

2021-03-12

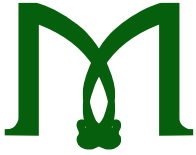
Using evolutionary theory to hypothesize a transition from patriliney to matriliney and b...

This work was made openly accessible by BU Faculty. Please [share](#) how this access benefits you. Your story matters.

| Version | Published version |
|-------------------------------|--|
| Citation (published version): | S. Mattison, C. Sum, A. Reynolds, G. Baca, T. Blumenfield, S. Niedbalski, R. Liu, M. Zhang, L. Liu, L. Wei, M. Su, H. Li, M.K. Shenk, K. Wander. 2021. "Using Evolutionary Theory to Hypothesize a Transition from Patriliney to Matriliney and Back Again among the Ethnic Mosuo of Southwest China." <i>Matrix: A Journal for Matricultural Studies</i> , Volume 2, Issue 1, pp. 90 - 117. |

<https://hdl.handle.net/2144/43650>

Boston University



Using evolutionary theory to hypothesize a transition from patriliney to matriliney and back again among the ethnic Mosuo of Southwest China

SIOBHÁN M. MATTISON^{1,2*}, CHUN-YI SUM³, ADAM Z. REYNOLDS¹, GABRIELLE D. BACA¹, TAMI BLUMENFIELD^{1,4}, SARA NIEDBALSKI¹, RUIZHE LIU¹, MENG ZHANG⁵, LIGE LIU⁶, LIN WEI⁶, MINGJIE SU⁷, HUI LI⁷, MARY K. SHENK⁸, KATHERINE WANDER⁹

Abstract

Transitions to matriliney are said to be relatively rare. This evidence is sometimes used to support arguments that perceive matriliney as a problematic and unstable system of kinship. In this article, we use an evolutionary perspective to trace changes in kinship to and from matriliney among the Mosuo of Southwest China as potentially adaptive. The Mosuo are famous for practicing a relatively rare form of female-biased kinship involving matrilineal descent and inheritance, natalocal residence, and a non-marital reproductive system ('walking marriage' or sese). Less well documented is their patrilineal subpopulation, who practice male-biased, patrilineal inheritance and descent, patrilocality, and exclusive marriage. Our analysis supports the existence of a prior transition to matriliney at least a millennium ago among Mosuo residing in the Yongning Basin, followed by a subsequent transition to patriliney among Mosuo residing in the more rugged mountainous terrain near Labai. We argue that these transitions make sense in light of economic, social, and political conditions that disfavor versus favor disproportionate investments in men, in matriliney versus patriliney, respectively. We conclude that additional evidence of such transitions would shed light on explanations of variation in kinship and that convergent approaches involving analysis of genetic, archaeological, and ethnohistorical data would provide holistic understandings of kinship and social change.

Affiliations: ¹University of New Mexico, Department of Anthropology; ²National Science Foundation, Cultural Anthropology Program; ³Boston University, College of General Studies; ⁴Yunnan University, School of Ethnology and Sociology; ⁵Fudan University, Department of Cultural Heritage and Museology and Institute of Archaeological Science; ⁶College of Humanities & Social Development, Northwest A&F University; ⁷Fudan University, MOE Key Laboratory of Contemporary Anthropology; ⁸Pennsylvania State University, Department of Anthropology; ⁹Binghamton University (SUNY), Department of Anthropology; *Corresponding author: smattison@unm.edu



© 2021 The Author(s). Published by the International Network for Training, Education, and Research on Culture. This is an Open Access article licensed under a Creative Commons license: Attribution 4.0 International (CC-BY).

On considère que les transitions vers la matrilinearité sont rares, un phénomène qui est parfois utilisé pour soutenir des arguments qui perçoivent la matrilinearité comme un système de parenté problématique et instable. Dans cet article, les auteurs utilisent une perspective évolutionniste pour retracer les changements dans les systèmes de parenté vers la matrilinearité ou la patrilinearité parmi les Mosuo du sud-ouest de la Chine, et analysent ces transitions comme étant potentiellement adaptatives. Les Mosuo sont réputés pour un système de parenté relativement rare impliquant la filiation et l'héritage matrilineaires, la résidence natolocale et un système reproducteur non matrimonial («mariage ambulante» ou sese). Moins bien documentée est leur sous-population patrilineaire, qui pratique l'héritage et la filiation patrilineaires, la résidence patrilocale et le mariage exclusif. Notre analyse soutient l'existence d'une transition préalable vers la matrilinearité, il y a au moins un millénaire chez les Mosuo résidant dans le bassin de Yongning, suivie d'une transition ultérieure vers la patrilinearité chez les Mosuo résidant dans le terrain montagneux plus accidenté près de Labai. Nous soutenons que ces transitions ont un sens en vue de certaines conditions économiques, sociales et politiques qui défavorisent ou, alternativement, investissent dans les hommes de manière disproportionnée, ce qui infléchit la société vers la patrilinearité plutôt que la matrilinearité. Nous concluons que des preuves supplémentaires de telles transitions éclaireraient les explications de la variation des systèmes de parenté et que des approches convergentes impliquant l'analyse de données génétiques, archéologiques et ethnohistoriques fourniraient une base holistique à notre compréhension de la parenté et du changement social.

Introduction

Matriliney – a system of kinship in which descent is conferred along female lines¹ (Mattison 2016; but see Fortunato 2019) – is considered rare (Mattison, Shenk, et al. 2019; Murdock and White 1969; Schneider and Gough 1961). Although outdated, the most widely promulgated statistic suggests only 17% of societies are matrilineal, with a greater preponderance of patriliney (Murdock and White

¹ The definition of matriliney varies and includes notions of genealogical descent, corporate descent, inheritance, and post-marital residence (locality). The overlap between these domains of kinship is considerable across societies, but far from perfect (e.g., Fortunato 2019; Kopytoff 1977; Surowiec et al. 2019). We distinguish between various facets of matri-kinship as much as possible in this article. Where they are grouped together, we make broader generalizations about features of ‘female-biased kinship’ (see Mattison, Quinlan et al., 2019; Mattison, Shenk, et al., 2019). This is far from perfect, as ‘no society is entirely matrilineal or patrilineal as regards descent, inheritance, succession, and authority’ (Richards, p. 207, cited in Fortunato 2019) and all individuals maintain relationships with and are supported by bilateral kin. And, indeed, there is significant variation even in descent among the Mosuo (because lineage membership is defined according to the household in which an individual is born and residence often contradicts expected patterns (Tables 1-3). Yet, regardless of actual residence, descent, and inheritance patterns, the Mosuo refer to themselves as ‘matrilineal’ versus ‘patrilineal’ based on community of residence. We retain this usage here, as it also facilitates our efforts to trace how and why these communities diverged, and recognizes across domains of kinship, these labels correctly reflect lineal biases.

1969)², though more refined analyses show that 14% may be a better figure (Fortunato 2019; Murdock and Wilson 1972). Several social and ecological features have been associated with matrilineal biases in kinship,³ including horticulture, expansive land bases, labor-limited subsistence, and frequent occurrences of fishing excursions or external warfare that remove men from households for protracted periods (Aberle 1961; Divale 1974). Sociologically, matrilineality has been associated with high rates of marital dissolution and correspondingly limited parenting by fathers (Mattison et al. 2014). These associations have been used as evidence in support of causal models explaining the conditions that are conducive to matrilineal biases in kinship as well as conditions that prompt such biases to fade or give way to other types of kinship organization (Fortunato 2012; Mattison 2011; Shenk et al. 2019). Investigations of transitions are informative for understanding the conditions that support or undermine matrilineal kinship organization, because, as changes occur within the same society, the variables that change can be isolated as causal (Shenk et al. 2019).

In this paper, we draw on ethnography and evolutionary theory to trace and explain changes in kinship norms and practices among two Mosuo 摩梭 (Na 纳) communities in Yunnan Province in southwestern China. Our arguments support the hypothesis that Mosuo people residing in the Labai mountainous region (拉伯山区) have experienced transitions from patrilineal biases in kinship organization to matrilineal and back again. While Marxism-inspired *evolutionist* models were often invoked in twentieth-century China to justify Han-Chinese supremacy over non-Han populations, this paper shows that contemporary evolutionary theory, when applied in an informed and inductive manner, can complement ethnohistorical, ethnographic, and genetic research in shedding light on how and why some cultural norms and practices persist while some change. Evolutionary theory allows us to illustrate where these transitions coincide with and depart from common evolutionary explanations of matrilineality, and where new explanations may be necessary. It also provides a valuable lens to explain why cultural characteristics associated with a matrilineal past persist within the broader context of patrilineality in Labai.

Matrilineality in Evolutionist Literature and Contemporary Evolutionary Theory

Anthropology has a lengthy history of problematizing matrilineality: early in the history of anthropology, kinship systems were characterized as stages along a unilinear continuum of civilization, with matrilineal kinship considered a primitive stage en route to more civilized patrilineal, patriarchal societies (Bachofen 1967; Morgan 1964 [1877]; Tylor 1889; see also Mattison 2010a; Shenk et al. 2019; Chao 1987). According to this perspective, dubbed *evolutionism*, all societies could be rank-ordered by social and technological complexity, which marked their evolutionary stage of development. Specifically, Morgan proposed five stages of successive development. The first

2 Some (e.g., Morgan, Bachofen) have argued that matrilineality was more common (Shenk et al. 2019) or even universal in the past (see Knight 2008).

3 'Matrilineal' refers strictly to descent and inheritance, but overlaps strongly with other female-biased forms of kinship, including matrilocality (Surowiec et al., 2019). These correlations may refer to different components of matrilineal systems (e.g., warfare to locality and horticulture to inheritance). See Fortunato 2019 for considerations of how non-overlapping domains of kinship affect inferences regarding biases in kin investments.

'primitive' state was characterized by promiscuous and unregulated sex (including among brothers and sisters) within the human 'horde'; this was followed by a shift toward consanguineous groups that produced families; then, descent groups formed around matrilineal principles; and, eventually, there was a shift toward patriline, patrilocality, and the monogamian family (Morgan 1964 [1877]). The evolutionist view, which became influential in contemporary China after becoming a core doctrine of the Chinese Communist Party, envisions matriliney as sociologically and evolutionarily primitive⁴ and culturally inferior to patriliney, explaining features of otherwise civilized societies associated with matriliney as survivals of a previous transition through a matrilineal state (Chao 1987).

