergent, they are to serve two important functions: to highlight the necessity for

interdisciplinary dialogue concerning the juxtaposition of biological pedigrees (their close or more distant grades, resp., or their complete absence) with archaeological and anthropological data, and to illustrate the breadth and diversity of research areas requiring novel approaches, analyses, and interpretations. Similar to the volume edited by Meller et al. 2023 [104], which stemmed from a conference in Halle, the recent paper is anticipated to stimulate theoretical discussions concerning the distinctions (and links) between genetic and social relatedness.

After the nineteenth century, scholarly disciplines increasingly evolved in relative isolation, each refining its own methods and epistemologies. Today, however, archaeology—especially in dialogue with the natural sciences such as (molecular) biology—exemplifies a renewed era of integration, where disciplinary boundaries are crossed and knowledge is enriched through collaboration. This reintegration is a future avenue and a vital safeguard, enabling us to cross-check and contextualize evidence drawn from single sources—whether ancient DNA, social kin structures, or archaeological features—and to approach the full complexity of human history. Drawing insights from genetic research, biological and cultural anthropology, and archaeology opens new paths toward understanding human social history across millennia. Such work demands both intellectual curiosity and humility, an attitude best cultivated by archaeologists, anthropologists, and molecular biologists alike as we investigate our shared human past.

Acknowledgements

The conference “Beyond Genetics: Exploring Non-Biological Kinship in Prehistoric Times” was generously supported by the Fritz Thyssen Foundation and the University of Vienna. We are grateful to the Austrian Academy of Sciences’ Austrian Archaeological Institute for hosting us and providing the facilities. Special thanks go to Hannah Skerjanz, Domnika Verdianu, and Sigrid Pratsch for their invaluable help and organizational expertise, as well as to Elisabeth Weissensteiner and Mario Börner for their assistance with figures and the visual abstract.

Author Contributions

Conceptualization, S.C., A.H.-C. and K.R.-S.; Writing—Original Draft Preparation, S.C., A.H.-C., K.R.-S., E.B., M.B., R.C., V.H., K.J., D.F.L., M.L.R., R.M., P.S., R.S., A.S.-O, D.S., M.S., S.S., P.W. and A.Ž.; Writing—Review & Editing, S.C., A.H.-C. and K.R.-S.; Project Administration, S.C., A.H.-C. and K.R.-S.; Funding Acquisition, S.C., A.H.-C., K.R.-S., A.S.-O. and P.S.

Ethics Statement

Not applicable.

Informed Consent Statement

Not applicable.

Data Availability Statement

Not applicable.

Funding

This research was funded by Fritz Thyssen Foundation grant number 30.24.0.100AA (S.C., A.H.-C. and K.R.-S.), European Union’s Marie Skłodowska-Curie Action Grant Number 101108084 “X-KIN: Exploring Patterns of Prehistoric Kinship from Socio-Cultural Anthropological Perspectives” (S.C.) and Grant Number 101062307 “SKIN: Social Kinships and Cooperative Care. Approaching Relatedness in Later Prehistory through the Analysis of Women and Children Buried Together” (A.H.-C.), as well as by the European Research Council (ERC) under the European Union’s Horizon 2020 Research and Innovation Program Grant Numbers 101117101 “anthropYXX” (A.S.-O.) and 885646 “infraNorth” (P.S.).

