

The Not Very Patrilocal European Neolithic

Strontium, aDNA, and Archaeological
Kinship Analyses

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Preface and Acknowledgments

Kinship is an enduring subject that addresses the entanglement of corporate groups, identities, gender dynamics, marriage, ideologies, political economies, power relations, production, exchange, and interaction. In short, it is the holistic subject of relationality both in structural practice and negotiated agency that pervades all aspects of human lives. As Peregrine put it ‘to argue as an anthropologist, that kinship is not important to understanding any given society is problematic; to suggest it is unimportant to understanding the social organization of a non-state society is ridiculous’ (2001: 44).

Elsewhere, I have attempted to correct some of the misunderstandings of kinship within archaeology (e.g., Ensor 2013a), and separately and to a lesser degree bioarchaeology (e.g., Ensor, Irish, and Keegan 2017) - illustrating how relevant the subject is to contemporary perspectives and questions, outlining methods for inference that are free of theoretical biases, and suggesting these fields can make positive contributions to broader kinship research. This book expands on those efforts by subsuming social anthropological perspectives on kinship for bioarchaeology, the rapidly emerging field of paleogenetics, and archaeology, each with its own quirks, materials, and perspectives. As described in the introduction, the book’s conception developed from an increasing awareness of the troubling ways that kinship is being envisioned and interpreted in strontium isotope and ancient DNA research on the European Neolithic leading to the widespread interpretations of patrilocality. Those problems provided an opportunity to present and apply models I had been developing to better infer ancient kinship practices from biological data and through a contemporary theoretical lense. The inclusion of archaeology was meant to provide an independent means for testing the reinterpretations of the published strontium and aDNA data. In light of one outstanding, highly critical peer review, I learned that European audiences may be less familiar with developments in archaeological kinship research elsewhere and with the nature of decades of cross-cultural research supporting those efforts. This led to an opportunity to additionally address those issues for a new audience, resulting in two entire chapters devoted to archaeology. The end result is what I hope to be a social anthropologically informed guide to inferences, if not a source of debate, for all three fields and for scholars specializing in different European regions and beyond.

The book is limited in three major ways. The first two involve access to information from Europe. Having been conceptualized and drafted during the early devastating wave of the Covid-19 pandemic in the summer of 2020, and later revised during the third or fourth waves of the pandemic in Spring 2021, it was a project almost entirely dependent on publications available online while working at home. There could be no travel to libraries and archives. This undoubtedly limited the ideas and data from Europe that I could access. Another limitation is language. I am fluent in Spanish and have a reading proficiency in other Iberian languages. However, all other European languages are beyond my reading competency and I had to rely exclusively on English publications for all studies east of Iberia. This also presumably limited the ideas and data available from across numerous languages and nations. To the authors of all the works that I assume might otherwise have contributed in some way to this book, or who might have deserved citation in it, I apologize for the omissions. Despite these two

limitations, I believe the sample of literature is sufficient enough to make the points and to provide an adequate number of cases as examples of how to infer kinship practices with the three lines of evidence.

This book is less about the European Neolithic and more about kinship analysis. The third limitation is the lack of archaeological contexts for the case studies. By that I mean I could not situate each site used for reanalysis of strontium isotopes and aDNA evidence, or even those used for archaeological kinship analysis, within a background description of the specific archaeological periods, trends, and major archaeological questions or debates about them. To do so would have significantly increased the length while simultaneously distracting from the book's focus on kinship analysis. Re-orienting understandings of corporate kin groups, marriage, and residence; introducing the interpretive models for inference using strontium isotopes; doing the same for aDNA; applying the models to reassess the published data for each of those; critiquing the supporting evidence popularly used in those fields; clarifying the nature of cross-cultural research and the studies supporting archaeological kinship; applying those archaeological methods to infer kinship practices at selected sites from Iberia to Poland and Hungary; and concluding on kinship practices across much of Neolithic Europe seemed a monumental task in itself. So I had to satisfy myself with just demonstrating the applications of the kinship analyses on each site selected. This omission leaves it up to European researchers to make use of site-specific results for new insights on local and temporal questions on their specific region of focus. They are, after all, better situated for that purpose.