The evolutionist position lacks scientific validity and has been widely criticized for numerous reasons (Knight 2008), including obvious ethnocentric biases in describing societal advancement and a fallacious understanding and application of modern evolutionary theory to describing societal evolution (c.f., Currie and Mace 2011). Indeed, Boas, while initially convinced of the evolutionary primacy of matriliney, eventually sought examples of transitions to matriliney as counterexamples that would 'discredit Morgan' (Boas 1890; cited in Shenk et al. 2019). Not much later, European structural-functionalists discarded the notion of universal stages of kinship, positing instead variation in kinship around universal elementary forms (Lévi-Strauss 1969) and/or principles (Radcliffe-Brown 1924). Additional criticisms targeted overly simplistic typologies of evolutionism (e.g., Lowie 1919, 1920) and the inconsistencies between the evolutionist framework and ethnographic observations (Kopytoff 1977; Leach 1961; Malinowski 1927).

Contemporary (neo-Darwinian) evolutionary theory departs significantly from unilineal evolutionary theory in its attempts to understand variation in human kinship (Mattison 2011; Shenk and Mattison 2011). Notably, contemporary evolutionary theory typically does not begin with the premise that matrilineal kinship organization is problematic (Mattison, Shenk, et al. 2019), instead focusing on how historical and contemporary variation in numerous female-biased kinship institutions sheds light on factors that establish women as central to the functions of human families and/or limit certain roles of men (Mattison, Shenk, et al. 2019). Although its theoretical framework differs, evolutionary anthropology has taken up the mantle of prior cross-cultural and structural-functional investigations of matriliney to depict the patterns, causes, and consequences of matrilineal kinship with specific attention to *variation* in the ways that matriliney and related institutions are expressed.

Secondly, in contrast to *evolutionism*, which sought to find *universal* patterns in kinship, contemporary evolutionary theory anticipates a wide range of *variation* in kinship norms, institutions, and behaviors as these take shape in remarkably diverse social and ecological environments (Mattison and Sear 2016; Shenk and Mattison 2011). Thirdly, this wide range of variation precludes unilineal evolutionary processes as drivers of change – a beetle is as evolved as a human since both continue to reproduce

⁴ An evolutionarily ancestral or primitive (cf., derived) trait is one that is inherited via a common ancestor and has undergone relatively limited change. There is no value judgment attached to this term and no expectation of sequential evolution to more advanced traits. Sociologically primitive traits are traits that reflect a poor fit to the contemporary environment; the fact that such traits persist suggests to adherents of this view that more advanced traits should have evolved or will evolve to take its place. We are not adherents of this view.

successfully in their respective environments. Likewise, patriliney is no more evolved than matriliney. Rather, within the constraints of their personal circumstances and the societies within which they are embedded, individuals adjust behaviors in relation to local socio-ecologies so as to effectively acquire resources and secure the health and well-being of themselves and their children.

Contemporary evolutionary explanations⁵ of matriliney center on two widely known correlates of matrilineal kinship: low paternity certainty and means of subsistence that limit advantages of male authority. Low paternity certainty has been described as one of the 'oldest hypotheses in social science' (Alexander 1974) and is not uniquely evolutionary (see, e.g., Chao 1987). In its simplest form, this hypothesis suggests that anything that lowers a man's certainty over his parentage – e.g., high likelihood of cuckoldry, prolonged absences, etc. – will disincentivize investments in his wife's or partner's children, as any such investments would result in returns to the biological father rather than to the man making such costly investments. At some point (the paternity threshold), a man's paternity becomes so insecure that it makes more sense for him to limit investments in parenting (Mattison, Quinlan, et al. 2019) or invest in his sister's children, and matriliney results (e.g., Alexander 1974; Greene 1978). Variations on the simplest version of this hypothesis note that its assumptions are restrictive and that relaxing those creates a broader range of circumstances under which matrilineal kinship organization may be evolutionary stable. For example, if returns to investment are non-linear, if polyandrous marriage frees men from needing to invest in their own children, and if the effects of non-overlapping parentage are considered, matrilineal biases in investment can evolve even under much higher levels of paternity certainty and with different consequences for genetic relatedness between fathers and the targets of their investments (see Fortunato 2012; Rogers 2012)⁶.

The second class of explanations focuses on the different ways in which men versus women may benefit from different means of subsistence. In general, men are thought to capitalize on resources differently than do women – men are able to use resources to increase their number of children to a degree that is not feasible for women (e.g., by securing additional wives, leading to large numbers of children). Women also benefit from access to and control over resources in similar ways (Reynolds et al. 2020; Scelza 2013), but often to a lesser extent than men, especially with respect to fertility (Trivers and Willard 1973; but see Borgerhoff Mulder 2004; Brown et al. 2009). Thus, subsistence systems such as horticulture that do not provide disproportionate advantages to men are thought conducive to matriliney, especially if these are also associated with low paternity certainty (Cronk 1989; Flinn 1989; Fortunato 2012; Holden et al. 2003; Mattison, Shenk, et al. 2019).⁷

5 Evolutionary theory is built based on assumptions that individuals attempt to maximize reproductive success/optimize fertility based on individual constraints and the environments in which they are situated. Tests of evolutionary theory that involve direct metrics of RS are helpful, but not required, to evaluate evolutionary hypotheses.

6 Marital systems that produce low confidence in paternity are associated with matriliney and consistent with evolutionary arguments. Polyandry, including walking marriage as practiced among some Mosuo (see below) would likely lower paternity certainty and might also decrease the relative benefit to men of investing in their biological children, if those children are already receiving investments from the mother's other lovers.

7 This is a very brief sketch of these explanations. Fuller descriptions and consideration of less common explanations are provided in Mattison et al., 2019.

Note that these explanations are not meant solely to explain variation in kinship at the group level, but also extend to individual decision-making. Thus, populations that rely on horticulture as a primary means of subsistence are, on average, more likely to be matrilineal; individuals whose own circumstances limit the perceived value of patriliney or investment in sons are expected to bias investments toward matrilineal kin (Cronk 1989; Mattison 2011; Quinlan and Flinn 2005). These hypotheses are inconsistent with universalist perspectives such as unilinear evolutionism and certain strands of sociobiology (see Mace 2014). The explanations are, however, consistent with non-evolutionary perspectives that characterize matriliney as a system of limited male control over resources (e.g., Alesina et al. 2013; BenYishay et al. 2017) and cross-cultural and structural-functional arguments that focus on how social support is affected by differences in kinship and access to resources (e.g., Divale 1974; Douglas and Kaberry 2013; Ember and Ember 1971; Murdock 1949). At the same time, there have been very few empirical tests of these explanations and even fewer documented cases of transitions to and from matriliney that would help to elucidate its causes and consequences (Shenk et al. 2019). This is especially glaring in light of the biases affecting the ethnographic record and likely over-generalizations based on biased examples (Kopytoff 1977; Murdock 1949; Shenk et al. 2019)⁸.

In this article, we take up these issues via an analysis of divergent kinship norms, institutions, and practices among the Mosuo of southwest China, a society with two distinct sub-populations that are separated geographically, but share ethnic identity, language, religious traditions, and other cultural ideals while exhibiting strong divergences in kinship norms and institutions.⁹ We explore the history and contemporary expressions of these divergences using qualitative and quantitative data collected in 2017 and 2018 from nine months of participant-observation, informal interviews and conversations with over two dozen individuals, and a demographic survey conducted with 505 households in Mosuo villages in Yunnan. Our discussion begins by describing the ethnography of these two kinship systems, which helps to identify the extent to which transitions are associated with divergence in practices. Next, we draw on ethnohistorical literature and genetic studies to suggest possible directions of change in kinship modalities and explanations, both evolutionary and ethnographic, for these transitions. As we describe in the conclusion, this case study provides scant evidence of relatively

⁸ This also extends to specific domains of kinship or, more accurately, specific biases in investments. For example, transmission of information, inheritance, and access to household resources may be differentially biased toward certain kin with the same changes in these causal factors. This is beyond the scope of this paper, but interested readers should refer to Fortunato (2019).

⁹ We have been working with the Mosuo since 2001 (TB), 2006 (SMM) and 2017 (CYS), collecting both quantitative and qualitative data through mixed methods including participant observation, interviewing, and formal questionnaires. The data described here were collected in 2017 and 2018 from matrilineal and patrilineal villages in Yunnan Province. In each village, we collected socio-demographic data, along with health measures based on anthropometric measurements or biomarkers recovered from dried blood spots. We spoke to one or more individuals in each household selected by convenience sampling, walking door to door in an attempt to cover as many households as possible in a given village. Our final sample, in the matrilineal and patrilineal communities, respectively, included: 300 and 205 households and 1902 and 1062 individuals (socio-demographic data); 582 and 390 individuals (anthropometry); 207 and 178 individuals (biomarkers). We collected additional information about migration history during the summer of 2019.

recent transitions to matriliney. The more recent reversion in one subpopulation of the Mosuo to patriliney underscores flexibility in kinship institutions and the vast adaptability of human cultures.

One Ethnic Group, Two Kinship Systems

Although every culture exhibits flexibility in kinship (Harrell 1997; Stone 2014), among contemporary societies, the Mosuo are distinct as a single culture with two geographically separate subpopulations with different kinship systems – one predominately patrilineal and one predominately matrilineal. We begin by examining the broad differences in kinship institutions between the well-known matrilineal subpopulation and the lesser-known patrilineal subpopulation. These differences in kinship norms and institutions allow us to investigate what we believe are two transitions to matriliney and to patriliney arising in the same culture over around a millennium.

The Mosuo 摩梭 (aka Na 纳, Naze 纳日, Yongning Naxi 永宁纳西) (Harrell 2001; McKhann 1995) are a population of roughly 40,000 individuals living at upwards of 1700 meters' elevation on the border of Yunnan and Sichuan Provinces (Walsh 2004). The matrilineal Mosuo, occasionally characterized as 'China's last matriarchal society' (see Mattison 2010b)¹⁰, are well known to ethnographers for practicing a relatively rare form of female-biased kinship involving matrilineal descent and inheritance, natalocal residence, and a non-marital reproductive system known as *sese* ('walking marriage' or *zouhun* 走婚). In this system, a man visits his partner in the evening, sometimes secretly, returning to his maternal house in the morning, and leaves most care and authority over any resultant children to their mother's brother (Walsh 2004). Less well known is a smaller subpopulation of Mosuo residing amidst steeper mountainous terrain in Labai 拉伯, about a day's journey from the main basin area (Yongning 永宁) that acts as the nexus of matrilineal Mosuo activity.¹¹ The Labai subpopulation is predominantly patrilineal and patrilocal; they currently practice exclusive marriage as the normative form of reproductive union (Shih 2010, p. 126).