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

References

1. Mittnik A, Massy K, Knipper C, Wittenborn F, Pfrengle S, Carlichi-Witjes N, et al. Kinship-based social inequality in Bronze Age Europe. *Science* **2019**, *366*, 731–734. doi:10.1126/science.aax6219.
2. Fowler C, Olalde I, Cummings V, Armit I, Büster L, Cuthbert S, et al. A high-resolution picture of kinship practices in an Early Neolithic tomb. *Nature* **2022**, *601*, 584–587. doi:10.1038/s41586-021-04241-4.
3. Rivollat M, Rohrlach AB, Ringbauer H, Childebayeva A, Mendisco F, Barquera R, et al. Extensive pedigrees reveal the social organization of a Neolithic community. *Nature* **2023**, *620*, 600–606. doi:10.1038/s41586-023-06350-8.
4. Blöcher J, Brami M, Feinauer IS, Stolarczyk E, Diekmann Y, Vetterdietz L, et al. Descent, marriage, and residence practices of a 3,800-year-old pastoral community in Central Eurasia. *Proc. Natl. Acad. Sci. USA* **2023**, *120*, e2303574120. doi:10.1073/pnas.2303574120.
5. Cveček S. Why kinship still needs anthropologists in the 21st century. *Anthropol. Today* **2024**, *40*, 3–6. doi:10.1111/1467-8322.12861.
6. Guyon L, Heyer E, Chaix R. Was descent in Neolithic and Bronze Age Europe patrilineal or bilateral? *Proc. R. Soc. B* **2025**, *292*, 20250815. doi:10.1098/rspb.2025.0815.
7. Cveček S, Raghavan M, Bickle P. Kinship Trouble: What, When, Where, Why, and How—and So What? *Camb. Archaeol. J. in press*.
8. Källén A. *The Trouble with Ancient DNA: Telling Stories of the Past with Genomic Science*; Chicago University Press: Chicago, IL, USA, 2025.
9. Ensor BE. *The Not Very Patrilocal European Neolithic. Strontium, aDNA, and Archaeological Kinship Analyses*; Archaeopress: Oxford, UK, 2021.
10. Bentley RA. Prehistory of Kinship. *Annu. Rev. Anthropol.* **2022**, *51*, 137–154. doi:10.1146/annurev-anthro-041320-021036.
11. Brück J, Frieman CJ. Making kin: The archaeology and genetics of human relationships. *TATuP-Zeitschrift für Technikfolgenabschätzung Theorie und Praxis* **2021**, *30*, 47–52. doi:10.14512/tatup.30.2.47.
12. Whiteley P, McConvell P. How Crow-Omaha Skewing Spreads. *J. Anthropol. Res.* **2021**, *77*, 483–519. doi:10.1086/716742.
13. Morgan LH. *Systems of Consanguinity and Affinity of the Human Family*; Smithsonian Institution: Washington, DC, USA, 1871.
14. Guemple L. *Inuit Spouse-Exchange*; Department of Anthropology, University of Chicago: Chicago, IL, USA, 1961.
15. Schweitzer PP, Golovko EV. Local Identities and Traveling Names: Interethnic Aspects of Personal Naming in the Bering Strait Area. *Arct. Anthropol.* **1997**, *34*, 167–180.
16. Schweitzer PP. (Ed.) *Dividends of Kinship: Meanings and Uses of Social Relatedness*; Routledge: London, UK, 2000.
17. Sahlins MD. *The Use and Abuse of Biology: An Anthropological Critique of Sociobiology*; University of Michigan Press: Ann Arbor, MI, USA, 1976.
18. Ingold T. Becoming Persons: Consciousness and Sociality in Human Evolution. *Cult. Dyn.* **1991**, *4*, 355–378. doi:10.1177/092137409100400307.
19. Mostowlansky T, Rota A. Emic and etic. In *The Open Encyclopedia of Anthropology*, Stein F, Ed.; 2023. http://doi.org/10.29164/20emicetic.
20. Barnard A, Spencer J. (Eds.) *Encyclopedia of Social and Cultural Anthropology*, 1st ed.; Routledge: London, UK, 1997.
21. Weiner AB. Trobriand Kinship from Another View: The Reproductive Power of Women and Men. *Man* **1979**, *14*, 328–348. doi:10.2307/2801571.
22. Cveček S. Enthrone, dethrone, rethrone? The multiple lives of matrilineal kinship in Aegean prehistory. *Archaeol. Dialogues* **2023**, *30*, 102–122. doi:10.1017/S1380203824000059.
23. Hrnčíř V, Květina P. Application of Comparative Ethnology in Archaeology: Recent Decades. *Anthropologie* **2023**, *61*, 229–246.
24. Scelza BA, Prall SP. Only Death Will Separate Us: The Role of Extra-marital Partnerships among Himba Pastoralists. *Arch. Sex. Behav.* **2023**, *52*, 1355–1363. doi:10.1007/s10508-023-02553-2.
25. Murdock GP. *Ethnographic Atlas*; University of Pittsburgh Press: Pittsburgh, PA, USA, 1967.
26. Surowiec A, Snyder KT, Creanza N. A worldwide view of matriliny: Using cross-cultural analyses to shed light on human kinship systems. *Philos. Trans. R. Soc. B Biol. Sci.* **2019**, *374*, 20180077. doi:10.1098/rstb.2018.0077.
27. Bowie F. (Ed.) *Cross-Cultural Approaches to Adoption*; Routledge: London, UK, 2004.
28. Carroll V. (Ed.) *Adoption in Eastern Oceania*; University of Hawaii Press: Honolulu, HI, USA, 1970.
29. Warner L, Erdélyi G. (Eds.) *Stepfamilies Across Europe and Overseas, 1550–1900*; Routledge: London, UK, 2024.
30. Hewlett B, Boyette AH, Chellan V, Dira S, Fouts H, Hill K, et al. Stepfamilies, adoption and other forms of the family in hunter-gatherers. *Hunt. Gatherer Res.* **2023**, *9*, 209–236. doi:10.3828/hgr.2024.26.
31. Payne-Price AC. Etic Variations on Fosterage and Adoption. *Anthropol. Q.* **1981**, *54*, 134–145. doi:10.2307/3317891.
32. Silk JB. Adoption and Kinship in Oceania. *Am. Anthropol.* **1980**, *82*, 799–820. doi:10.1525/aa.1980.82.4.02a00050.

