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RESEARCH ARTICLE

Making kin

The archaeology and genetics of human relationships

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Abstract • Thanks to next generation sequencing (NGS), we can now access ancient biological relationships, including ancestry and parentage, with a startling level of clarity. This has led to recentring of kinship within archaeological discourse. In this paper, we argue that blood and biology are key elements of kin-making only in so far as they are contextualized and made sense of through social relations. We argue that the conceptions of kinship that underpin archaeogenetic studies are the product of a particular historical and political context. Archaeology, with its focus on the material remains of the past, provides opportunities to examine how other forms of material and technological intervention (including ritual, exchange, and the sharing of food) facilitated the creation of kinship links not solely rooted in the human body. Here, we consider the extent to which the social salience of biological relationships identified through ancient DNA analysis can be addressed without imposing contemporary forms of familial structure and gender ideology onto the past.

Herstellung von Verwandtschaft. Die Archäologie und Genetik menschlicher Beziehungen

Zusammenfassung • Dank Next Generation Sequencing (NGS – Sequenzierung der nächsten Generation) haben wir jetzt erstaunlich klaren Zugang zu alten biologischen Beziehungen, einschließlich Abstammung und Elternschaft. Verwandtschaft ist dadurch wieder in den Mittelpunkt des archäologischen Diskurses gerückt. In diesem Aufsatz argumentieren wir, dass Blut und Biologie nur insofern Schlüsselemente der Verwandtschaftsherstellung sind, als sie durch soziale Beziehungen kontextualisiert und mit Sinn gefüllt werden. Wir argumentieren, dass die Vorstellungen von Verwandtschaft, die archäogenetischen Studien zugrunde liegen, das Produkt eines bestimmten historischen und politischen Kontextes sind. Die Archäologie mit ihrem Fokus auf die materiellen Überreste der Vergangenheit bietet die Möglichkeit zu untersuchen, wie andere Formen der materiellen und technologischen Intervention (einschließlich Rituale, Austausch und das Teilen von Nahrung)

die Herstellung von Verwandtschaftsbeziehungen ermöglicht haben, die nicht nur im menschlichen Körper verwurzelt waren. Wir betrachten hier, inwieweit die soziale Bedeutung biologischer Beziehungen, die durch Analysen alter DNA identifiziert wurden, adressiert werden kann, ohne der Vergangenheit heutige Formen der Familienstruktur und Geschlechterideologie aufzupressen.

Keywords • archaeogenetics, kinship, biogenetic determinism, relations, identity

Introduction

Kin-making is a key part of how humans structure their relations with each other, with their wider community and with the non-human world. Kin relations are constituted by shared values and shared experience, as well as by shared cultural or biological lineage. Yet some of the most prominent narratives of kinship in the present moment concern themselves only, or largely, with biological relatedness as discoverable by DNA testing, as critiqued by, among others, TallBear (2013). Archaeological collaboration with geneticists has led to an explosion of new and more refined methods for studying ancient DNA (aDNA) and, thanks to the methodological refinements of next generation sequencing (NGS), we are now able to ask specific questions about genetic ancestry in our studies of the past. Biomolecular data have also begun to be applied to the reconstruction of past kinship organization and social structure through marriage and mobility patterns extrapolated from aDNA research, requiring a new attention to kinship studies by archaeologists so that the biological data can be put in dialogue with more complex, social models or approaches (Brück 2021 with comments).

At this crucial moment for our discipline, when archaeogenetic studies are being heralded as offering extraordinary insights into past communities, it is imperative that archaeologists attend to the work of colleagues elsewhere in the social sciences (TallBear 2018) in order to retain a critical stance on the assumptions that so often underpin interpretations of archaeogenetic data. Here, we present the models of kinship afforded

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by archaeogenetic research and compare these to social conceptions of kinship developed by anthropologists and Indigenous scholars in order to develop a more complex approach to making kin in the past that encompasses a range of archaeological data.

Genetics, biology and relatedness

Archaeogenetic research has been part of the discipline in one form or another for several decades (Hofreiter et al. 2001; Willerslev and Cooper 2005) but the ability to reliably and rapidly sequence the whole genome of archaeological modern humans is a more recent development, and one which has allowed aDNA to have a major impact on our understanding of past people and their world. Thanks to NGS, we now have access to an ever-increasing wealth of high definition genetic data for thousands of prehistoric individuals, offering us unprecedented information about the biology, pathology, and lineage of ancient people (Skoglund and Mathieson 2018). Using sophisticated modelling it is now possible, on the one hand, to define the genetic characteristics of whole populations past and present, and on the other, to speak with extraordinary detail about the lives and relationships of individual people. Here, we divide this research into lineage somewhat arbitrarily into two general groups: 1) research into vertical patterns of relatedness, that is between ancient and modern populations in order to study, for example, hominin evolution or the population structure of Eurasia, and 2) horizontal patterns of relatedness, that is between populations or individuals in the past.