In this article, we focus on patrilineal Mosuo residing in Labai, a region covering 475 km² of a long strip of steep mountainous terrain, stretching from the margin of Yongning basin in the east to the Jinsha River 金沙 (also known as the Moxie River 磨些 in imperial China) to the west.¹² According to a report provided by a local governmental representative in 2018, seventy-nine percent of the region is covered with dense woods and vegetation. The average altitude of the region is 2290 meters, with a

10 The Mosuo are not strictly 'matriarchal' in that the maternal uncle is symbolically as important as the maternal grandmother (but see Mattison, Quinlan, et al. 2019). They are also not the only Chinese society to practice matriliney now or in the past. Some contemporary Pumi (Prmi) communities living nearby engage in similar matrilineal practices (see Harrell 2001), and the Tibetan Zhaba also practice matriliney and visiting marriage (Chen 2018); many other Tibeto-Burman speaking populations engage in relatively unrestricted romantic practices without being matrilineal; and, as described below, the extent to which contemporary populations retain matrilineal traits is debated.

11 This region is sometimes referred to as Labo, including by Shih (2010), but *Labai* is closer to the Nuru language pronunciation. Mathieu (2003) refers to the region as Labei. The three terms are synonymous.

12 There are also patrilineal Mosuo residing in Sichuan (see Harrell 2001). We have not engaged in research in those communities so limit our discussion to the patrilineal communities in Yunnan Province included in our surveys.

maximum elevation 4300 meters. Because of the mountainous landscape, population is sparse in the region as compared to the Yongning Basin (Blumenfield et al. 2018). Arable land per capita is 2.67 mu (0.44 acres). The area has historically been relatively inaccessible (Harrell 2001; Mattison 2010b). Though access improved recently following road construction in the 2010s, the area remains relatively remote, with roads often impassible due to landslides (Blumenfield et al. 2018). There is no market in Labai, and residents often rely on travelers to Yongning to acquire foodstuff and household items. According to the government report, the population of Labai was 10,574 in 2015, among whom 4199 identified as Mosuo. The region has long been ethnically heterogenous and today is also home to Han, Pumi, Naxi, Lisu, Miao, Zhuang, and Zang (Tibetan) populations, all of whom identify as patrilineal.

Mosuo people in Labai and Yongning today share ethnic identity and language (albeit spoken with different regional accents and with minor variations in vocabulary). Religious practices overlap in both regions: cultural myths and ritualistic knowledge are imparted by religious specialists known as *daba* 达巴. Tibetan Buddhism is also common, especially in matrilineal areas. Rites of passage and many other cultural practices also largely overlap in the two subpopulations; they share a common food culture and style of dress that distinguishes them from neighboring ethnic groups.

Despite these similarities, Labai and Yongning Mosuo express notable differences in cultural norms and practices surrounding kinship. Whereas the Yongning Mosuo are predominantly matrilineal, Labai Mosuo are predominantly patrilineal. This is true both in stated norms and largely in practice: 51% of the households we surveyed in Yongning (versus 10.7% in Labai) were structured matrilineally, while 51.2% in Labai (versus 15.7% in Yongning) assumed a patrilineal structure (Table 1). Whereas among the Yongning Mosuo, all resident lineal descendants communally inherit household property, among the Labai Mosuo, sons are the primary inheritors of family property, and daughters move out of their natal home (Table 2) (and often village; Table 3) to reside with their husbands after marriage.

Inheritance in matrilineal Mosuo communities occurs via the maternal line: all co-resident members of a household—normally including only women’s children—are equal inheritors of household (*yidu*) property. However, because men’s children typically reside with their mothers, this leads to *de facto* inheritance from a set of sisters to their daughters (see Mattison 2011). Studies diverge on particulars of inheritance mode in Labai, but there is a greater degree of inequality built in as only sons, and often only one son, inherit the house and its land. Some report primogeniture, where eldest sons inherit (Mathieu 2003, p. 247; Mattison 2010b), whereas others suggest relatively equal division of family property among male descendants, and occasional inclusion of female descendants (Zhou 1988, pp. 437–8). Others suggest that ultimogeniture (youngest son inheriting) prevails: “The youngest sons usually enjoy priorities in situations of inheritance; they are given the family house and land and equipment that are of better quality and sometimes quantity” (Zhan 1998, p. 356).

Our recent ethnographic observation corroborates a stated preference for ultimogeniture. Several of our informants touted the benefits of ultimogeniture for securing livelihoods of youngest-borns; the youngest son often inherits the family house, where he continues to live with his parents, while his elder brothers move out to establish their new households elsewhere. This arrangement, these

informants explained, ensures that both the youngest brother and the aging parents are well-taken care of. Cultivating the family's existing farmland is believed to be easier than moving somewhere else to start over. Normative rules aside, informants acknowledge that inheritance decisions are made based on a range of factors beyond gender and birth order, such as the household's wealth, as well as the individual's ability and marital status. Whatever the historical norm, it appears at this point that inheritance is variable (Tables 4 and 5).

Romantic pairing among the matrilineal Mosuo in Yongning has historically centered around *sese*, described above, although a small proportion of matrilineal Mosuo have also engaged in marriage, historically and continuing until today (see C.-K. Shih 2001). Patrilocal marriage in Labai usually involves the transfer of brideprice and banquets hosted by the groom's family (Zhou 1988, p. 427), demonstrating the importance of the bride and her family (Lamu 2008; Mathieu 2003). According to Mathieu, marriage rituals in Labai also recognize that a house's gods are connected to the women in the household (2003, p. 241). Whereas Yongning Mosuo households are large, intergenerational households, with up to 16 members (Mattison 2010a), most Labai residents live in smaller households, in which married couples co-reside with their children and sometimes the husband's parents and their unmarried children. Scholarly accounts report a cultural preference for cross-cousin marriage, even though young people have considerable freedom to choose their spouses (Mathieu 2003, p. 237; Shih 2010, p. 201).¹³ We saw a few cases of cross-cousin marriage in Labai during our field research in 2018. Our informants described these marriages as arrangements that reinforce existing kin relationships (*qin shang jia qin* 亲上加亲). Very few of our Labai respondents identified their relationships as walking marriage (Table 6), although we heard about furtive relationships and children born out of wedlock in a few instances; premarital dating is normal in both regions but is no longer referred to as *sese* in Labai (Mathieu 2003; Shih 2010, pp. 122-126).¹⁴ Mosuo men and women can choose their partners freely, but men are expected to marry a lover who becomes pregnant (Mathieu 2003, p. 251).

Differences in gender norms are consistent with female versus male biases in kinship systems. Women are central to the organization of the matrilineal household whereas men have assumed positions of importance in patrilineal households, if less hierarchically than in other Chinese patrilineal populations. For example, the place of honor (on the left-hand side closest to the hearth, which sits in

13 Shih cites research published in 1988 by Zhan Chengxu, estimating that about half of marriages in the Jiase region of Labai in 1963 were reciprocal cross-cousin marriages (Zhan 1988: 357, cited in Shih 2010: 117). Shih writes, "The norm was that the sister's eldest daughter was obliged to marry the brother's eldest son, if she was wanted." (2010: 117)

14 Historically, *sese* was apparently a common practice in Labai. Shih provides an eight-generation genealogy that includes both marriage and *sese* relationships (2010, pp. 123-126). The eldest ancestor in Generation I had only *sese* relationships, her sons in Generation II both married, and the daughter of one son, Generation III, had *sese* relationships. Her son married, and his children (Generation V) both had *sese* relationships. The descendants of one of these children, in Generation VI, had *sese* relationships followed by marriage. One of these descendants was a son born in 1916 who married at age 30, then had nine children. Everyone in Generations VII and VIII captured in the genealogy married, with the exception of the youngest individuals. Flexibility in the system, characterized by alternating *sese* and marriage from one generation to the next, is reported to have ended around the same time that the political system changed to Communist Party control.

the middle of the *remi* (*zumu wu* 祖母屋, grandmother room) in the matrilineal Mosuo house—the cornerstone of the household where family members eat, relax, cook, and sometimes sleep—is given to the oldest woman in the house (Weng 1993). In Labai, the hearth is usually positioned in the corner, and the place of honor can be assumed by either parent. Household heads can be male or female in both matrilineal and patrilineal communities, but a far greater fraction of household heads is female in the former: 62.2% of the households we surveyed in Yongning reported having female heads of household, while only 24.4% of the surveyed households in Labai did (Table 4).

Taken together, kinship institutions and norms display differences—some significant and some subtle—in matrilineal Yongning and patrilineal Labai. There are clear divergences in the standard domains of kinship that have undoubtedly resulted in different access to and control over resources and social support for women versus men in each context. At the same time, the majority of comparative work on the correlates and effects of patriliney versus matriliney compare the matrilineal Mosuo to the neighboring Yi (Gong et al. 2014; Gong and Yang 2012) or Han (Liu and Zuo 2019; Zhang et al. 2018), whose traditions of patriliney are both longer established and far more male-biased than those of the patrilineal Mosuo (Lamu 2008; Mathieu 2003). These more subtle differences between the patrilineal and matrilineal Mosuo may be the result of a relatively recent transition to patriliney in Labai compared to much lengthier histories of patriliney (and indeed, patriarchy) among neighboring ethnic groups.

Historical Origins of Mosuo Matriliney: Ethnohistorical evidence and evolutionary interpretations

How did these differences in kinship norms and institutions arise within a single ethnic group? Did the Mosuo begin as matrilineal, patrilineal, or something else? What were the circumstances under which these transitions took place? What can reconstructing these transitions among the Mosuo reveal about kinship transitions more generally? Because matrilineal Mosuo kinship is thought by many to be unusual, the origins of its institutions have been extensively documented and investigated. Based on associated evidence and existing analyses (discussed below), we infer a lengthy duration of habitation in the Yongning Basin and in the adjacent Muli 木里 region of Sichuan that involved a transition to matriliney that predated or coincided with this move to the Basin area. Although evidence is more limited regarding the differentiation of the patrilineal Mosuo, signs point to a more recent move to the Labai region and a coincident adoption of patriliney. The factors that have been associated with these transitions are consistent with aspects of evolutionary theory, but also suggest novel hypotheses that warrant future attention.