33. Hrdy SB. *Mothers and Others: The Evolutionary Origins of Mutual Understanding*; Harvard University Press: Cambridge, MA, USA, 2009.
34. Schacht R, Kramer KL. Are We Monogamous? A Review of the Evolution of Pair-Bonding in Humans and Its Contemporary Variation Cross-Culturally. *Front. Ecol. Evol.* **2019**, *7*, 426706. doi:10.3389/fevo.2019.00230.
35. Jaeggi AV, Gurven M. Natural cooperators: Food sharing in humans and other primates. *Evol. Anthropol. Issues News Rev.* **2013**, *22*, 186–195. doi:10.1002/evan.21364.
36. Bird R. Cooperation and conflict: The behavioral ecology of the sexual division of labor. *Evol. Anthropol. Issues News Rev.* **1999**, *8*, 65–75. doi:10.1002/(SICI)1520-6505(1999)8:2<65::AID-EVAN5>3.0.CO;2-3.
37. Hewlett BS. Culture, History, and Sex. *Marriage Fam. Rev.* **2000**, *29*, 59–73. doi:10.1300/J002v29n02_05.
38. Hewlett BS. *Intimate Fathers: The Nature and Context of Aka Pygmy Paternal Infant Care*; University of Michigan Press: Ann Arbor, MI, USA, 1991.
39. Kramer KL, Veile A. Infant allocare in traditional societies. *Physiol. Behav.* **2018**, *193*, 117–126. doi:10.1016/j.physbeh.2018.02.054.
40. Meehan CL. The effects of residential locality on parental and alloparental investment among the Aka foragers of the central African Republic. *Hum. Nat.* **2005**, *16*, 58–80. doi:10.1007/s12110-005-1007-2.
41. Kramer KL. Children's Help and the Pace of Reproduction: Cooperative Breeding in Humans. *Evol. Anthropol. Issues News Rev.* **2005**, *14*, 224–237. doi:10.1002/evan.20082.
42. Page AE, Emmott EH, Dyble M, Smith D, Chaudhary N, Viguier S, et al. Children are important too: Juvenile playgroups and maternal childcare in a foraging population, the Agta. *Philos. Trans. R. Soc. B Biol. Sci.* **2021**, *376*, 20200026. doi:10.1098/rstb.2020.0026.
43. Hill K, Hurtado AM. Cooperative breeding in South American hunter–gatherers. *Proc. R. Soc. B Biol. Sci.* **2009**, *276*, 3863–3870. doi:10.1098/rspb.2009.1061.
44. Kramer KL. Cooperative Breeding and its Significance to the Demographic Success of Humans. *Annu. Rev. Anthropol.* **2010**, *39*, 417–436. doi:10.1146/annurev.anthro.012809.105054.
45. Sear R. The male breadwinner nuclear family is not the 'traditional' human family, and promotion of this myth may have adverse health consequences. *Philos. Trans. R. Soc. B Biol. Sci.* **2021**, *376*, 20200020. doi:10.1098/rstb.2020.0020.
46. Lancy DF. *The Anthropology of Childhood: Cherubs, Chattel, Changelings*, 3rd ed.; Cambridge University Press: Cambridge, UK, 2022.