This book could not have matured into its final form without the critical reviews of several scholars. I thank Grigoris Argeros for statistical consulting. Penny Bickle, Carol Ember, Marisa Ensor, Daniela Hofmann, Joel Irish, and anonymous peer reviewers provided valuable insights and comments on earlier drafts of chapters or the whole manuscript, pointed out errors, suggested additional literature to address, clarified problems in some of the data, and gave me further insight on the different audiences. I took their input seriously and made heavy revisions in light of their comments, which I believe resulted in significant improvements. I also wish to thank those at Archaeopress for turning this vision into reality. David Davison shepherded the manuscript through the publication process. Robin Orlić did excellent work on the type setting. Any remaining issues or errors are exclusively my fault.

Chapter 1

Introduction

Well-informed archaeological and bioarchaeological kinship analyses yield important new understandings of prehistoric societies, open new avenues of exploration, and make broader contributions to the subject (Ensor 2013a). This focus has guided my interdisciplinary engagements across social anthropology, archaeology, and biological anthropology for two decades. Alongside others (e.g., Ensor, Irish, and Keegan 2017; Johnson and Paul 2016; Keegan 1992, 2006, 2009, 2011, 2019; Keegan and Maclachlan 1989; Keegan, Maclachlan, and Byrne 1998; Peregrine 2001; Peregrine and Ember 2002) I am convinced that kinship is essential to understanding prehistoric societies: their political economies, social organizations, gender relations, identities, interactions, and demographic dynamics, among other topics. This pursuit involves a struggle to better familiarize archaeologists and bioarchaeologists with the subject, dispel myths about it, and allay communal anxieties over approaching the topic. I have also argued that ethnological, ethnohistorical, and linguistic interpretations of prehistoric kinship are guided by speculative evolutionary models - a necessity in the absence of data dating to prehistory - that also compel problematic methodological assumptions. To better address prehistoric kinship practices for understanding specific societies and address broader issues, ethnologically-informed approaches are necessary for archaeological and bioarchaeological analyses that are 1) appropriate for those materials and 2) independent of (not guided by) high-level theoretical models (e.g., Ensor 2002, 2003a, 2011, 2013a, 2013b, 2013c, 2016, 2017a; Ensor, Irish, and Keegan 2017).

Given this career focus, my attention is inescapably drawn to the expanding application of increasingly sophisticated technologies for producing isotopic and ancient DNA (aDNA) data used to interpret kinship in the European Neolithic. These sources provide lines of evidence that can accompany archaeological and phenotypic (morpho-metric) trait distribution analyses informing on kinship. They can independently contribute new understandings of past societies, which can also influence broader perspectives on kinship. I am continually amazed by the possibilities afforded by these techniques and how useful the data have become for delineating ancient social lives and interactions. Though applied globally, the applications on Neolithic Europe have been impressive, ground-breaking, abundant, and guiding.

This book is an intervention. Despite the growing consensus for patrilocality throughout the European Neolithic, the data used to arrive at that conclusion in most cases contradict patrilocality and in other cases are equally consistent with a number of more likely alternatives. The problem is not with the data but in their interpretation. The astounding advancements in isotopic and aDNA research have enormous potential to address ancient kinship practices but the literature on Neolithic Europe demonstrates those capabilities are not matched by an understanding of the subject to which they are being applied. I am not just referring to the avoidance of standard, traditional symbols adopted in social anthropology for females (circles) and males (triangles) for illustrations; that is merely an annoyance. The problems are far more serious. When kinship is treated as the subject of biological relations (e.g., Brandt *et al.* 2014; Gomes *et al.* 2017; Haak *et al.* 2008; Juras *et al.* 2017; Keller *et al.* 2015; Lacan *et al.* 2011a; Lee *et*