Adoption of matriliney in Yongning following ethnic divergence

The origins of the matriliney in populations now known as (matrilineal) Mosuo have been studied from various vantage points. Some accounts suggest that Qiangic 羌 nomadic herders from the northwest migrated south to escape the rule of China's Qin Dynasty (221–206 BC) and became ancestral to today's Mosuo, Pumi, and Naxi peoples in Lijiang, Yongning, and vicinity (e.g., Lamu 2008; Lu et al. 2012; Ma 2014; McKhann 1998). These people were long ago described as 'know[ing] their mothers but not their fathers' (see, e.g., Zhong and Xiao 2008, cited in Lu et al., 2012). While historical records

of antiquity are incomplete, it is possible that some ethnic enclaves were matrilineal during centuries of intertribal warfare until the region came under the control of the Tang (618–907) and Nanzhao (738–937) Dynasties.

Genetic evidence points toward an origin of matriliney, however, not linked to a common matrilineal ancestor but as a distinct practice adopted in the Yongning basin *after* inhabitants there became separated from a common ancestral population shared with neighboring ethnic groups. In a recent analysis, Lu et al. (2012) test the hypothesis that, should matrilineal Mosuo today have practiced matriliney for thousands of years, there should be less diversity in their population's mitochondrial DNA (mtDNA) when compared with surrounding patrilineal populations. mtDNA is inherited solely via one's mother, so if women remain in their natal communities, as they often do among the matrilineal Mosuo today, diversity in mtDNA should be lower than if women from many lineages migrate into communities as is common in neighboring patrilineal and patrilocal populations. Their analysis reveals genetic clustering among Mosuo, Pumi, and Naxi, implying similarities in their genomes and recent ancestry, with a significantly closer relationship between the Mosuo and the Pumi. This implies a common ancestral population in the same region, as expected. Because Lu et al. (2012) find that the Mosuo cluster primarily with other groups who are patrilineal and patrilocal, it is more parsimonious¹⁵ to infer that the Mosuo became matrilineal following ethnic divergence from a shared patrilineal and patrilocal ancestor than that all other closely related groups became patrilineal and patrilocal from a shared matrilineal ancestor.

Whereas the genetic evidence does not provide firm timing for a transition to matriliney, ethnohistorical accounts infer a lengthy history of matriliney, originating in the region around Yongning during the Tang (618–907) and Song (960–1279) dynasties. This inference is based in part on when specific historical references are made to the Mosuo. Although the 'Mo-so' have been recorded as living elsewhere in Yunnan and southwest Sichuan, the term reappears in the regional historical record during the Tang Dynasty (Mathieu 2003, p. 370).¹⁶ There is also evidence showing that the ruling elites in Yongning, the Mou, 'succeeded each other through their matriline' by this time (Mathieu 2003, p. 88). The Tang–Song era also spans the period when the historical *Nü Guo* 女国 (women's kingdom), north of present-day Muli, was reported to have arrived in the Lijiang and Yongning areas. Records date this to some time during the tenth century, supporting the existence of matrilineal practices in some ethnic enclaves in the region (Mathieu 2003, pp. 407–409).

The reasons for the Mosuo adoption of matriliney are unclear; however, at least one common explanation is broadly consistent with evolutionary hypotheses. This is the hypothesis that the 'frequent mercantile travels of [Mosuo] men resulted in ... matrilocality' (Liu 2008, cited in Lu et al. 2012). Even prior to the Tang period, peoples of northwest Yunnan were engaged in long-distance trade, silver mining from mountains, and gold extraction from rivers—activities that fed the local feudal economy (Mathieu 2003, p. 35; Shih 2010). These economic activities drew men away from

¹⁵ In biology, 'parsimonious' refers to the simplest explanation of the results.

¹⁶ An earlier, similar term, "Mo-sha", disappeared after an unsuccessful revolt by that group in 225 A.D., and it is not clear that Mo-sha people are the same as the later "Mo-so" (Mathieu 2003, p. 370).

their homes, making it necessary for women to manage domestic finances and activities (Wang and Luo 1991). Sociologically, female centrality would have been a very likely consequence of protracted male absences (see also Chao 1987). Male absences would also have lowered men's paternity certainty and their interests in taking on the role of fathers (Mattison 2011; Mattison, Quinlan, et al. 2019).¹⁷

Still, others have noted that lengthy male absences were not unique to the Mosuo, who have been dealing with the same historical, ecological, and economic contingencies as their neighbors (Lamu 1992, cited in Mathieu 2003, p. 22). We speculate that the Mosuo's relative (certainly not complete) isolation in the expansive Yongning Basin until the early twentieth century (Shih 2001) created additional conditions that favored the initial development and later persistence of matrilineal institutions. Here, evolutionary theory fills gaps in the historical record to illuminate why matriliney might have developed: expansive land and labor-limited agriculture are often conducive to matriliney (Fortunato 2012), and the terrain of the Yongning Basin seems to fit this description compared to the more rugged terrain occupied by the patrilineal Mosuo.

Other interesting explanations of Mosuo matrilineal institutions are less clearly consistent with evolutionary theory as currently conceptualized. For example, Zhao (1987) argues that Mosuo matriliney is the product of changes in family and gender roles that came about as Lamaism required that a quarter of the Mosuo population remain celibate. Wei-Yang Chao (1987) suggests that lamas had to work around restrictions that made it permissible for lamas to be genitors and sexual partners, but not fathers or formal husbands. Mosuo matriliney and the visiting marriage system would be creative solutions to this problem. However, we view this as a somewhat unlikely explanation: we do not see similar institutions among other Tibetan and Mongolian groups who also practice the Yellow Sect of Lamaism (Shih 2001). It may be more likely that these religious practices have been easy to reconcile with pre-existing matrilineal practices of the Yongning Mosuo. Mathieu (2003) ties matriliney to two events: the migration of matrilineal tribes from the Nü Guo during the tenth century, and the feudal reforms that arose during the Ming Dynasty (1368-1644) when official recognition of Mosuo chieftains by Ming officials began. According to Mathieu's reconstruction, implementing a non-marital reproductive system in Yongning contributed to the transition of Yongning society from a tribal caste system to a three-tiered feudal domain. The non-marital system, which she suggests would have limited caste-based alliances that could be strengthened through marriages, would have solidified the power of the chieftain and been 'advantageous to Yongning feudal rule' (Mathieu 2003, p. 399). Although this may suggest a somewhat more recent transition to matriliney than the above material, political pressure is undoubtedly part of the landscape affecting adaptations in kinship, whenever the transition took place.

¹⁷ Polyandrous marriage could result in additional benefits to men of diverting their investments toward sororal nieces and nephews (Fortunato 2012). However, as argued elsewhere, we have limited direct evidence for significant male investment in sororal nieces and nephews.

From matriliney to patriliney in the Labai mountainous region

If the Mosuo originally adopted matrilineal institutions after cleaving from a patrilineal ancestral population, then today's Labai Mosuo either represent an older continuation of ancestral customs – evolutionarily the most parsimonious explanation based on phylogenetic analysis – or have readopted patriliney following migration away from the matrilineal populations in Yongning and Muli. This history is much more difficult to reconstruct, given more limited attention to the patrilineal Mosuo subpopulation. However, the ethnohistorical evidence strongly suggests that the patrilineal Mosuo cleaved off from the Yongning Basin and from Muli at some point in the not-too-distant past. Examining available evidence of this cleavage through an evolutionary lens, we suggest possible reasons why today's patrilineal Mosuo might have readopted patriliney and associated institutions: as adaptations to an arduous terrain with relatively circumscribed land, need for consistent male labor inputs, and cultural assimilation to a more consistent presence of other ethnic groups with patrilineal customs.

Although evidence is relatively thin, some ethnologists and fieldworkers suggest that some Mosuo migrated from Yongning to Labai relatively recently. Chuan-Kang Shih's examination of Labai reveals 'no verifiable record indicating when and why the Mos[u]o first migrated to the mountainous area' (2010, p. 115), yet implies strongly that the patrilineal Mosuo migrated from the Yongning Basin and gradually came to adopt patrilineal norms and institutions following settlement in outlying regions. Relaying a conversation with a Labai Mosuo person, Shih reports that, at an unspecified time in the past, Yongning residents moved to Labai in search of gold in the Jinsha River (Shih 2010, p. 115), a phenomenon that was further corroborated by one of our informants. Another ethnological study conducted in 1963 suggests that initial migrants from Yongning moved at an undetermined time with their livestock to the Labai mountains to graze (Zhou 1988, p. 414). Other studies suggest that the Mosuo may have moved relatively recently from Yongning, merely 'ten-odd generations ago' (*shiduo dai yiqian* 十多代以前, about 250 years ago) (Lamu 2008, p. 115). These accounts point to Labai Mosuo hailing ultimately from a matrilineal, Yongning origin, though there is no clear evidence as to when the initial migration took place. Another clue comes from the rituals conducted by the *daba*, which send recently deceased ancestors back toward *Sipiannawa* according to prescribed routes. Both *daba* and adult family members are aware of which route should be taken; these routes are said to mirror original migration routes (Lamu Gatusa, personal communication, September 2020).