47. Lancy DF. *Playing on the Mother Ground: Cultural Routines for Children's Development*; Guilford: New York, NY, USA, 1996.
48. Leinaweaver JB. *The Circulation of Children: Kinship, Adoption, and Morality in Andean Peru*; Duke University Press: Durham, UK, 2008.
49. Alber E. "The real parents are the foster parents": Social parenthood among the Baatombu in Northern Benin. In *Cross Cultural Approaches to Adoption*; Bowie F, Ed.; Routledge: London, UK, 2004; pp. 33–47.
50. Crawford S. *Childhood in Anglo-Saxon England*; Stroud: Sutton, UK, 1999.
51. Chen Y, Ge E, Zhou L, Du J, Mace R. Sex inequality driven by dispersal. *Curr. Biol.* **2023**, *33*, 464–473.e4. doi:10.1016/j.cub.2022.12.027.
52. He Q-Q, Rui J-W, Zhang L, Tao Y, Wu J-J, Mace R, et al. Communal breeding by women is associated with lower investment from husbands. *Evol. Hum. Sci.* **2022**, *4*, e50. doi:10.1017/ehs.2022.47.
53. Zhou L, Ge E, Micheletti AJC, Chen Y, Du J, Mace R. Monks relax sibling competition over parental resources in Tibetan populations. *Behav. Ecol.* **2022**, *33*, 1070–1079. doi:10.1093/beheco/arac059.
54. Micheletti AJC, Mace R. Sibling competition and dispersal drive sex differences in religious celibacy. *Evol. Hum. Behav.* **2024**, *45*, 144–152. doi:10.1016/j.evolhumbehav.2024.01.004.
55. Chen Y, Ge E, Zhou L, Du J, Mace R. Gender inequality in workloads explained by operational sex ratio. *iScience* **2024**, *27*, 110063. doi:10.1016/j.isci.2024.110063.
56. Shankland D. *Archaeology and Anthropology: Past, Present and Future*; Berg: Oxford, UK, 2012.
57. Spriggs M. (Ed.) *Archaeology and Anthropology: Areas of Mutual Interest*; Archaeopress: Oxford, UK, 1977.
58. Needham R. Descent Systems and Ideal Language. *Philos. Sci.* **1960**, *27*, 96–101.
59. Gellner E. Ideal Language and Kinship Structure. *Philos. Sci.* **1957**, *24*, 235–242.
60. Skov L, Peyrégne S, Popli D, Iasi LNM, Devièse T, Slon V, et al. Genetic insights into the social organization of Neanderthals. *Nature* **2022**, *610*, 519–525. doi:10.1038/s41586-022-05283-y.
61. Bickle P, Van Vleet K, Souvatzi S, Cintas Peña M, Rebay-Salisbury K, Schauer P, et al. Moving to stay in (a woman's) place: was patrilocality the dominant mode of post-marital residence across later European Prehistory? *Curr. Anthropol.* **2025**, *66*. doi:10.1086/738727.
62. Souvatzi SG. *A Social Archaeology of Households in Neolithic Greece: An Anthropological Approach*; Cambridge University Press: Cambridge, MA, USA, 2008.
63. Souvatzi S. Kinship and Social Archaeology. *Cross Cult. Res.* **2017**, *51*, 172–195. doi:10.1177/1069397117691028.