al. 2012), then researchers are misunderstanding the most basic facts about the subject. When claims are made that biological nuclear family relationships are a form of social organization or are consistent with patrilocality (e.g., Bentley 2013; Bentley *et al.* 2012; Haak *et al.* 2008; Schroeder *et al.* 2019), then clearly researchers have been misguided. When males make up a sizeable percentage of individuals with nonlocal strontium isotope ratios and patrilocality is concluded because a larger percentage are females (e.g., Bentley 2013; Bentley *et al.* 2012; Haak *et al.* 2008), then assistance is needed for improving models for interpretation. When it is implicitly assumed a priori that spouses are buried together (e.g., Bentley 2013; Bentley *et al.* 2012; Haak *et al.* 2008; Hrnčír, Vondrovský, and Květina 2020; Knipper *et al.* 2017; Le Roy *et al.* 2016; Mittnik *et al.* 2019), then those with social anthropological understandings of kin-based identities should offer assistance. When it is assumed that only patrilineal/patrilocal organization can account for female heterogeneity and male homogeneity (e.g., Goldberg *et al.* 2017; Gomes *et al.* 2017; Haak *et al.* 2008; Le Roy *et al.* 2016; Mittnik *et al.* 2019; Rivollat *et al.* 2016; Schroeder *et al.* 2019), it is time to help expand practitioners' knowledge of kinship. When associations between subsistence and kinship practices are ubiquitous (e.g., Bentley 2013; Bentley *et al.* 2012; Rasteiro and Chikhi 2013; Schroeder *et al.* 2019), then it is time to revisit the reasons those ideas were discredited half a century ago. When researchers can in all seriousness write of 'female exogamy' (e.g., Knipper *et al.* 2017; Mittnik *et al.* 2019), then we are truly in deep trouble with even the most basic concepts. When archaeological publications seriously propose one or few coeval dwellings in a cluster indicate a 'clan' (e.g., Bogaard *et al.* 2016) then it is time enlighten scholars on the basics of social organization. When researchers do not appear to realize what the patterns in their data do indicate and how much more they could address with them, it is time for assistance from a social anthropological perspective. The intention is not to dissuade from addressing kinship, and certainly not to ridicule or antagonize those who have painstakingly committed themselves to doing so. Instead, the purpose of this book is to redirect interpretations, narrow the disconnect with the subject matter, and promote a more informed perspective consistent with social anthropological knowledge. Once better equipped in this regard, isotope and aDNA investigators will be better situated to reap the extraordinary potential at their disposal for both understanding the European Neolithic and contributing useful knowledge that can address broader issues. At stake is the value of this body of research.

I am an interloper. Although having paid attention to the archaeological and bioarchaeological literature on the European Neolithic for some time, my archaeological regions of specialization are in the Americas. Although engaging with global ethnology for all of my career, I am more familiar with the Americas and Africa than Europe. My sampling of the European literature is influenced by my language capabilities and ability to access information. I am fluent in Spanish and functional in reading Portuguese and Catalan, which facilitated sampling of the Iberian research. However, accessibility of journals in those languages from afar undoubtedly influenced what was available to me. All of the literature used for Central Europe was limited to English-language publications, which presumably restricted access to a range of ideas and data published in the many national languages from France to Poland and Czechia and Hungary that may have been very useful. Though I had experience recording and analyzing dental pathologies and morphological traits, I have not collected biological anthropological data since the 1990s. I know not how to extract, prepare, sequence, authenticate, and otherwise produce the isotopic and aDNA data. I am no geneticist. In fact, this book accepts

the data presented by all publications used for reassessment without questioning their quality or the methods to produce them. What this book brings to the table - and what is palpably most needed by isotope and aDNA research on the European Neolithic - is a social anthropologically-guided understanding of the relationship between kinship and biological data: a complicated relationship that most experts on kinship can conveniently ignore but which bioarchaeologists and geneticists must valiantly embrace. It also brings overdue informed perspectives on kinship for European archaeological research.