Ethnographic insights are consistent with evolutionary explanations in explaining adoption of recent patrilineal customs based on ecological and social differences between the patrilineal and matrilineal regions, but also offer new hypotheses that could be explored by evolutionary and non-evolutionary scholars (see also Fortunato 2012). Indigenous scholar and Labai native Lamu Gatusa points to economic considerations surrounding the value of land versus labor, which resonate with evolutionary and economic arguments (e.g., Ji et al. 2014; Kolodny et al. 2019; Mattison, Quinlan, et al. 2019). He explained that the smaller plots of farmland in Labai do not require as much labor to cultivate and maintain as the expansive lands in the Yongning basin. The practical agricultural motivation to keep siblings together in one big matrilineal family is therefore not valid in Labai's ecological context (Lamu

2008, p. 115). One of our informants, a man in his forties, suggested that some Mosuo moved from Yongning to Labai because of population pressure, especially during the twentieth century. He explained that even though there is surplus of land in the Yongning basin, the relatively high altitude (over 2,600 meters) in Yongning results in limited productivity of only one harvest per year. A warmer climate and plentiful rain in Labai can produce as many as three harvests a year, he said. He explained, “One *mu* of land in Labai produces as much as 5–6 *mu* in Yongning.” Terrain in Labai is not suitable for rice cultivation, but the climate there is indeed more conducive to growing vegetables, fruits, and other crops (cf. Blumenfeld et al. 2018, pp. 264–5). This suggests that the need for *consistent* labor within a terrain that is relatively saturated (as opposed to easily expanded) may result in patriliney if households require defense and men are needed to participate in household labor.¹⁸

Under many conditions, men will prefer to invest intensely in their children and their households if a high degree of paternity certainty exists (Flinn 1989; Hrdy 2000; Mattison, Quinlan, et al. 2019; but see Fortunato 2012; Rogers 2013). This makes one widely-invoked explanation surrounding the relative difficulty of engaging in walking marriage in mountainous terrain especially interesting. This explanation centers on the difficulties associated with ‘walk[ing] back and forth’ (*sese*) between houses at night among small villages that are sparsely located and amidst very difficult, steep terrain. After taking a strenuous hike to a Labai village that lasted from dawn to after dark, Shih writes, “I am firmly convinced that the rugged terrain is a decisive factor, if not the only one, that has limited the practice of *tisese* and led to wide practice of marriage among the Moso in the mountainous area” (Shih 2010, p. 131). Our Mosuo informants from Yongning similarly found it difficult to fathom how people could commute among different Labai villages on a regular basis. If a Labai man started hiking from his natal village in the evening, our informants speculated, ‘dawn would have broken (*tian dou liang le* 天都亮了) by the time he reached his destination!’ This is, of course, an exaggeration, but *sese* is indeed more impractical in Labai than in the Yongning Basin. The flatter landscape in Yongning permitted villages to grow much larger and to locate relatively close to one another, allowing men to travel between hamlets and villages without undue difficulty.

Cultural factors also matter when it comes to the readoption of patriliney. Christine Mathieu (2003) documents extensive efforts on the part of ruling elites, including Mou and Ah chiefs, to downplay their matrilineal succession and emphasize their patrilineal links. Under the influence of the Confucian scholar Yang Shen, the sixteenth century chief Mu Gong re-wrote his genealogy. The Ah chiefs were eager to downplay their Mongol connections, but their pre-Mongol successions were matrilineal, and matrilineality was not a legitimate line of succession in Chinese terms. The chiefs of the frontier were not necessarily subject to Confucian rules, but the Lijiang chiefs were eager to align themselves with imperial powers.¹⁹ The perception of matriliney as culturally inferior might have facilitated the development of institutionalized marriage in the Labai mountains. Even today, some Labai Mosuo we talked to continue to call walking marriage a ‘messy’ (*luan* 乱) practice, implying an association

18 One informant explained, “There is no one at home [to help with housework and farm work],” and, “My husband’s brothers have all left [for marriage or for work elsewhere]; it is pitiful for him to be alone all by himself.”

19 Early in the Qing Dynasty, patrilineal succession became a required element of native chieftain rule (Shih 2010, p. 106; cf. Shih 2001).

between polygynandry and illegitimate relationships, relationships that would, in any case, reinforce matrilineal investments by men in children (Fortunato 2012). Increasingly conscious of external perceptions in a predominately patrilineal country, the pursuit of status beyond the Mosuo community may also have contributed to the abandonment of matrilineal structures.

Communist marriage reforms in the 1950s through the 70s may also have contributed to adoption of marital practices thought to increase paternity certainty.²⁰ During this period, the Communist Party deployed 'one-husband, one-wife' campaigns in Yongning villages, encouraging and eventually requiring community members to abandon *sese* in favor of marriage (Chou 2009; Shih 2010). An informant described his paternal grandfather's migration to the Labai region from Yongning in the 1920s–1930s. The grandfather initially practiced walking marriage and had several wives across different Labai villages, before eventually settling down with our informant's grandmother. Our informant believed that walking marriage in Labai gradually ceased during his grandfather's generation in part because it was cast as an uncivilized practice by the Communist State.

Whereas the marriage campaigns ran against customs in Yongning, they likely reinforced marriage among the Mosuo of Labai. Patriliney and associated customs were likely reinforced further in Labai by significant and longstanding ethnic heterogeneity in the region located along the trade route to Tibet, Burma, and India (Lamu 2008, p. 115; see also Zhan et al. 1980, pp. 195–6). Labai Mosuo often found themselves living in small hamlets or villages near the patrilineal Naxi or other patrilineal groups. *Sese* only functions well when both members of a couple are part of larger families that expect to house them throughout their lives. If a Mosuo woman became romantically involved with a Naxi man, to satisfy his own cultural expectations, the man would expect to marry. A Mosuo man enamored of a Naxi woman would also need to establish a new household if their relationship were to last and meet with family approval, unless his family lacked female siblings. Thus, partnerships with members of other groups usually precluded *sese* relationships, while facilitating acculturating to and embracing patrilineal practices.

Patrilineal Practice, Matrilineal Culture?

While the historical evidence of Mosuo origins and relatedness to other ethnic groups are topics of active debate, the contention that Mosuo people became patrilineal upon their migration from the matrilineal regions of Yongning and Muli to mountainous Labai has been less scrutinized. Given the apparent recency of the transition to patriliney, what, if any, features of matriliney remain? Limited scholarship and our own observations suggest that Labai Mosuo indeed share certain features of matrilineal kinship that predominate in Yongning. Lamu Gatusa (2008, p. 114) describes Labai as a society 'in transition' (*guodu* 过渡) [from matriliney]. Specifically, he explains, "Labai is not, strictly speaking, matrilineal households and *zouhun*, nor is it a strict one-husband, one-wife system; rather, it's in a transitional state." (Lamu 2008, p. 114) He goes on to argue that the Labai Mosuo, while

²⁰ The Marriage Campaigns have had only partial sustained influence on marriage patterns in the matrilineal Mosuo, even though marriage is also institutionalized among the matrilineal Mosuo as an alternative to *sese* (Mattison 2010a).

characterized by patrilocal marriage and patrilineal inheritance and descent, have retained certain features of matriculture. The emphasis on recent matriliney in emic perspective is important to consider as it speaks to the apparent recency of kinship transition in the Mosuo.

Contemporary evolutionary theory allows us to forego the assumption of progressive transformations and instead focus on shared ancestry in explaining the ethnographic phenomenon that we too found in our research. Our observations were similar to those of Lamu Gatusa in that we similarly saw cultural characteristics that might be more conventionally associated with matrilineal cultures: premarital sexual norms in Labai resemble walking marriage (see also Harrell 2002), women enjoy relatively high status, and the mother's brother - though not co-resident - continues to assume important symbolic and ceremonial significance in patrilineal households (Lamu 2008, pp. 114-18; c.f. Radcliffe-Brown 1924; Starkweather and Keith 2019).²¹ Indeed, many of our informants confessed that they did not think much about differences between the two subpopulations. Instead, our informants were occasionally at pains to reinforce shared identity despite differences in kinship norms and institutions. In at least two instances, seemingly frustrated by the interviewer's persistence in asking about the historical trajectories of migration, our informants—one from Yongning and one from Labai—ended the conversation by reaffirming their shared Mosuoness: “We all are Mosuo. We are all the same [people] (“*doushi mosuo, doushi yiyang de*” 都是摩梭, 都是一样的).

As indicated above, Lamu Gatusa has observed that Labai Mosuo ‘retain matriarchal ideology and display emerging features of patriarchy’ (Lamu 2008, p. 114). While we hesitate to characterize patriliney as ‘emerging’, during our fieldwork, we observed features that were consistent with a better situation for Labai women than in many patrilineal populations in China. The level of gender egalitarianism was high, both in terms of respect for women and gendered division of labor, when we conducted fieldwork in patrilineal Labai in the 2000-2010s. Cultural norms that tend to be associated with patrilineality, including the devaluation of women's status and women's isolation from their natal kin, do not seem to have taken root in Labai. Just as Christine Mathieu had seen in the 1990s, we observed that either parent could be honored at the family's hearth (Mathieu 2003, p. 236). Several women we talked to were responsible for family finances. And, during our fieldwork, a young man in one of the villages where we stayed began a relationship with a woman in a neighboring village, occasionally disappearing at night to visit her, and returning home by dawn. These visits, not so unlike the walking marriages still common in Yongning, were not subject to disapproval so long as they took place before the couple officially married, and were not extramarital relationships (see also Lamu 2008, p. 115).

We also learned of nominally patrilocal marriages that do not conform to expectations of such. For example, a young woman moved back to her natal home with her infant son, explaining that she preferred to stay with her parents (rather than her in-laws) while her husband was working in another region for an extended period. We did not find any stigmatization against the few divorced or

21 Mathieu also points out that kinship terms among Labai Mosuo also reflect a matrilineal ethos: terms for paternal ancestors only go up through father's father (FF), while terms for maternal ancestors exist for two additional generations (MMMM) (Mathieu 2003, pp. 403-404).

widowed women we knew, who moved back to their natal homes with their children and lived in the absence of husbands. And, as Lamu Gatusa points out, there is little stigma against siblings living in the same household (2008, p. 118), which is consistent with prevailing matrilineal norms. Both oral testimonies and household arrangements show that conjugal bonds and patrilocal residence do not discount the important natal bonds with parents and among siblings.

In this sense, we find it pertinent to use what Marie-Francoise Guédon defines as ‘matriculture’ to characterize patrilineal Mosuo in Labai: to properly understand their social and cultural dynamics requires scholars to forego latent assumptions of patriliney and patriarchy as normative and to read matriliney ‘as an entirely different, less hierarchical system in which women play a central role while upholding the importance and value of all members of the society, including men’ (Guédon 2020, p. 5). Indeed, from Mosuo creation myths in which female protagonists are glorified to the architectural setup of the Mosuo household today, evidence abounds that patrilineal Mosuo embrace a ‘feminine worldview’ in which ‘women embody not only the divine but also all that is civilized’ (Mathieu 2003, p. 402). We conclude based on this evidence that, in spite of their predominantly patrilineal norms and institutions, Mosuo people from Labai share with their Yongning counterparts relatively strong respect for women and deep commitment to their siblings and their children. Matriculture is thus apparent even within a system otherwise dubbed patrilineal.