64. Souvatzi S. Kinship, Social Space and History in Prehistory. In *Social Archaeology of Kinship in Iberia and Beyond: Recent Multistranded Advances from Household Archaeology to aDNA*; Blanco-González A, Alarcón-García E, Eds.; Sidestone: Leiden, The Netherlands, *in press*.
65. Souvatzi S. Concentricity, Circularity and Kinship in the First Farming Communities: Examples from Neolithic Greece and Turkey. In *Prehistoric Kinship: Contemporary Perspectives in Archaeology and Bioarchaeology*; Souvatzi S, Bickle P, Cveček S, Eds.; Cambridge University Press: Cambridge, MA, USA, *in press*.
66. Popli D, Peyrégne S, Peter BM. KIN: A method to infer relatedness from low-coverage ancient DNA. *Genome Biol.* **2023**, *24*, 10. doi:10.1186/s13059-023-02847-7.
67. Ringbauer H, Huang Y, Akbari A, Mallick S, Olalde I, Patterson N, et al. Accurate detection of identity-by-descent segments in human ancient DNA. *Nat. Genet.* **2024**, *56*, 143–151. doi:10.1038/s41588-023-01582-w.
68. Alaçamlı E, Naidoo T, Güler MN, Sağlıcan E, Aktürk Ş, Mapelli I, et al. READv2: advanced and user-friendly detection of biological relatedness in archaeogenomics. *Genome Biol.* **2024**, *25*, 216. doi:10.1186/s13059-024-03350-3.
69. Ringbauer H, Novembre J, Steinrücken M. Parental relatedness through time revealed by runs of homozygosity in ancient DNA. *Nat. Commun.* **2021**, *12*, 5425. doi:10.1038/s41467-021-25289-w.
70. Valles-Colomer M, Blanco-Míguez A, Manghi P, Asnicar F, Dubois L, Golzato D, et al. The person-to-person transmission landscape of the gut and oral microbiomes. *Nature* **2023**, *614*, 125–135. doi:10.1038/s41586-022-05620-1.
71. Yaka R, Mapelli I, Kaptan D, Doğu A, Chyleński M, Erdal ÖD, et al. Variable kinship patterns in Neolithic Anatolia revealed by ancient genomes. *Curr. Biol.* **2021**, *31*, 2455–2468.e18. doi:10.1016/j.cub.2021.03.050.
72. Altınışık NE, Kazancı DD, Aydoğan A, Gemici HC, Erdal ÖD, Sarıaltun S, et al. A genomic snapshot of demographic and cultural dynamism in Upper Mesopotamia during the Neolithic Transition. *Sci. Adv.* **2022**, *8*, eabo3609. doi:10.1126/sciadv.abo3609.
73. Yüncü E, Küçükakdağ Doğu A, Kaptan D, Kılıç MS, Mazzucato C, Güler MN, et al. Female lineages and changing kinship patterns in Neolithic Çatalhöyük. *Science* **2025**, *388*, eadr2915. doi:10.1126/science.adr2915.
74. Žegarac A, Jovanović J, Blagojević T, de Becdelièvre C, Stefanović S. Unveiling the narrative behind the neonate burials at Lepenski Vir in present-day Serbia. *J. Archaeol. Sci.* **2025**, *178*, 106214. doi:10.1016/j.jas.2025.106214.
75. Žegarac A, Winkelbach L, Blöcher J, Diekmann Y, Krečković Gavrilović M, Porčić M, et al. Ancient genomes provide insights into family structure and the heredity of social status in the early Bronze Age of southeastern Europe. *Sci. Rep.* **2021**, *11*, 10072. doi:10.1038/s41598-021-89090-x.