Reorienting isotope, aDNA, and archaeological research - in Europe or anywhere else - toward consistency with social anthropological knowledge on kinship is the first task for the book. Though one reviewer thought the second chapter may be too dense for most biological anthropologists and geneticists, it is essential. It is also essential for archaeologists since much of that literature also demonstrates a limited understanding of the subject. Without the basic reorientation to the subject matter, scholars are unlikely to productively contribute interpretations on kinship. A thorough overview of the subject, its components (e.g., descent, residence, marital alliances, kin nomenclature, etc.), the historical and competing theoretical perspectives used to address it, and the various methodologies that have been developed is beyond the current scope. The orientation includes what most kinship experts should be able to agree on, despite varying theoretical perspectives. The successful reader will abandon two assumptions: that kinship equates to biological relatedness and that 'nuclear' families are the building blocks of kinship. Although the Neolithic European research mostly seeks to address residence, the overview is reoriented instead toward that which matters most: corporate groups and marriage practices. In many cases, corporate groups are not the same as residential groups but they are always the most meaningful in terms of making a living and individual-to-collective identities. In other cases, the corporate group and the residential group is one and the same. Since we cannot assume a priori the latter any more than we can assume that residential group members are buried together, the overview considers the more common strategies to form corporate kin groups and how those strategies determine what biological relations are included and excluded, what non-biological relations are included and excluded, and how those structure cemetery compositions (postmortem location). Once focused on the descent-based strategies to form corporate groups, then residence - practices to reproduce the corporate groups - has additional implications on patterns in life histories and mobilities of individuals. Marriage strategies are also discussed in relation to corporate groups as these structure the distribution of aDNA. One's genetic makeup is, after all, a biocultural phenomenon. Additionally, community patterns - the distributions of kin group members and marital alliances within and across local groups (settlements) - are reviewed since these also govern biological distributions. In some combinations of practices, there are de facto or de jure systems to follow for group membership, marriage, and residence, and beyond those are negotiated and fluid strategies. In others, many or all important relations are negotiated and/or fluid. The major sets of kinship practices emphasized include corporate exogamous matrilineal descent groups that can use avunculocal, matrilocal, uxorilocal or other residence strategies; two alternative forms of corporate exogamous patrilineal descent groups - those that do and do not transfer wives' memberships - that most commonly use patrilocal or virilocal residence strategies; and bilateral descent, which can be combined with any form of residence - in this case the basis for corporate group memberships - while negotiating individual marriage alliances and residencies to cast genealogical and affinal networks across groups near and/or far.

Once grounded in the essentials, the second chapter concludes with models to guide the interpretation of strontium isotope and aDNA data. These models are not specific to the European Neolithic and should apply globally. An example of a conventionally-applied logic-based model is that females with nonlocal strontium isotope ratios and males with only local ratios indicates patrilocality. However, that pattern is not specific to patrilocality; it could even occur with matrilineal descent groups. This book provides more logic-based models that more fully consider the common sets of kinship practices. The varied ways that descent and descent groups structure cemetery compositions and how residence influences mobility can produce four conceivable patterns in intra-cemetery strontium isotope ratios. For example, male local and female nonlocal ratios - the conventional model for patrilocality - is actually generated by three very different sets of practices: matrilineal descent groups combined with avunculocality, patrilineal descent groups whereby wives' memberships are transferred to their husbands' groups, and bilateral descent combined with patrilocality. A second intra-cemetery pattern can be generated by matrilineal descent groups or patrilineal descent groups without wives' membership transfers (regardless of residence for each), and potentially any set of practices that emphasize marital alliances among localized groups. Another intra-cemetery pattern can only be produced when combining bilateral descent with matrilocality. Yet another pattern is produced exclusively through bilateral descent and bilocality. Depending on the kinds of aDNA data generated there may be as many as five distinguishable patterns. One is exclusively associated with matrilineal descent groups. One is exclusively generated by bilateral descent and matrilocality. A third would result from patrilineal descent groups. One is exclusively a product of bilateral descent combined with bilocality. Another pattern could be generated by bilateral descent combined with patrilocality and also by patrilineal descent groups that transfer wives' memberships. Both mitochondrial and Y-chromosome haplogroup and haplotype data are required to distinguish all five patterns, and autosomal data can assist in



Figure 1.1. Locations of Neolithic European sites discussed in text.