Conclusions, Limitations, and Future Directions

In this article, we examine extant scholarship and ethnographic evidence to trace and explain how Mosuo kinship has adapted to various social, ecological, and political circumstances over time. Our data suggest that the Mosuo developed matrilineal descent and related institutions in deep historical time, following divergence from an ancestral ethnic population that was patrilineal, patrilocal, and engaged in marriage as the primary reproductive union. Our study shows the relevance of contemporary evolutionary theory in analyzing the Mosuo case, which not only expands ethnographic knowledge about the Mosuo but also addresses larger discussions about the conditions favoring transitions to and from matrilineal kinship. Evolutionary explanations focus on how men versus women make use of available resources, both social and natural, and posit various conditions under which men’s motivations to contribute significantly to their households as fathers and husbands might be limited. Key among these are conditions that limit paternity certainty or render men peripheral to day-to-day household functioning and conditions that favor equal investments in male and female reproductive careers – or, said differently – do not disproportionately favor male agendas involving control of women and resources. We also reviewed possible explanations for the stability of matriliney using evolutionary theory, which suggest that a convergence of factors, including an expansive land base and the absence of men, likely creates conditions that enables its persistence until today. The re-adoption of patriliney in Labai is likely of much more recent origin, facilitated by conditions that limited the feasibility of walking marriage while requiring consistent inputs of male labor to make household ends meet.

The reversion to or readoption of patriliney that apparently played out in the last two hundred and fifty years following a likely older history of adoption of matriliney from patriliney speaks to two important theoretical and ethnographic points. First, while evolutionism posits a unilineal view of societal progression from matrilineal to patrilineal (Mattison 2010a; Morgan 1964 [1877]; Shenk et al. 2019), the Mosuo have apparently exhibited significant flexibility, transitioning both to and from matriliney in association with different waves of demographic expansion into new environments. While such events have only been described rarely in the ethnographic literature (Murdock 1959; Shenk et al. 2019), this circumstance is anticipated by contemporary evolutionary anthropologists (Mattison, Quinlan, et al. 2019; Shenk et al. 2019) and by ethnographic scholars of kinship criticizing the stagnant essentialism of earlier typological thinking (Sahlins 2011; Schneider 1972; Yanagisako and Collier 1987). The relative rarity of evidence of transitions to matrilineal kinship (Shenk et al. 2019; Surowiec et al. 2019) probably has more to do with the limitations and recency of the contemporary historical and ethnographic record than any inherent lack of flexibility in human kinship systems. Indeed, the Asian record has often been overlooked in reconstructions of kinship transitions (Ji et al. 2020). This case study provides additional evidence of recent transitions to matriliney in Sino-Tibetan populations, countering historical narratives described in the introduction that transitions to matriliney are rare. Typologies of kinship also overlook the significant flexibility in practices and the more subtle differences in the ways that, for example, patriliney versus matriliney, are enacted across cultures, with important implications for investment patterns and evolutionary theory (Fortunato 2019). To capture transitions more effectively will require more nuanced quantitative metrics associated with a *process* of change and more case studies illustrating the *in situ* ontology of transition.

Second, the ethnographic evidence we describe in this article for the transitions to patriliney lands on very similar explanations to those proposed by modern economic and evolutionary scholars, namely: geography and productivity (Holden et al. 2003; Mattison 2011; Mattison, Shenk et al. 2019); labor versus land limitations (Alesina et al. 2013; Mattison, Shenk, et al. 2019); and conflict and cooperation due to variation in household demography (Fortunato 2012; Ji et al. 2013, 2014; Mattison et al. 2018). That certain types of marital practices (e.g., walking marriage) associated with one type of kinship system are constrained by differences in geography (e.g. rugged terrain, long distances between villages) is a novel insight emerging from emic views of the practicalities of daily life. Future work should pay close attention to these narratives, as they can reflect highly localized means of behavioral adaptation while having major implications for family, marital, and even religious practices.

This analysis of transition is subject to various limitations of historical and ethnographic evidence, especially of the patrilineal subpopulation. Although we are relatively confident of the direction of transition *to* and *from* matriliney, respectively (see also Ji et al. 2020), the timing of divergence is uncertain and would be informative of the conditions that are associated with changing kinship institutions. We relied extensively on existing ethnohistorical analyses of these populations to build our understanding of these transitions. These accounts do not always agree; the addition of the genetic and evolutionary perspectives provide complementary evidence that may help to resolve discrepancies (Shenk and Mattison 2011), but genetic data are imperfect and scholars who are not familiar with the vagaries of self- versus other-identified ethnicities may create inappropriate

comparisons (e.g., Healy et al. 2017). Additional studies, including those analyzing different sections of the genome, and studies of archaeological differences between these populations, would aid attempts at historical reconstruction. Our evidence suggests that kinship and identity are both highly flexible and pivot around each other in ways that are not easily predictable without a better understanding of the political, economic, social, and ecological contexts shaping decision-making in both realms. The matrilineal Mosuo and patrilineal Mosuo have been, and continue to be, willing to characterize their practices in terms of absolutes (i.e., ‘we do things such and such a way’), but such characterizations change over time and are otherwise belied by variability in actual patterns of behavior and cultural emphases on flexibility when informants are pressed to explain unique kinship configurations.

Acknowledgements

We thank first and foremost our study participants for their friendship and patience of our enduring interest in their day-to-day lives. Various funders have supported the work described in this paper, including the National Science Foundation (BCS 1920812, 1927519, 1738978, 0717918), the American Philosophical Society, the University of Washington, the University of New Mexico, the Santa Fe Institute, and the University of Auckland. We are grateful to Yunnan University and Fudan University for their institutional assistance in support of our research. We thank the editors and reviewers of this special issue for review and support in developing this manuscript. This material is based upon work supported by (while serving at) the National Science Foundation. Any opinions, findings, and conclusions or recommendations expressed in this material are those of the author(s) and do not necessarily reflect the views of the National Science Foundation.

Author Biographies

Siobhán M. Mattison is an associate professor of evolutionary anthropology at the University of New Mexico and a rotating program officer in cultural and biological anthropology at the National Science Foundation. She has worked with the Mosuo for nearly fifteen years, focusing on why and how matrilineality diverges from patrilineality, as well as what consequences these divergences have for individual and population health.

Chun-Yi Sum is Lecturer of Social Sciences at Boston’s University’s College of General Studies. Her research interests include identity, family, and morality in contemporary China.

Adam Reynolds is a Ph.D. student at the University of New Mexico whose research focuses on gender disparities in health in matrilineal societies.

Gabrielle D. Baca is a recent graduate of the University of New Mexico, and serves as a researcher in the Human Family and Evolutionary Demography Lab.

Tami Blumenfeld, whose work on social transformations and heritage in China's Na (Mosuo) communities began with a Fulbright award in 2001 and has spanned two decades, is Kui Ge Scholar of

Ethnology at Yunnan University and Adjunct Assistant Professor of Ethnology at the University of New Mexico.

Sara D. Niedbalski is a population geneticist and Ph.D. candidate at the University of New Mexico whose research interests focus on the genomic consequences of population histories.

Ruizhe Liu is a PhD student in Human Family and Evolutionary Demography (HFED) lab at UNM, where she focuses on kinship and human behavior ecology (HBE). In this paper, she helps with data analysis.

Meng Zhang is a lecturer of Archaeology in the Department of Museology and Cultural Heritage at Fudan University.

Lige Liu is an associate professor in the College of Humanities & Social Development at Northwest A&F University, and her research interests include marriage and family, aging and old-age support, and rural-urban migration.

Wei Lin is a graduate student majoring in Sociology in the College of Humanities & Social Development at Northwest A & F University, and her research interests include family and rural-urban migration.

Mingjie Su is a PhD candidate in human biology at Fudan University, where he studies the impact of human behavior on health; he participated in data collection, analysis, and write-up.

Hui Li is professor of human biology and Director of the MOE Key Laboratory of Contemporary Anthropology at Fudan University.

Mary Shenk is an anthropologist and demographer with interests in marriage, family, kinship, and fertility; her research focuses on South Asia and cross-cultural comparison.

Katherine Wander is an associate professor of anthropology and director of the Laboratory for Anthropometry and Biomarkers at Binghamton University (SUNY) with expertise in minimally invasive characterization of health outcomes in population-based (or non-clinical) research.

Author Contributions: SMM, TB, MKS conceived of the study; SMM, CYS, AZR, TB, SDN, RL, MZ, LL, LW, MJS, KW participated in data collection; AZR, GDB, TB, SDN, RL participated in data analysis; SMM, TB, HL secured funding; all authors contributed to writing the manuscript.

Appendix 1: Tables of Data

Table 1. Household composition. Percentages are column-wise and represent the fraction of households in matrilineal and patrilineal areas with household composition that conforms to various lineal norms. Designations are based on household residents that include descendants of women, only (matrilineal), men, only (patrilineal), both men and women (bilateral), a woman, her partner, and her children, only (nuclear), or other.

| | Matrilineal Area (Yongning) | Patrilineal Area (Labai) |
|-------------|--------------------------------|-----------------------------|
| Matrilineal | 153 (51.0%) | 22 (10.7%) |
| Patrilineal | 47 (15.7%) | 105 (51.2%) |
| Bilateral | 37 (12.3%) | 9 (4.4%) |
| Nuclear | 60 (20.0%) | 68 (33.2%) |
| Other | 3 (1.0%) | 1 (0.5%) |

Table 2. Post-marital residence at the household level. Percentages are column-wise and represent the fraction of individuals in matrilineal and patrilineal communities following various locality norms at the household level.

| | Matrilineal Area (Yongning) | Patrilineal Area (Labai) |
|------------|--------------------------------|-----------------------------|
| Natalocal | 319 (32.8%) | 14 (2.5%) |
| Matrilocal | 161 (16.5%) | 81 (14.6%) |
| Neolocal | 271 (27.8%) | 146 (26.3%) |
| Patrilocal | 223 (22.9%) | 314 (56.6%) |

Table 3. Migration away from natal communities. Percentages are row-wise and represent the fraction of males and females migrating away from their natal communities.