Schiffles et al. (2016) provide us one example of vertical research. They set out to investigate the impact of Iron Age, Roman and early medieval mobility, including migrations, on the genetic structure of the current British population by comparing ten archaeological whole-genome sequences with 30 modern British and over 500 modern European ones. They then ap-

By contrast, Knipper and colleagues (2017) and Mittnik and colleagues (2019) offer two well-developed articles examining the horizontal relatedness among individuals in a series of approximately 4000-year-old cemeteries in southern Germany. Through a mixture of genomic and isotopic methods combined with fine-grained archaeological data, they are able to reconstruct biological family trees, link these with spatial patterns in cemeteries and specific grave goods, and combine them with mobility data suggesting some members of the cemetery community – typically female-bodied – were born elsewhere. They use this to argue for a social structure predicated on female exogamy and patrilocality. These two papers are part of an emerging trend (Reich 2019; Sjögren et al. 2020) of archaeologists and geneticists arguing that biomolecular data offer special insight into past social practices, including kinship and mobility, at least in part through these patterns of relatedness revealed by NGS.

Both vertical and horizontal studies of relatedness, being based in genetic data, necessarily equate kinship and lineage with biological relatedness, with blood relations forming the building blocks of their social and population models.

Relations and relatedness

Social scientists (especially anthropologists) have long grappled with the tension between biology and society when seeking to understand kinship. Since the 1980s, biologized models of relations have been critiqued for their eurocentrism and for reifying a false opposition between nature and culture (MacCormack and Strathern 1980; Schneider 1984).

Subsequent research has expanded our understanding of kinship beyond biological relatedness to include affiliative and adoptive relationships as well as relations with other-than-human kin (Sahlins 2013). In many cultural contexts, kinship is not conferred by birth but is a product of social practices such as

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plied statistical modeling to determine the shared lineage between these different samples and found that early medieval ancestry makes up less than 40% of the genetic profile of the modern British population with notable regional variation. At the time, this study presented novel methods applied to whole genomes. That said, drawing connections between past and present populations through mitochondrial DNA (mtDNA) transmitted maternally and y-haplogroup lineages transmitted paternally is an established area of research, applied by the public in various ways, both laudable (Abel and Schroeder 2020) and dangerous (Hakenbeck 2019).

co-residence or the sharing of food (Carsten 2004); kin, in other words, are made. Feminist and queer approaches to kinship have decentered the heteronormative assumptions of consanguinity and descent in favor of relations of care (Weston 2013), and recent research has pushed us to consider its materiality (Goldfarb and Schuster 2016). From a standpoint in disability studies, Wolf-Meyer (2020) proposes that technology can also be kin in that we develop intimacy and mutuality with technological things as they mediate our engagement with the wider world, as with the use of a walking stick or a prosthetic. Webs of obligation encompass more than the living world.

Indeed, following the lead of First Nations and Indigenous scholars (TallBear 2018; Todd 2017; Watts 2013), kin-making is not cross-culturally generalizable, and the line we tend to draw between human and non-human substance is an artefact of our own society rather than a universal experience. Dwelling in the world creates and sustains kinship (Andrade 2014). Relations may be plants, animals, and places; and we are obliged to the non-human world, just as we are to our human kin (Kimmerer 2013, pp. 233–239).

Biological concerns, of course, remain present, as demonstrated by vibrant ongoing research around in vitro fertilization, post-humanist ‘biohacking’ and the public’s engagement with personal genetic testing (Carsten 2004; Haraway 2016). But, even here, the definition of biological kin is expanded (Franklin

pend on which genetic markers are analyzed. Moreover, studies of population genetics construct Indigeneity in a particular way. The drive to collect DNA samples from living representatives of Indigenous groups in order to understand human evolutionary history is underlined by the assumption that such groups are pristine, uncontaminated by complex historical processes of interaction with their neighbors, and that they are in danger of disappearing (Marks 2001). Thus, as TallBear (2013) argues, they are rendered relics of earlier stages of human evolution whose DNA is essential to understanding the history of humanity – here construed primarily as the history of the modern European/white subject. By representing Indigenous DNA as part of ‘modern’ humans’ inheritance, such studies promote new forms of colonialism.

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2001). Although some anthropologists reject biological definitions of kinship (Sahlins 2013), genomic data and genetic webs of relations remain part of the Euro-American definition and experience of kinship (Reardon 2017; Stallard and de Groot 2020).