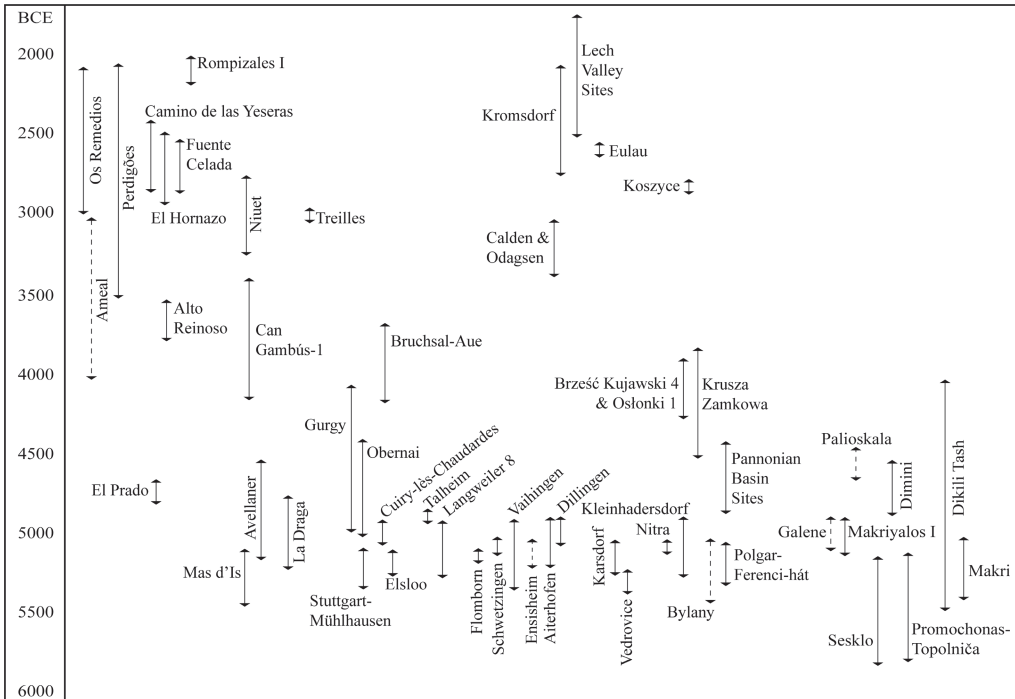


Figure 1.2. Chronological distribution of sites discussed in text.

their recognition. With only mitochondrial (mt) haplogroups, however, fewer patterns could be distinguished, thus increasing the number of equally plausible alternatives that can be interpreted. Ideally, the interpretations from both strontium and aDNA data can be combined to narrow down the number of plausible alternatives.

Chapters 3, 4, and 7 re-analyze previously published data from numerous sites from Portugal to Poland and Hungary, added to which are summaries of Souvatzis's (2017) archaeological analyses of Greek Neolithic sites. The sites span multiple archaeological macro- and microregions - cultural regions defined by the geographic distribution of material culture (e.g., pottery and architecture styles, among other traits). They also span multiple dated periods - defined by changes to material culture within each region. Some sites date to the Early Neolithic, some date to the Late Neolithic, and others to local transitional periods or as late as the Early Chalcolithic or Early Bronze Age. The Middle, Early, and Late Neolithic differ in chronology by region, as does the Early, Middle, Late, and post-Linearbandkeramik. Figures 1.1 and 1.2 illustrate the locations and chronological distribution of sites referenced in the book. To maintain focus on the development and application of kinship analyses using strontium, aDNA, and archaeology the book does not provide much overview of the archaeological regions, periods, or culture designations, which are described abundantly elsewhere (e.g., Bickle and Whittle 2013; Fowler, Harding, and Hofmann 2015).

Using the four strontium isotope models, Chapter 3 reassesses data from 14 cemeteries and settlements and two sets of neighboring settlements from Spain to Hungary spanning the Early to Late Neolithic (figures 1.1 and 1.2). Using those authors' reported data, ratios are

analyzed in three ways: by comparing the percentages of adult females and males with local ratios, near-local ratios, and nonlocal ratios; comparing the percentages of adult females and males with nonlocal ratios; and by sex-pooled comparisons of local, near-local, and nonlocal ratios. Most results do not conform with practices that include patrilocality, though some results can be generated by multiple alternatives, which may include patrilocality among them. Different considerations need to be made for three mass burials of massacre victims (Eulau, Talheim, and Koszyce) since their compositions may not be guided by descent group memberships, but rather, who was together at the time they were killed (residence). Whereas two of those mass burials definitely do not conform with patrilocality, one might alongside two different but equally plausible interpretations. In general, this reassessment through social anthropologically-informed models does not support the assumption of widespread patrilocality and/or patrilineal descent. Put another way, the more common patterns in the published data could not be generated by patrilocality. If there was a norm across Europe from the Early to Late Neolithic, it was a flexible and fluid strategy using bilateral descent and bilocality.