| | Matrilineal Area (Yongning) | | Patrilineal Area (Labai) | |
|--------|--------------------------------|------------------------------|-----------------------------|------------------------------|
| | Left Natal Community | Remain in Natal Community | Left Natal Community | Remain in Natal Community |
| Female | 37 (40.7%) | 54 (59.3%) | 50 (59.5%) | 34 (40.5%) |
| Male | 36 (29.0%) | 88 (71.0%) | 39 (36.4%) | 68 (63.6%) |

Table 4. Household heads by gender. Percentages are column-wise and represent the fraction of households in matrilineal and patrilineal areas that are headed by males and females. The household head can serve as a proxy of inheritance, as the head has often assumed authority over inherited property or has established a new household over which they hold authority.

| | Matrilineal Area (Yongning) | Patrilineal Area (Labai) |
|--------|--|-------------------------------------|
| Female | 189 (62.2%) | 53 (24.4%) |
| Male | 115 (37.8%) | 217 (75.6%) |

Table 5. Household heads by birth order. Counts represent the number of individuals in each birth order category who are heads of household in each area. Percentages represent the fraction of individuals of a given birth order who became heads of household. The household head can serve as a proxy of inheritance, as the head has often assumed authority over inherited property or has established a new household over which they hold authority.

| | Matrilineal Area (Yongning) | Patrilineal Area (Labai) |
|--------|--|-------------------------------------|
| First | 77 (17.3%) | 53 (19.1%) |
| Only | 8 (11.4%) | 7 (24.1%) |
| Middle | 160 (27.5%) | 93 (30.6%) |
| Last | 59 (14.4%) | 64 (23.7%) |

Table 6. Type of reproductive union. Percentages are column-wise and represent the relationship status of adult individuals (age>16) in matrilineal and patrilineal areas who follow different marriage norms.

| | Matrilineal Area (Yongning) | Patrilineal Area (Labai) |
|-------------|--|-------------------------------------|
| Married | 649 (44.3%) | 614 (71.3%) |
| Never | | |
| Married | 392 (26.8%) | 245 (28.5%) |
| <i>Sese</i> | 424 (28.9%) | 2 (0.2%) |

References Cited:

- Aberle, D. (1961). Matrilineal descent in cross-cultural perspective. In David M. Schneider & K. Gough (Eds.), *Matrilineal Kinship* (pp. 655–727). Berkeley, CA: University of California Press.
- Alesina, A., Giuliano, P., & Nunn, N. (2013). On the Origins of Gender Roles: Women and the Plough. *The Quarterly Journal of Economics*, 128(2), 469–530. <https://doi.org/10.1093/qje/qjt005>
- Alexander, R. D. (1974). The evolution of social behavior. *Annual Review of Ecology and Systematics*, 5, 325–383.
- Bachofen, J. J. (1967). *Myth, religion, and mother right; selected writings of J. J. Bachofen*. Princeton, NJ.: Princeton University Press.
- BenYishay, A., Grosjean, P., & Vecchi, J. (2017). The Fish is the Friend of Matriliney: Reef Density and Matrilineal Inheritance. *Journal of Development Economics*, 127, 234–249. <https://doi.org/10.1016/j.jdeveco.2017.03.005>
- Blumenfield, T., Sum, C.-Y., Shenk, M. K., & Mattison, S. M. (2018). Poverty alleviation and mobility in southwest China: examining effects of market transition and state policies in Mosuo communities. *Urban Anthropology and Studies of Cultural Systems and World Economic Development*, 47(3), 259–299.
- Boas, F. (1890). Second general report on the Indians of British Columbia. *Sixth Report on the North-Western Tribes of Canada*, 454–463.
- Borgerhoff Mulder, M. (2004). Are men and women really so different? *Trends in Ecology & Evolution*, 19(1), 3–6. <https://doi.org/10.1016/j.tree.2003.11.002>
- Brown, G. R., Laland, K. N., & Borgerhoff Mulder, M. (2009). Bateman's principles and human sex roles. *Trends in ecology & evolution*, 24, 297–304.
- Chao, W. Y. (1987). *Evolutionary theory and cultural diversity: A study of the ethnology of China's national minorities*. University of California at Berkeley, Berkeley, CA.
- Chen, Y. (2018). *The Revival of "Visiting Marriage" --Family Change and Intergenerational Relations among Matrilineal Tibetans in Southwestern China*. Case Western Reserve University School of Graduate Studies. Retrieved from http://rave.ohiolink.edu/etdc/view?acc_num=case1544207449090513
- Chou, W.-S. (2009). *Wufu wufu de guodu? Zhongnü bu qingnan de muxie Mosuo (A society without fathers or husbands?)*. Beijing, China: Guangming Ribao Chu.
- Cronk, L. (1989). Low socioeconomic status and female-biased parental investment: The Mukogodo example. *American Anthropologist, New Series*, 91, 414–429.
- Currie, T. E., & Mace, R. (2011). Mode and tempo in the evolution of socio-political organization: reconciling 'Darwinian' and 'Spencerian' evolutionary approaches in anthropology. *Philosophical Transactions of the Royal Society B: Biological Sciences*, 366, 1108–1117.
- David M. Schneider & Kathleen Gough. (1961). *Matrilineal Kinship*. Berkeley: University of California Press.
- Divale, W. T. (1974). Migration, external warfare and matrilocality. *Behavior Science Research*, 9, 75–133.
- Douglas, M., & Kaberry, P. M. (2013). *Man in Africa*. Routledge.

- Ember, M., & Ember, C. E. (1971). The conditions favoring matrilineal versus patrilineal residence. *American Anthropologist*, 73, 571–594.
- Flinn, M. V. (1989). Household composition and female reproductive strategy in a Trinidadian village. In A. E. Rasa, C. Voegl, & E. Volland (Eds.), *The Sociobiology of Sexual and Reproductive Strategies* (pp. 206–233). London: Chapman & Hall.
- Fortunato, L. (2012). The evolution of matrilineal kinship organization. *Proceedings of the Royal Society B: Biological Sciences*, 279, 4939–4945. <https://doi.org/10.1098/rspb.2012.1926>
- Fortunato, L. (2019). Lineal kinship organization in cross-specific perspective. *Philosophical Transactions of the Royal Society B: Biological Sciences*.
- George P. Murdock & Douglas R. White. (1969). Standard Cross-Cultural Sample. *Ethnology*, 8, 329–369.
- Gong, B., Yan, H., & Yang, C.-L. (2014). Gender differences in the dictator experiment: evidence from the matrilineal Mosuo and the patriarchal Yi. *Experimental Economics*, 1–12. <https://doi.org/10.1007/s10683-014-9403-2>
- Gong, B., & Yang, C.-L. (2012). Gender differences in risk attitudes: Field experiments on the matrilineal Mosuo and the patriarchal Yi. *Journal of Economic Behavior & Organization*, 83, 59–65. <https://doi.org/10.1016/j.jebo.2011.06.010>
- Greene, P. (1978). Promiscuity, paternity, and culture. *American Ethnologist*, 5, 151–159.
- Guédon, M.-F. (2020). Introduction. *Matrix: a Journal for Matricultural Studies*, 1, 3–7.
- Harrell, S. (1997). *Human families*. Boulder, CO: Westview Press.
- Harrell, S. (2001). *Ways of Being Ethnic in Southwest China*. Seattle, WA: University of Washington Press.
- Harrell, S. (2002). Book review: A society without fathers or husbands: the Na of Southwest China. *American Anthropologist*, 104, 982–983.
- Healy, M. E., Hill, D., Berwick, M., Edgar, H., Gross, J., & Hunley, K. (2017). Social-group identity and population substructure in admixed populations in New Mexico and Latin America. *PLOS ONE*, 12(10), e0185503. <https://doi.org/10.1371/journal.pone.0185503>
- Holden, C. J., Sear, R., & Mace, R. (2003). Matriliney as daughter-biased investment. *Evolution and Human Behavior*, 24, 99–112.
- Hrdy, S. B. (2000). The Optimal Number of Fathers: Evolution, Demography, and History in the Shaping of Female Mate Preferences. *Annals of the New York Academy of Sciences*, 907(1), 75–96. <https://doi.org/10.1111/j.1749-6632.2000.tb06617.x>
- Ji, T., Wu, J.-J., He, Q.-Q., Xu, J.-J., Mace, R., & Tao, Y. (2013). Reproductive competition between females in the matrilineal Mosuo of southwestern China. *Philosophical Transactions of the Royal Society B: Biological Sciences*, 368(1631), 20130081. <https://doi.org/10.1098/rstb.2013.0081>
- Ji, T., Xu, J.-J., & Mace, R. (2014). Intergenerational and Sibling Conflict Under Patrilocality. *Human Nature*, 25(1), 66–79. <https://doi.org/10.1007/s12110-013-9188-6>
- Ji, T., Zhang, M. H., Currie, T. E., Meade, A., Pagel, M., & Mace, R. (2020). A phylogenetic study of Sino-Tibetan kinship evolution. *The evolution of language: Proceedings of the 13th International Conference*, 177.