76. Lévi-Strauss C. *The Elementary Structures of Kinship*; (Originally published as *Les Structures élémentaires de la Parenté*, 1949); Bell JH, von Sturmer JR, Needham R, Translators; Beacon Press: Boston, MA, USA, 1969.
77. Knipper C, Mittnik A, Massy K, Kociumaka C, Kucukkalipci I, Maus M, et al. Female exogamy and gene pool diversification at the transition from the Final Neolithic to the Early Bronze Age in central Europe. *Proc. Natl. Acad. Sci. USA* **2017**, *114*, 10083–10088. doi:10.1073/pnas.1706355114.
78. Rebay-Salisbury K, Berner M, Wiltschke-Schrotta K, Herrero Corral AM, Wolf M, Kanz F. More Error than Minority: Gendered Burial Practices Align with Peptide-based Sex Identification in Early Bronze Age Burials in Central Europe. *Camb. Archaeol. J.* **2025**, 35, 456–471. doi:10.1017/S095977432500006X.
79. Furtwaengler A, Rebay-Salisbury K, Neumann GU, Kanz F, Ringbauer H, Bianco RA, et al. Tracing social mechanisms and interregional connections in Early Bronze Age Societies in Lower Austria. *bioRxiv* **2025**. doi:10.1101/2025.02.10.636471.
80. Rebay-Salisbury K, Pany-Kucera D, Spannagl-Steiner M, Kanz F, Amory C, Parson W. Tracing mother-child relations in Austrian Early Bronze Age communities through mitochondrial DNA. In *Kinship, Sex, and Biological Relatedness: The Contribution of Archaeogenetics to the Understanding of Social and Biological Relations*; Meller H, Krause J, Haak W, Risch R, Eds.; Landesmuseum für Vorgeschichte: Halle/Saale, Germany, 2023; pp. 213–226.
81. Rebay-Salisbury K, Pany-Kucera D, Spannagl-Steiner M, Kanz F, Galeta P, Teschler-Nicola M, et al. Motherhood at early Bronze Age Unterhautzenthal, Lower Austria. *Archaeol. Austriaca* **2018**, *102*, 71–134. doi:10.1553/archaeologia102s71.
82. Meyer C, Ganslmeier R, Dresely V, Alt KW. New Approaches to the Reconstruction of Kinship and Social Structure Based on Bioarchaeological Analysis of Neolithic Multiple and Collective Graves. In *Theoretical and Methodological Considerations in Central European Neolithic Archaeology*; BAR International Series 2325; Kolář J, Trampota F, Eds.; Archaeopress: Oxford, UK, 2012; pp. 11–23.
83. Carsten J. *After Kinship: New Departures in Anthropology*; Cambridge University Press: Cambridge, MA, USA, 2004.
84. Carsten J. (Ed.) *Cultures of Relatedness: New Approaches to the Study of Kinship*; Cambridge University Press: Cambridge, MA, USA, 2000.
85. Ivey Paula K. Cooperative Reproduction in Ituri Forest Hunter-Gatherers: Who Cares for Efe Infants? *Curr. Anthropol.* **2000**, *41*, 856–866. doi:10.1086/317414.
86. Murphy EM. Ten years of Childhood in the Past. *Child. Past* **2017**, *10*, 1–9. doi:10.1080/17585716.2017.1305079.
87. Le Roy M. Pratiques funéraires et recrutement: reprise d'étude des collections osseuses issues des dolmens du Languedoc oriental et sud des Cévennes à la fin du Néolithique. *L'Anthropologie* **2022**, *126*, 103099. doi:10.1016/j.anthro.2022.103099.