The development of whole genome sequencing and the ‘new genetics’ it spawned also birthed a new and complex discourse around genetics and kinship that has only accelerated with the advent of NGS. Marks (2001), for example, delineates the racist legacy of human population genetics which influenced and shaped the long-running vertical relatedness study the Human Genome Diversity Project with its promise to tell (an unspecified) us ‘*who* and ‘*what*’ we are. Indeed, the intersection of ancestry, personal identity, and race remains a dominant concern, with more recent work investigating how, for example, contemporary people use home DNA tests to construct ancestral lineages tying them to imagined past populations (Strand and Källén 2021). TallBear (2013), while rejecting a genetic definition of Indianness as an imposition of colonialism, outlines the complex relationship between ‘gene talk’ and ‘blood talk’ for describing lineage in First Nations communities and, perhaps more importantly to her argument, making genealogies legible within the racist framework of a settler state. Indeed, Wolf-Meyer (2020) argues that genetic tests do not so much expose kin relations as invent them, by creating ties between bodies through substance. This echoes earlier work by Haraway (1997, pp. 56) who sees genes creating new intimacies between humans and between us and non-humans, since we share genes amongst us despite our difference of species.

TallBear (2013, pp. 60) describes how technical choices and technological knowledge in DNA and aDNA research shape perceived patterns of relatedness. Y-chromosome and mtDNA analyses reveal only a tiny percentage of an individual’s ancestry, for example, while the patterns of relatedness that emerge de-

Science, in other words, does not reveal hidden truths but generates, orders, and evaluates data to create a particular vision of the world. But, the critiques of Indigenous scholars, anthropologists and others have yet to be adequately addressed in the recent flood of archaeogenetic studies. The research questions at the heart of NGS analyses presuppose the existence of distinct groups – groups that are then created through the application of statistical methods. Such results bolster essentialist, biogenetic formulations of identity that do not fit people’s lived experience and that are too easily weaponized in political debates around rights, roots, and belonging.

Kinship in archaeology

Although archaeology and anthropology have been entwined for generations, archaeological data has rarely been fine-grained or abundant enough to afford insight into the kinship structures our social anthropologist colleagues have delineated. Instead, individual bodies of the dead have been a primary focus for studies of relations. For example, the identification of non-metric traits in human bone assemblages (that is, morphological features that may have been inherited) has been argued to indicate biological relatedness, as at the megalithic tomb at La Chaussée-Tirancourt in northern France (Leclerc and Masset 2006), where each chamber was interpreted as the burial-place for a different family group. Elsewhere, close spatial relationships between different individuals in the grave have been interpreted as indicating kinship among the deceased. MtDNA analysis indicated that the woman buried together with two children in a Corded Ware grave at Eulau in northern Germany was not their biological mother, but the excavators argue that she is likely to have been their stepmother (Haak et al. 2008). This example fore-

grounds possible points of disjunction between biological and social kinship and highlights the modern, Eurocentric assumptions regarding the character of the family unit that underlie such interpretations.

Archaeologists have occasionally attempted to identify more specific forms of kinship organization. It has been observed that the primary burials in British Bronze Age barrows were frequently male, while women and children were often buried in satellite positions; and it has therefore been suggested that these communities were patrilineal (Parker Pearson 1999, pp.90). However, such interpretations ignore the many barrows in which women or children were the primary burials, and essentialize a binary gender system based on archaeological methods of sexing human remains and interpreting grave goods (Frieman et al.

We ground our own work in the need to balance ideas of relation that are discoverable by genetic research with those whose form is less tangible. This applies both to what we have termed vertical and horizontal kinship. Hence, Frieman and colleagues (Frieman et al 2019) have been exploring the ways that biologized kinship discourse about past individuals has the potential to impact and shape contemporary worldviews due to the sense of connection or vertical lineage that forms part of the DNA discourse. We delineate how social models drawn from genetic data necessarily foreground heterosexually reproductive individuals, meaning genetic-led narratives of affiliation and social reproduction make central unions between two individuals of opposite binary gender, even though this conformation is far from universal in global human society past and present. In this

Social models predicated on genetic lineage inadvertently reinforce contemporary inequalities.

2019). Inferences regarding kinship structure have been made using other types of archaeological data also. Ensor (2017), for example, has employed cross-cultural analysis to identify regular associations between house size, settlement layout and kinship organization, distinguishing a variety of different descent and residence patterns among Maya and Hohokam groups.

The evidence of biogenetic relatedness offered in increasing quantity and detail since the adaptation of NGS methods for the study of ancient DNA has both challenged and enriched this patchy research history into kinship. Horizontal kinship studies in particular have been extended beyond groups of already associated human remains to explore patterns of relatedness across whole cemeteries or even regions. However, this wealth of scientific data is not matched by the equivalent development of social models, unlike elsewhere in the human sciences where whole genome data has been rapidly assimilated into a rich ongoing discourse into social structure and kinship.