Chapter 4 reassesses the aDNA evidence from published sources in light of the five intra-cemetery models presented in Chapter 2. It examines data from 12 cemeteries and settlements and one set of neighboring settlements (for which I present four inter-cemetery models) in addition to the mass burial at Koszyce (figures 1.1 and 1.2). These provide a sample from Spain to Poland and also span the Early to Late Neolithic. Some sources provide only haplogroups/subhaplogroups for mt HVS-I/HVS-II polymorphism and/or STPs as a basis for evaluation. Because unrelated individuals may share the same haplogroup, those data sets increase the number of plausible inferences. Others provide individual haplotype data (HVS-I, or STP mutation sequences) enabling individual matches that could indicate biological relationships: a) mother-child, b) siblings, c) materteral (matrilineal parallel cousins), or d) simply a genetic matriline spanning generations. These can be used to narrow down the range of plausible inferences. Still others provide Y-chromosome STR haplogroup and/or haplotype data while others include all of these in addition to autosomal, genomic runs of homozygosity (ROH), and allelic identity-by-state (IBS) analyses to interpret first and second degree relations. For some sites the samples - the numbers of sex-identified adults - are appallingly small or only haplogroups are presented. In those cases, only a range of plausible interpretations are possible. No interpretations could be provided for two sites. For other sites, on the opposite end of the spectrum, the multiple sources of aDNA data enable the identification of a specific set of kinship practices. For the sites where authors presented strontium isotope data alongside aDNA data, the reassessments from Chapter 3 are discussed in relation to the reevaluation of the aDNA patterns. As with the strontium isotope site specific patterns, the majority of the site-specific aDNA patterns does not conform with patrilocality. Nine of the sites' data either rule out any kinship practices that include patrilocality or have equally plausible alternatives. Two cases do have patterns suggesting patrilineal descent groups (of either kind) or bilateral descent and patrilocality, with the latter more likely. However, when developing individual life histories combining the aDNA and strontium isotope ratios for one of those sites, it becomes clear that bilocality is the most plausible.

Common in the European Neolithic literature using strontium isotopes and aDNA is the co-citing of one-another's supporting arguments for patrilocality. Meanwhile, most of the supporting evidence, as it turns out, are questionable claims from an ethnological standpoint

and unfortunate distractions to the exceptional quality of work the bioarchaeologists and geneticists are otherwise presenting. The purpose of Chapter 5 is to make that audience aware of these problems in the hopes that they can avoid them in the future. The identification of biological nuclear family relationships is frequently suggested to support the interpretation of patrilocality (e.g., Bentley 2013; Bentley *et al.* 2012; Haak *et al.* 2008). Yet nuclear family relationships - biological or not - are compatible with any set of kinship practices. Identifying biological nuclear family relationships on its own does not tell us much about kinship. Archaeological evidence for subsistence is another source of corroborating evidence frequently given (e.g., Bentley 2013; Bentley *et al.* 2012; Rasteiro and Chikhi 2013; Schroeder *et al.* 2019). However, there are no strong cross-cultural correlations between agriculture and patrilocality or between transhumant agri-pastoralists and patrilocality. Nor can we claim that pastoral societies and violent conflict go hand-and-hand. Rarely, but present in the literature, is the association of patrilocality with patrilineal descent (e.g., Bentley 2013). We cannot predict descent from residence. Finally, an uncomfortable discussion is provided on essentializing: the associating of language, culture, and even kinship practices with biological affinity (i.e., race theory). The assumption that biological populations are associated with kinship practices ignores all evidence that there are no such discrete populations and that kinship practices are responses to socioeconomic circumstances that vary within and among communities. Though many works avoid this when discussing the expansion of Anatolian farmer-pastoralists into Europe and their interactions with indigenous foragers, others have assumed or specifically sought cultural distinctions, or interpreted differential treatment, on the basis of biological ancestries (e.g., Le Roy 2016; Rasteiro and Chikhi 2013). Moreover, synthesis literature relying on the phylogenetic model - equating biological populations with language and kin terminology - has also been used to support interpretations (e.g., Bentley 2013). The numerous problems with these perspectives are outlined to make investigators aware of why they are objectionable.