88. Rey L, Rottier S, Santos F, Goude G. Sex and age-related social organization in the Neolithic: A promising survey from the Paris Basin. *J. Archaeol. Sci. Rep.* **2021**, *38*, 103092. doi:10.1016/j.jasrep.2021.103092.
89. Le Roy M. Des « dents-outils »: Étude préliminaire des restes humains de la population du Néolithique final du dolmen de Gabiane 6 (Labeaume). *Ardèche Archéologie* **2018**, *35*, 12–18.
90. Jean N, Lemercier O, Durand V, Le Roy M, Gély B. Étude anthropologique du dolmen du Bronze ancien du Pala 2 à Chauzon (dép. Ardèche / F). *Archäologisches Korresp.* **2019**, *49*, 183–195.
91. Le Roy M, Polet C. Children at Work: Looking for Evidence in Past Societies. *Child. Past* **2019**, *12*, 57–66. doi:10.1080/17585716.2019.1638558.
92. Wilson RA. Why kinship is progeneratively constrained: Extending anthropology. *Synthese* **2022**, *200*, 175. doi:10.1007/s11229-022-03537-w.
93. Laland KN, Uller T, Feldman MW, Sterelny K, Müller GB, Moczek A, et al. The extended evolutionary synthesis: its structure, assumptions and predictions. *Proc. R. Soc. B Biol. Sci.* **2015**, *282*, 20151019. doi:10.1098/rspb.2015.1019.
94. Sofaer JR. *The Body as Material Culture: A Theoretical Osteoarchaeology*; Cambridge University Press: Cambridge, MA, USA, 2006.
95. Lawrence J, Stojanowski CM, Paul KS, Seidel AC, Guatelli-Steinberg D. Heterogeneous frailty and the expression of linear enamel hypoplasia in a genealogical population. *Am. J. Phys. Anthropol.* **2021**, *176*, 638–651. doi:10.1002/ajpa.24288.
96. Chaix R, Austerlitz F, Khegay T, Jacquesson S, Hammer MF, Heyer E, et al. The Genetic or Mythical Ancestry of Descent Groups: Lessons from the Y Chromosome. *Am. J. Hum. Genet.* **2004**, *75*, 1113–1116. doi:10.1086/425938.
97. Alard B, Guyon L, Laurent R, Phoeung CL, Bourdier F, Pavard S, et al. Social kinship without genetic legacy in horticulturalists. *In preparation*.
98. Evrard O. *Chroniques Des Cendres: Anthropologie Des Sociétés Kmou ET Dynamiques Interethniques du Nord-Laos*; IRD Éditions: Paris, France, 2006.
99. Chaix R, Quintana-Murci L, Hegay T, Hammer MF, Mobasher Z, Austerlitz F, et al. From Social to Genetic Structures in Central Asia. *Curr. Biol.* **2007**, *17*, 43–48. doi:10.1016/j.cub.2006.10.058.
100. Marchi N, Hegay T, Mennecier P, Georges M, Laurent R, Whitten M, et al. Sex-specific genetic diversity is shaped by cultural factors in Inner Asian human populations. *Am. J. Phys. Anthropol.* **2017**, *162*, 627–640. doi:10.1002/ajpa.23151.
101. Karmin M, Saag L, Vicente M, Sayres MAW, Järve M, Talas UG, et al. A recent bottleneck of Y chromosome diversity coincides with a global change in culture. *Genome Res.* **2015**, *25*, 459–466. doi:10.1101/gr.186684.114.
102. Guyon L, Guez J, Toupance B, Heyer E, Chaix R. Patrilineal segmentary systems provide a peaceful explanation for the post-Neolithic Y-chromosome bottleneck. *Nat. Commun.* **2024**, *15*, 3243. doi:10.1038/s41467-024-47618-5.
103. Cveček S. Fostering interdisciplinary dialogues. *Archaeol. Dialogues* **2023**, *30*, 132–136. doi:10.1017/S1380203824000096.
104. Meller H, Krause J, Haak W, Risch R. (Eds.) *Kinship, Sex, and Biological Relatedness: The Contribution of Archaeogenetics to the Understanding of Social and Biological Relations*; Landesmuseum für Vorgeschichte: Halle/Saale, Germany, 2023.