Making kin

As a direct result of the ancient genetic revolution of the last decade, archaeologists are now grappling with kinship, both horizontally between ancient individuals and vertically as it connects past and present populations, with more depth, rigor and complexity than at any time in the discipline's past. We are, to some extent, playing catch up as we try concomitantly to assimilate an ever widening pool of scientific data about biological relatedness; to explore how kin were *made* through social practices such as ritual, exchange, and the sharing of food; and to push back against uncritical constructions of lineage and identity that reinforce narratives of race and ethnicity in the present (Frieman and Hofmann 2019; Furholt 2019).

way, social models predicated on genetic lineage inadvertently reinforce contemporary inequalities and render harder to parse those aspects of gender, relation, and identity that do not materialize biologically.

Brück and colleagues (Booth et al 2021) have called into question generalized models that uncritically impose contemporary gender relations onto the past by demonstrating variability in kinship structures among Chalcolithic groups in Britain – groups that have elsewhere been modelled as patrilineal and patriarchal (Sjögren et al 2020). Instead, we drew on archaeological and genetic evidence to elucidate the importance of matrilineal links and of kinship between those who were not genetically related. We argue that, even where patrilineal relations were foregrounded, this did not mean that women lacked social and political power. We noted, for example, that no genetic links could be discerned amongst the small group of near-contemporary burials from Windmill Fields, Ingleby Barwick, North Yorkshire; here, kinship may have been based not on biological links but on co-residence or other shared social practice. On Amesbury Down in Wiltshire, paternal links were sometimes emphasized (for example, in the neighboring graves of two adult men, identified genetically as father and son). Yet, evidence for the reopening of the nearby grave of an adult woman in order to retrieve some of her bones, possibly for curation, suggests that she may have been viewed as a venerated ancestor.

Indeed, archaeology is particularly well positioned to consider how kin relations are generated through social practice and are not solely located in the human body. Johnston (2020), for example, argues that Bronze Age hoards in Britain and Ireland gave material form to the inter-personal and inter-group exchanges central to the maintenance of kin relations, a task he describes as *kinwork*. He also addresses the role of non-human kin, exploring how Bronze Age kin relations were rooted

in places invested with animate and ancestral powers. These relations can be traced in material interventions in the landscape, such as the deposition of bronze objects at striking landmarks. One of us has interpreted the child-sized shale bracelets from British Bronze Age settlements, deliberately snapped into halves or quarters, as the residues of age-grade ceremonies in which fragments of socially-significant artefacts were gifted to important kin (Brück and Davies 2018). Such practices can be viewed as technologies that make kin, just as DNA testing is used to make kin in the present. Archaeology's focus on materiality, in other words, provides us with a unique perspective on kin-making that calls into question essentializing narratives, allowing us more scope to explore how kinship transcends the boundaries of the body and taking account of relations of obligation and care between humans and non-human others.

Conclusion

Although genetic models currently dominate archaeological discourse about kinship, we reject the proposition that they offer special insight into social structures or interpersonal relations. Genetic data offer one class of evidence which must be weighed alongside many others and carefully integrated into archaeological models so as not to reproduce our own unequal world in the past. The affordances of genetic research artificially limit the extent of kin modelling. Because genetic analysis defines relatedness as the outcome of sexual reproduction, it can only ever identify kin in a narrow and reductive sense that elides webs of obligation, mutuality, and interdependence. As an approach, it is inherently heteronormative and lacks tools to encompass the richness and complexity of social life. Too often, archaeogenetics offer an impoverished conception of kinship that biologizes social relations in immutable and irrevocable, natural patterns.

In contrast, as we have discussed, Indigenous scholars and feminist anthropologists exhort us to resist biological supremacy and move beyond models of kinship rooted in the heteronormative, patriarchal, and anthropocentric structures of settler sexuality (Kimmerer 2013; TallBear 2018). They consider what it means to be in relation with others and they develop a more expansive and inclusive definition of kinship as the outcome of ongoing acts of mutual care. This perspective makes space for forms of kinship that are not predicated on sexual reproduction. It allows for alternative visions of gender and sexuality, and is open to including other-than-humans as kin – a key prerequisite to imagining better ways of living in a world scarred by extractive capitalism.

The advent of rapid, increasingly affordable whole genome analysis for ancient samples has, for the first time, created an impetus for archaeologists to develop our own models of kinship that engage both with biological relatedness and with the social patterns discoverable in our other, fragmented datasets. In fact, we argue that the archaeological data can challenge and extend biologized narratives of kinship. Moreover, archaeologists, we

suggest, are particularly well-placed to contribute to wider debates about identity, kinship and biology for we reconstruct the varied social practices – for example building houses, burying the dead, or giving gifts – central to the creation of diverse forms of relations and relating in the past and the present.

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