- Knight, C. (2008). Early human kinship was matrilineal. In N. Allen, H. Callan, R. I. M. Dunbar, & W. James (Eds.), *Early Human Kinship* (pp. 61–82). Oxford: Blackwell.
- Kolodny, O., Mattison, S. M., & Creanza, N. (2019, In review). *An economic solution for the matrilineal puzzle*. Nature Communications.
- Kopytoff, I. (1977). Matrilineality, residence, and residential zones. *American Ethnologist*, 4(3), 539–558.
- Lamu, G. (2008). *Lamu Getusa Naxixue Lunji*. (G. Bai & Z. He, Eds.). Beijing, China: Minzu Chubanshe.
- Leach, E. R. (1961). Rethinking anthropology.
- Lévi-Strauss, C. (1969). *The elementary structures of kinship*. Boston: Beacon Press.
- Liu, E. M., & Zuo, S. X. (2019). Measuring the impact of interaction between children of a matrilineal and a patriarchal culture on gender differences in risk aversion. *Proceedings of the National Academy of Sciences*, 201808336. <https://doi.org/10.1073/pnas.1808336116>
- Lowie, R. H. (1919). *The matrilineal complex*. University of California Press.
- Lowie, R. H. (1920). *Primitive society*. Liveright Publishing Corporation.
- Lu, Y., Wang, C., Qin, Z., Wen, B., Farina, S. E., Jin, L., et al. (2012). Mitochondrial origin of the matrilocal Mosuo people in China. *Mitochondrial DNA*, 23, 13–19.
- Ma, J. (2014). *Nüerguo Qingyuan (Love and fate in the Daughters' Kingdom)*. Yunnan, China: Yunnan Publishing Group.
- Mace, R. (2014). Human behavioral ecology and its evil twin. *Behavioral Ecology*, 25(3), 443–449. <https://doi.org/10.1093/beheco/aru069>
- Malinowski, B. (1927). Sex and repression in primitive society. *New York: EP Dutton*.
- Mathieu, C. (1996). Lost kingdoms and forgotten tribes: Myths, mysteries and mother-right in the history of the Naxi nationality and the Mosuo people of southwest China.
- Mathieu, C. (2003). *A History and Anthropological Study of the Ancient Kingdoms of the Sino-Tibetan Borderland - Naxi and Mosuo*. Lewiston, New York: The Edwin Mellen Press.
- Mattison, S. M. (2010a). Economic impacts of tourism and erosion of the visiting system among the Mosuo of Lugu Lake. *The Asia Pacific Journal of Anthropology*, 11, 159–176. <https://doi.org/10.1080/14442211003730736>
- Mattison, S. M. (2010b). *Demystifying the Mosuo: The behavioral ecology of kinship and reproduction of China's "last matriarchal society"* (Ph.D. Dissertation). University of Washington, Seattle, WA.
- Mattison, S. M. (2011). Evolutionary contributions to solving the “matrilineal puzzle”: a test of Holden, Sear, and Mace’s model. *Human Nature*, 22, 64–88. <https://doi.org/10.1007/s12110-011-9107-7>
- Mattison, S. M. (2016). Matrilineal and matrilocal systems. In N. Naples, R. C. Hoogland, M. Wickramasinghe, & W. C. A. Wong (Eds.), *The Wiley Blackwell Encyclopedia of Gender and Sexuality Studies* (pp. 1655–1660). Hoboken, NJ: John Wiley & Sons, Ltd. <http://onlinelibrary.wiley.com.libproxy.unm.edu/doi/10.1002/9781118663219.wbegss493/abstract>. Accessed 5 May 2016
- Mattison, S. M., Moya, C., Reynolds, A., & Towner, M. C. (2018). Evolutionary demography of age at last birth: integrating approaches from human behavioural ecology and cultural evolution. *Phil. Trans. R. Soc. B*, 373(1743), 20170060. <https://doi.org/10.1098/rstb.2017.0060>

- Mattison, S. M., Quinlan, R. J., & Hare, D. (2019). The expendable male hypothesis. *Philosophical Transactions of the Royal Society B: Biological Sciences*, 374(1780), 20180080. <https://doi.org/10.1098/rstb.2018.0080>
- Mattison, S. M., Scelza, B., & Blumenfeld, T. (2014). Paternal investment and the positive effects of fathers among the matrilineal Mosuo of Southwest China. *American Anthropologist*, 116(3), 591–610.
- Mattison, S. M., & Sear, R. (2016). Modernizing evolutionary anthropology. *Human Nature*, 27(4), 1–16. <https://doi.org/10.1007/s12110-016-9270-y>
- Mattison, S. M., Shenk, M. K., Emery Thompson, M., Borgerhoff Mulder, M., & Fortunato, L. (2019). The evolution of female-biased kinship in humans and other mammals. *Philosophical Transactions of the Royal Society B: Biological Sciences*, 374(1780), 20190007. <https://doi.org/10.1098/rstb.2019.0007>
- McKhann, C. F. (1995). The Naxi and the Nationalities Question. In S. Harrell (Ed.), *Cultural Encounters on China's Ethnic Frontiers* (pp. 39–62). Seattle, WA: University of Washington Press.
- McKhann, C. F. (1998). Naxi, Rerkua, Moso, Meng. In M. Opitz & E. Hsu (Eds.), *Naxi and Mosuo Ethnography* (pp. 23–47). Zürich: Völkerkundemuseum der Universität Zürich.
- Morgan, L. H. (1964). *Ancient society*. Cambridge: Belknap Press of Harvard University Press.
- Murdock, George P. (1949). *Social Structure*. New York, NY: Macmillian Company.
- Murdock, George P., & Wilson, S. F. (1972). Settlement Patterns and Community Organization: Cross-Cultural Codes 3. *Ethnology*, 11(3), 254–295. <https://doi.org/10.2307/3773219>
- Murdock, George Peter. (1959). *Africa its peoples and their culture history*.
- Oppitz, M., & Hsu, E. (Eds.). (2001). *Naxi and Moso Ethnography: Kin, Rites, Pictographs*.
- Quinlan, R. J., & Flinn, M. V. (2005). Kinship, sex, and fitness in a Caribbean community. *Human Nature*, 16, 32–57.
- Radcliffe-Brown, A. (1924). The mother's brother in South Africa. *South African Journal of Science*, 21, 542–555.
- Reynolds, A. Z., Wander, K., Sum, C.-Y., Su, M., Emery Thompson, M., Hooper, Paul L., et al. (2020, In Revision). *Matriliny reverses gender disparities in inflammation and hypertension among the Mosuo of China*.
- Rogers, A. R. (2012). Genetic relatedness to sisters' children has been underestimated. *Proceedings of the Royal Society B: Biological Sciences*, 280, 20121937.
- Sahlins, M. D. (2011). What kinship is (part one). *Journal of the Royal Anthropological Institute*, 17(1), 2–19. <https://doi.org/10.1111/j.1467-9655.2010.01666.x>
- Santos, G., & Harrell, S. (2017). *Transforming patriarchy: Chinese families in the twenty-first century*. University of Washington Press.
- Scelza, B. A. (2013). Choosy But Not Chaste: Multiple Mating in Human Females. *Evolutionary Anthropology: Issues, News, and Reviews*, 22(5), 259–269. <https://doi.org/10.1002/evan.21373>
- Schneider, David Murray. (1972). What is kinship all about? In Reining (Ed.), *Kinship studies in the Morgan centennial year*. Washington, DC: Anthropological society of Washington.
- Shenk, M. K., Begley, R. O., Nolin, D. A., & Swiatek, A. (2019). Why does matriliney fail? Causes and frequency of matrilineal transitions estimated from a de novo coding of a cross-cultural sample. *Philosophical Transactions of the Royal Society B: Biological Sciences*.

- Shenk, M. K., & Mattison, S. M. (2011). The rebirth of kinship: evolutionary and quantitative approaches in the revitalization of a dying field. *Human Nature*, 22, 1–15. <https://doi.org/10.1007/s12110-011-9105-9>
- Shih, C. (2000). Tisese and its anthropological significance: issues around the visiting sexual system among the Moso. *L'homme*, 154–155, 697–712.
- Shih, C.-K. (2001). Genesis of Marriage among the Moso and Empire-Building in Late Imperial China. *The Journal of Asian Studies*, 60(02), 381–412. <https://doi.org/10.2307/2659698>
- Shih, C.-K. (2010). *Quest for Harmony: The Moso Traditions of Sexual Union & Family Life*. Stanford, CA: Stanford University Press.
- Starkweather, K., & Keith, M. H. (2019). One piece of the matrilineal puzzle: The socioecology of maternal uncle investment. *Philosophical Transactions of the Royal Society B: Biological Sciences*.
- Stone, L. (2014). *Kinship and gender* (5th Edition.). Boulder, CO: Westview Press.
- Surowiec, A., Snyder, K., & Creanza, N. (2019). A worldwide view of matriliney: Using genetic data to shed light on the evolution of human kinship systems. *Philosophical Transactions of the Royal Society B: Biological Sciences*.
- Trivers, R. L., & Willard, D. E. (1973). Natural selection of parental ability to vary the sex ratio of offspring. *Science*, 179, 90–92.
- Tylor, E. B. (1889). On a method of investigating the development of institutions: Applied to laws of marriage and descent. *The journal of the royal anthropological institute of Great Britain and Ireland*, 18, 245–272.
- Walsh, E. R. (2004). The Na. *Encyclopedia of Sex and Gender: Men and Women in the World's Cultures*. http://books.google.co.nz/books?id=XUAsskBg8ywC&pg=PA697&lpg=PA697&dq=eileen+walsh+na+encyclopedia+sex+gender&source=bl&ots=i0pbE_sjK2&sig=byQvT9RI5uHM_bj9E52geVn2nbM&hl=en&sa=X&ei=WwYZT57_KaWXiAfM3_j2Cw&redir_esc=y#v=onepage&q&f=false
- Wang, D., & Luo, R. (1991). Zouhun Zhi Zhi Mi [On the Enigma of the Marriage by Visit System]. *Minzu Tuanjie*.
- Weng, N. (1993). *The mother house: the symbolism and practice of gender among the Naze in Southwest China* (PhD Dissertation). University of Rochester, Rochester.
- Yanagisako, S. J., & Collier, J. F. (1987). Toward a unified analysis of gender and kinship. In *Gender and kinship: Essays toward a unified analysis* (pp. 14–50). Stanford, CA: Stanford University Press.
- Zhan, C., Wang, C., Li, J., & Liu, L. (1980). *Yongning Naxizu de azhu hunyin he muxi jiating*. Shanghai, China: Shanghai Remin Chubanshe.
- Zhang, Y., Zhao, X., Leonhart, R., Nadig, M., Wang, J., Zhao, Y., et al. (2018). A Cross-Cultural Comparison of Climacteric Symptoms, Health-Seeking Behavior, and Attitudes towards Menopause Among Mosuo Women and Han Chinese Women in Yunnan, China. *Transcultural Psychiatry*, 1363461518804094. <https://doi.org/10.1177/1363461518804094>
- Zhao, W. (1987). Yongning Naxizu Muxizhi He Azhu Hun Qiyuan Wenti Shangque [on the origins of the matrilineal system and the Azhu style of marriage of the Naxi nationality of Yongning]. *Yunnan Shehui Kexue*, 39–45.

Zhou, Y. (1988). Laboxiang Naxizu lingzhu jingji he jiating hunyin diaocha. In *Ninglang Yizu zixixian Yongning Naxizu shehui ji qi muxizhi diaocha (Investigation reports on the society and its matrilineal system of the Yongning Naxi in the Ninglang Yi Autonomous County)* (pp. 413–444). Kunming, China: Yunnan Renmin Chubanshe.