Rather than relying on the associations critiqued in Chapter 5, this book encourages qualitative, archaeological kinship analysis as a source of independent and theory-free information on European Neolithic kinship. Chapter 6 reviews different approaches to kinship, finding most have problematic assumptions with the exception of cross-cultural research distinguishing unilineal descent groups (lineages and clans) from bilateral descent in addition to distinguishing matrilocal, patrilocal, bilocal and other residence practices. Because archaeologists commonly maintain false myths about what cross-cultural research is and does, a section is devoted to addressing those concerns. In addition to alleviating archaeologists' unease with cross-cultural research, that discussion is meant to empower them to better evaluate individual cross-cultural studies. The specific studies demonstrating very strong global correlations with material patterns are then described. Those are followed by an evaluation of the concerns and 'caveats' for archaeological uses of those studies' results. Once again, the concerns and 'caveats' are found to be based on nonvalid assumptions about the studies and their applicability for archaeological inference; the concerns are misguided. In fact, the cross-cultural research provides greater confidence in interpretations than most archaeological modes of inference. Whereas the correlations are enduring statistical observations, theoretical perspectives differ in their uses and explanations for the associations between material patterns and kinship practices so those too are described. The methods' utility for identifying intra- and inter-community variation in change in practices is described in relation to how that ability is significant to contemporary theory seeking

actors' negotiations of relationality and identity. Chapter 6 ends with some thoughts about the archaeological theoretical perspectives, institutional investments, data reporting, and kinds of prehistoric housing and settlements that facilitate archaeological kinship analysis.

Chapter 7 applies archaeological kinship analysis to infer the practices in Neolithic Europe. It begins by reviewing Souvatzi's (2017) application of the approach to Neolithic Greece, which finds that kinship varied tremendously at the outset of farming in Europe. The chapter then applies the techniques to infer kinship practices at settlements in Iberia and Central Europe. The new analyses of Iberian settlements are hampered by fewer large-scale excavations and preserved dwellings in the reports that I could access. Nevertheless, the available data suggest matrilocality was rare, a range of possible other residential strategies were common, and bilateral descent was widespread. The application to Central Europe requires adaptation of the approach to the longhouses, offering a novel kinship perspective on houses and settlements in the region. Twelve settlements from different Linearbandkeramik (LBK) and post-LBK micro-regions (from France to Hungary, Poland, and Czechia) are analyzed on a phase-by-phase basis. The analyses result in the recognition of widespread bilateral descent. Nearly all sites exhibit the cross-cultural patterns for matrilocal, bilocal, and individual natal locality practices (where only one adult child, possibly a man or a woman, remains at their natal estate) but not patrilocal groups. The range of practices within settlements, over time, and within specific residential groups attests to a bilocal social norm. Some of the sites have strontium and aDNA data addressed in chapters 3 and 4, providing the opportunity to compare those with the archaeological results. The analyses present an opportunity to reconsider a number of normative models and add a kinship dimension to interpreting some previously observed phenomena. The kinship analyses also link matrilocal groups to what others have interpreted as more developed production capacities compared to groups using other residence strategies.

Concluding the book, Chapter 8 reviews the three lines of evidence, indicates how kinship can contribute new explanations on prior observations, and provides examples for further investigation. The strontium, aDNA, and archaeological data are more productive when used in conjunction but most importantly when using more informed models for interpreting results. Though indicating bilocality with bilateral descent, the strontium evidence illustrates variation in biases - matrilocal at some settlements and avunculocal/patrilocal/virilocal at others - while that for other settlements suggest a balance among those strategies. The aDNA evidence for several sites is ambiguous but revealing when combined with strontium isotope ratios, especially when used for life history analyses rather than pooling individuals. Though less successful for Iberia, the archaeological kinship analyses do not reveal bilocal residential groups for the LBK settlements as anticipated from the biological data. Instead, a bilocal norm is indicated whereby a range of strategies were used - matrilocal groups, neolocal groups, and individual natal local groups among the most common. Matrilocality provides an explanation for prior archaeological observations that large households had more developed production capacities. The cross-cultural association of bilocality and bilateral descent with resource insecurity adds a new dimension to understanding varied group success, mobility, and conflict. Suggestions for follow-up investigations beyond the present scope are discussed. Collaboration with ethnographers and ethnologists on the implications of a bilocal norm versus bilocal residential groups would be useful. Greater attention to marital alliances for new perspectives on micro-regional artifact spheres - as an alternative to 'ethnic' boundaries -

is discussed, providing hypotheses to test using a combination of isotopic (strontium, carbon, and nitrogen), paleobotanical, and zooarchaeological analyses. Isotope and aDNA analyses could use more attention to situating the placement of burials used for biological data within the chronological sequence of kinship practices at settlements. Above all, more familiarity with social anthropological knowledge on kinship is necessary to bridge the biological and social sciences for prehistorians to productively employ their increasing capacity to address ancient kinship.